Dodd Del.

Chapman Sculp.

The Genius of Literature presenting her Pupils to Minerva?

ENCYCLOPÆDIA LONDINENSIS;

OR,

UNIVERSAL DICTIONARY

OF

ARTS, SCIENCES, AND LITERATURE.

COMPREHENDING,

UNDER ONE GENERAL ALPHABETICAL ARRANGEMENT,

ALL THE WORDS AND SUBSTANCE OF

EVERY KIND OF DICTIONARY EXTANT IN THE ENGLISH LANGUAGE.

IN WHICH THE IMPROVED DEPARTMENTS OF

THE MECHANICAL ARTS, THE LIBERAL SCIENCES, THE HIGHER MATHEMATICS, AND THE SEVERAL
BRANCHES OF POLITE LITERATURE,

ARE SELECTED FROM THE

ACTS, MEMOIRS, AND TRANSACTIONS, OF THE MOST EMINENT LITERARY SOCIETIES,
IN EUROPE, ASIA, AND AMERICA.

FORMING A COMPREHENSIVE VIEW OF THE RISE, PROGRESS, AND PRESENT STATE, OF HUMAN
LEARNING IN EVERY PART OF THE WORLD.

EMBELLISHED BY A MOST

MAGNIFICENT SET OF COPPER-PLATE ENGRAVINGS,

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AND ENRICHED

WITH PORTRAITS OF EMINENT AND LEARNED PERSONAGES, IN ALL AGES OF THE WORLD.

TOGETHER WITH

A COMPREHENSIVE SYSTEM OF HERALDRY,

FINELY ILLUMINATED, AND ENRICHED WITH THE ARMORIAL BEARINGS OF THE ROYAL FAMILY;
OF THE ENGLISH, SCOTCH, AND IRISH, NOBILITY; OF THE BARONETS OF THE UNITED KINGDOM;
AND OF NUMEROUS DISTINGUISHED FAMILIES, PATRONS OF THIS WORK.

COMPILED, DIGESTED, AND ARRANGED,

By JOHN WILKES, OF MILLAND HOUSE, IN THE COUNTY OF SUSSEX, ESQUIRE;

ASSISTED BY EMINENT SCHOLARS OF THE ENGLISH, SCOTCH, AND IRISH, UNIVERSITIES.

VOLUME I.

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Non audiendi sunt homines imperiti, qui humano ingenio majorem, vel inutilem, et rebus gerendis adversam πολυμαθειαν criminantur. Est scilicet quedam Scientiarum cognatio et conciliatio; unde et Εγκυκλοπαιδειαν vocant Græci; ut in unâ perfectus dici nequeat, qui ceteras non attigerit.—Morhofi Polyhistor, l. i. c. i. s. i.

Those inexperienced persons, who make it a charge or accusation against variety and extensive learning, that it exceeds the compass of human ability, or is useless, or that it is an impediment to transacting business, deserve no attention. For there is between the Sciences a degree of natural and close connexion; from which the Greeks use the term "Encyclopædia;" so that no one can be perfect in any one Science, who has not attained to some knowledge of the rest,

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George B.

We being willing to give all due Encouragement unto this Work, intituled, *Encyclopaedia Londinensis; or, Universal Dictionary of Arts, Sciences, and Literature*, do by these Presents grant unto the Proprietor thereof, Our Royal Licence and Authority for the sole printing, publishing, and vending the said Work; and do hereby strictly forbid all our Subjects, within our Kingdoms or Dominions, to reprint or abridge the same, either in the like, or in any size or manner whatsoever; or to import, buy, vend, utter, or distribute in these Realms any Copies thereof reprinted beyond the Seas, as they will answer for the same at their peril; whereof the Commissioners and other Officers of Our Customs, the Master, Warden, and Company of Stationers, are to take notice, that due Obedience be rendered to Our Pleasure herein declared. Given at Our Court at Saint James's, the Fourth day of May 1795, in the Thirty-fifth Year of Our Reign.

By His Majesty's Command, *Portland*

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TO
THE SUBSCRIBERS AND PATRONS
OF THE
ENCYCLOPÆDIA LONDINENSIS.

IT cannot but be a reflection most highly gratifying to every studious mind, that amidst the desolations of war, and the unparalleled proceedings of hostile powers, which have long destroyed the Peace of Europe, the Light of Science and Literature has still shone, and the cultivation of liberal Arts has still continued to diffuse its influence with success and advantage over every part of the United Kingdom. It is also a circumstance, in which the humane and ingenious find peculiar satisfaction, that those learned and eminent persons, who are Members of Literary Societies in the various belligerent Countries, have made political animosity give place to feelings of a more generous nature; and, equally as if they enjoyed profound peace, have reciprocally communicated the result of their researches, experiments, and discoveries, for the general benefit of mankind.

The nations most distinguished in modern times for their literary societies, are Great Britain and Ireland, France, Italy, Sweden, Denmark, Holland, and Germany. Yet to these alone we are not indebted. Our brethren in America, for such we shall ever consider them, and our countrymen and fellow-subjects in the Empire of Hindoostan, have respectively contributed to the general Stock of recent Information. Stimulated by the laudable example of others who have been active in the cause of intellectual Improvement, and impelled as they were by an anxious desire of diffeminating polite Literature and scientific acquirements among the rising generation, I have endeavoured to select from all quarters, however remote, the most interesting communications and discoveries; and, having combined and incorporated them with the valuable store of Learning, which has long adorned and enriched Great Britain and Ireland, I thus have provided materials which may tend to consolidate

consolidate the foundation and raise the superstructure of my laborious work, **THE ENCYCLOPÆDIA LONDINENSIS**. In the prosecution of this work, it has been my studious care so to connect and arrange the various branches of classical and mathematical knowledge, as that propriety and perspicuity should be observed; information and taste be increased; reason and judgment be strengthened. How far my endeavours have been successful, must be pronounced by the sentence of others. That my labours however have not been altogether vain, nor the arrangements and improvements totally devoid of merit, I am induced to hope from the encouragement which has been given to this work by a very considerable part of the nobility as well as by the public in general. With the deepest sentiments of gratitude and respect for their patronage and favourable opinion,

I have the honour to subscribe myself

Their most obliged, obedient, and humble, servant,

Milland House, March 13, 1810.

J. WILKES.

ENCYCLOPÆDIA LONDINENSIS;

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ARTS, SCIENCES, and LITERATURE.

A.

THE letter A is the first of the alphabet in all the known languages of the world, that of Ethiopia excepted, in which it is the thirteenth. It is placed first, on account of its simplicity, very little more being necessary to its pronunciation than barely opening the mouth. In the English it hath three different sounds, which may be termed the broad, open, and slender.

The broad sound, resembling that of the German *a*, is found in many of our monosyllables, as *all*, *wall*, *malt*, *salt*, in which *a* is pronounced as *au* in *cause*, or *aw* in *law*. Many of these words were anciently written with *au*, as *fault*, *waulk*; which happens to be still retained in *fault*. This was probably the ancient sound of the Saxons, since it is almost uniformly preserved in the rustic pronunciation, and the northern dialects, as *maun* for *man*, *haund* for *hand*.

A, open, not unlike the *a* of the Italians, is found in *father*, *rather*, and more obscurely in *fancy*, *fast*, &c.

A, slender or close, is the peculiar *a* of the English language, resembling the sound of the French *e* masculine, or diphthong *ai* in *païs*, or perhaps a middle sound between them, or between the *a* and *e*; to this the Arabic *a* is said nearly to approach. Of this sound we have examples in the words, *place*, *face*, *waste*, and all those which terminate in *ation*; as *reflation*, *nation*, *generation*.

A is short, as *glass*, *grafs*; or long, as *glaze*, *graze*: it is marked long, generally, by an *e* final, *plane*; or by an *i* added, as *plain*. The short *a* is open, the long *a* close.

A, an article set before nouns of the singular number; *a* man; *a* tree; denoting the number *one*, as, *a* man is coming, that is, *no more than one*. This article has no plural signification. Before a word beginning with a vowel, it is written *an*, as, *an* ox, *an* egg, of which *a* is the contraction.

A, taken materially, or for itself, is a noun; as, *a* great *A*, *a* little *a*.

A is placed before a participle, or participle noun; and is considered by Wallis as a contraction of *at*, when it is put before a word denoting some action not yet finished; as, *I am a* walking. It also seems to be anciently contracted from *at*, when placed before local surnames, as, *Thomas a* Becket. In other cases, it seems to signify *to*, like the French *à*;

A hunting Chloe went.

They go *a* begging to a bankrupt's door.

Prior.

Dryden.

A has a peculiar signification, denoting the proportion of one thing to another. Thus we say, The landlord

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hath a hundred *a* year; The ship's crew gained a thousand pounds *a* man.

A is used in burlesque poetry, the same as *o*, to lengthen out a syllable, without adding to the sense;

For cloves and nutmegs to the line-*a*,
And even for oranges to China.

Dryden.

A, in composition, seems to have sometimes the power of the French *a* in these phrases, *a* droit, *a* gauche, &c. and sometimes to be contracted from *at*; as, *afide*, *aslope*, *asfoot*, *asleep*, *athirst*, *aware*, *atrip*;

And now a breeze from shore began to blow,
The sailors ship their oars, and cease to row;
Then hoist their yards *atrip*, and all their sails

Let fall, to court the wind, and catch the gales. Dryden.

A is sometimes redundant; as *arise*, *arouse*, *awake*; the same with *rise*, *rouse*, *wake*.

A, in abbreviations, stands for *artium*, or arts; as, A. B. bachelor of arts, *artium baccalaureus*; A. M. master of arts, *artium magister*; or, *anno*, as, A. D. *anno domini*.

A, in the Julian calendar, is the first of the seven DOMINICAL letters. It had been in use among the Romans long before the establishment of Christianity, as the first of the eight *nundinales litteræ*; in imitation whereof it was that the dominical letters were first introduced.

Among the ancients, *A* was a numerical letter, and signified 500; and, with a stroke over it, it stands for 5000. With logicians, it denotes an universal affirmative proposition. Among merchants, if set alone after a bill of exchange, it signifies *accepted*; and is used by them to distinguish their sets of accounts instead of a figure: thus, A, B, C, are instead of 1, 2, 3. *A*, or *aa*, is used by physicians instead of *ana*, and signifies that the proportions of the ingredients to which it refers are to be equal.

A, in music, is that note which lies between the second and third line in the treble; or upon the top, or fifth, in the bass.

A, in the ancient inscriptions of marbles, &c. occasionally stands for *Augustus*, *ager*, *aiunt*, &c. When double, it denotes *Augusti*; when triple *aurum argentum*, *as*; and sometimes its meaning can only be known by the rest of the inscription. Isidore adds, that when it occurs after the word *miles* (soldier), it denotes him young. On the reverse of ancient medals, it denotes them struck by the city of Argos, sometimes by that of Athens; but on coins of modern date it is the mark of Paris.

B

AAA.

AAA. The chemical abbreviation for Amalgama, or Amalgamation.

AA, rivers of Courland, Germany, Swisserland, Flanders, and France; *Aa* in the Danish language, *Ea* in the Saxon, and *Eau* in the French, signifying water.

AACH, a small town of Nellenburgh in Suabia, near a river of the same name which falls into the lake of Zell. It is subject to Austria, and seated on an eminence between the Danube and the lake of Constance. Lat. 47. 45. N. lon. 9. 0. E.

AAGGII-DOGGII, a mountain of Amasia, over which the caravans pass, in their journey between Constantinople and Isfahan.

AAG-HOLM, a small island of Norway.

AAHUS, a small town, in a county of the same name, in Westphalia, is situated near the source of the AA. Lat. 48. 13. N. lon. 7. 22. E.

AAIN-CHARIN, a village near Jerusalem, said to be the place where Zacharias lived: it is yet frequented by pilgrims; and near it there is a convent, a large elegant building with a handsome cupola, under which is an extraordinary fine mosaic pavement: the altar is a very splendid one, encompassed with marble steps, and is said to be built on the very spot where John the Baptist was born.

AAKIAR, a district of North Jutland, in Denmark.

AAKIRKE, an inland place in Bornholm, is the seat of the civil court and synod, and has the privileges of a town.

AALBERG, or AALBURGH, a bishopric in Jutland, Denmark; has for its capital

AALBORG, (that is, eel-town, from the number of eels taken there) an old, large, and populous, city, and, next to Copenhagen, the richest and best in Denmark. It has an exchange, and a harbour deep and secure, but rather dangerous in the entrance. It carries on a considerable trade in herrings and corn, and a manufactory of saddles and gloves. Lat. 57. 18. N. lon. 29. 16. E.

AALHEIDE, a large heath in Jutland.

AAM, or HAAM, a liquid measure in use among the Dutch, containing 128 *mingles*, each weighing nearly thirty-six ounces averdupoise; whence the Aam contains 288 English, and 148½ pints Paris measure.

AAMA, a province of Barbary, fifteen days journey from Tunis. The entrance to it is very dangerous, being very long and narrow, among quicksands and rivers, so covered with dust, that they appear like one continued plain.

AAN-SIRE, a small island of Norway.

AAR, rivers in Germany and Swisserland, and an island in the Baltic containing several villages but no town.

AARACK, a city of Hira in Persia.

AARASSUS, an ancient city of Asia Minor, mentioned by Strabo, but at present only a village. It is thought to be the Anassus of Ptolemy.

AARAW, a town and bailiwick in Bern, where the diets of the protestant cantons are held. In these assemblies the deputies and their servants being all citizens, dine in the same hall. Their town-house is built of the ruins of the castle, which the inhabitants of Aaraw entirely demolished when the Swiss shook off the yoke of Austria. Lat. 47. 20. N. lon. 8. 10. E.

AARHUUS, in North Jutland, Denmark, the capital of the diocese of the same name, is an open, large, and populous, city, with two market-places, an hospital, university, cathedral, and other public buildings. It lies low, on a beautiful plain, between the sea and an inland lake; from which last the water is conveyed, by means of a pretty broad canal, through the town. The harbour at the mouth of this canal or river is indeed safe and commodious, but hardly of sufficient depth and extent for the trade of the place. Lat. 56. 6. N. lon. 10. 0. E.

AARON, high priest of the Jews, and brother to Moses, was by the father's side great grandson, and by the mother's grandson, of Levi. By God's command he met Moses at the foot of mount Horeb, and they went together into

Egypt to deliver the children of Israel. They went to the court of Pharaoh, and told him that God commanded him to let the Hebrews go to offer sacrifices in the desert of Arabia; but the impious monarch disregarded this command, and caused the labour of the Israelites to be doubled. The messengers of the Almighty again returned to the king, when Aaron wrought a miracle in his sight to move his heart, and induce him to let the people go. Aaron cast down his miraculous rod, and it was immediately converted into a serpent: but the same thing being performed by the king's magicians, his heart was hardened more and more; and his obstinacy at last drew down the just judgments of heaven upon his kingdom, which was afflicted with ten dreadful plagues, in the same order that Aaron stretched forth his rod, at the command of the Almighty. The first was the changing of the waters of the Nile and of all the rivers into blood, so that the Egyptians died of thirst. In consequence of the second plague, the land was covered with innumerable swarms of frogs, which entered even into Pharaoh's palace. By the third plague, the dust was converted into lice, which cruelly tormented both man and beast. The fourth plague was a multitude of destructive flies, which spread throughout Egypt, and infested the whole country. The fifth was a sudden pestilence, which destroyed all the cattle of the Egyptians, without injuring those of the Israelites. The sixth produced numberless ulcers and fiery bites upon man and beast. The seventh was a dreadful storm of hail, accompanied with thunder and lightning, which destroyed every thing that was in the fields, and spared only the land of Goshen, where the children of Israel dwelt. By the eighth plague swarms of locusts were brought into the country, which devoured every green herb, the fruit of the trees, and the produce of the harvest. By the ninth plague thick darkness covered all the land of Egypt, except the dwellings of the children of Israel. The tenth and last plague was the death of the first-born in Egypt, who were all in one night cut off by the destroying angel, from the first-born of the king to the first-born of the slaves and of the cattle. This dreadful calamity moved the heart of the hardened Pharaoh, and he at length consented to allow the children of Israel to depart. That these miracles resulted from the immediate interposition of an offended Deity, is admitted by all authors sacred and profane; but the feats performed on this occasion by Pharaoh's magicians, have, without much reason, opened a wide field for controversy and dispute. We are told, that when Aaron cast down his rod, and it became a serpent, they also did the like with their enchantments; "for they cast down every man his rod, and they became serpents." This was a phenomenon which, it must be confessed, had a very miraculous appearance; and yet there seems to be nothing in it which might not have been effected by flight of hand. The Egyptians, and perhaps the inhabitants of every country where serpents abound, have the art of depriving them of their power to do mischief, so that they may be handled without danger. It was easy for the magicians, who were favoured by the court, to pretend that they changed their rods into serpents, by dexterously substituting one of those animals in place of the rod. In like manner they might pretend to change water into blood, and to produce frogs; for, after the previous information of the nature of the miracles which were to be wrought was given, the magicians might easily provide themselves with a quantity of blood and a number of frogs sufficient to answer their purpose of deceiving the people. Beyond this, however, their power could not go. It stopped where that of all workers in legerdemain must have stopped—at the failure of proper materials to work. Egypt abounds with serpents; blood could be easily procured; and without difficulty they might have frogs from the river. But when Aaron proceeded to the other miracles, and with his rod produced lice from the dust of the ground, the magicians, who had it not in their power to collect a sufficient quantity of these animals, were com-

pelled to own this to be an effect of divine agency. Thus Aaron had a great share in all that Moses did for the deliverance of the Israelites; whence the scriptures call him the prophet of Moses, and he acted in that capacity after the Israelites had passed over the Red Sea. He ascended mount Sinai with two of his sons, Nadab and Abihu, and seventy elders of the people; but neither he nor they went higher than half way, from whence they saw the glory of God; only Moses and Joshua went to the top, where they staid forty days. During their absence, Aaron, overcome by the people's eager intreaties, set up the golden calf, which the Israelites worshipped by his consent. This calf has given rise to various conjectures. Some rabbies maintain that he did not make the golden calf; but only threw the gold into the fire, to get rid of the importunities of the people; and that certain magicians, who mingled with the Israelites at their departure from Egypt, cast this gold into the figure of a calf. According to some authors, the fear of falling a sacrifice to the resentment of the people by giving a refusal, made Aaron comply with their desire: and they allege also, that he hoped to elude their request, by demanding of the women to contribute their ear-rings, imagining they would rather choose to remain without a visible deity, than be deprived of their personal ornaments. This affair of the golden calf happened in the third month after the Israelites came out of Egypt. In the first month of the following year, Aaron was appointed by God high-priest; which office he executed during the time the children of Israel continued in the wilderness. He died in the fortieth year after their departure from Egypt, upon mount Hor, being then 123 years old; A. M. 2522, of the Julian period 3262, before the Christian æra 1452.

AARON and JULIUS (Saints), suffered martyrdom together, during the persecution under the Emperor Dioclesian, in the year 303, about the same time with Saint Alban, the protomartyr of Britain. We are not told what their British names were, it being usual with the Christian Britons, at the time of baptism, to take new names from the Greek, Latin, or Hebrew. Nor have we any other particulars of their death; only that they suffered the most cruel torments. Each had a church erected to his memory; and their festival is placed, in the Roman martyrology, on the first of July.

AARON HARISCHON, a learned rabbi and CARAITE in the fifteenth century, wrote an Hebrew grammar, printed at Constantinople in 1581; probably the same with Aaron the caraites, who wrote a commentary on the five books of Moses, which is in MS. in the royal library of Paris.

AARSENS (Francis), Lord of Someldyck and Spyck, was one of the greatest ministers for negotiation the United Provinces could ever boast of. His father, Cornelius Aarsens, was register to the States; and, being acquainted with Mr. Pleffis Mornay, at the court of William prince of Orange, he prevailed upon him to take his son under him, with whom he continued some years. John Olden Barnevelt, who presided over the affairs of Holland and all the United Provinces, sent him afterwards agent into France, where he learned to negotiate under those profound politicians Henry IV. Villeroy, Silleri, Rossie, Jaonnin, &c. and he acquitted himself in such a manner as to obtain their approbation. Soon after he was invested with the character of ambassador, being the first who was recognised as such by the French court; at which time Henry IV. declared, that he should take precedence next to the Venetian minister. He resided in France fifteen years; during which time he received great marks of esteem from the king, who created him a knight and baron; and for this reason he was received amongst the nobles of the province of Holland. He was the first of three extraordinary ambassadors sent to England in 1620, and the second in 1641, to treat about the marriage of Prince William, son to the Prince of Orange. He was likewise ambassador-extraordinary at the French court in 1624; and the Cardinal de Richlieu having just taken the admi-

nistration of affairs into his hands, and knowing he was an able man, made use of him to serve his own purposes. He died in a very advanced age; and his son, who survived him, was reputed the wealthiest man in Holland.

AARSENS (Peter), a painter, called in Italy Pietro Longo, because of his stature, was born at Amsterdam in 1519. He was eminent for all kinds of subjects; but was particularly famous for altar-pieces, and for representing a kitchen with its furniture: he had the pain to see a fine altar-piece of his painting destroyed by the rabble in the insurrection of 1566, though a lady of Alcmæer offered 200 crowns to redeem it.

AARSEO, a town of Algiers, near the mouth of the river Mina, trades to Guinea, Numidia, and other places. Lat. 36. 50. N. lon. 2. 10. E.

AARTGEN, or AERTGEN, a painter of merit, the son of a woolcomber, born at Leyden in 1498. He worked at his father's trade till the age of eighteen; and then, having discovered a genius for designing, he was placed with Cornelius Engelheitz, under whom he made a considerable progress in painting. He became so distinguished, that the celebrated Francis Floris went to Leyden out of mere curiosity to see him. He found him inhabiting a poor half-ruined hut, and in a very mean condition. He solicited him to go to Antwerp, promising him wealth suitable to his merit; but Aartgen refused, declaring that he found more gratification in his poverty than others did in their riches. It was a custom with this painter never to work on Mondays, but to devote that day to the bottle. He used to stroll about the streets in the night, playing on the german flute, and in one of these frolics he walked into a rivulet and was drowned, in 1564.

AASAR, anciently a town of Palestine, in the tribe of Judah, situated between Azotus and Ascalon. In Jerome's time it was an hamlet.

AASTRUP, a district of Aalberg and North Jutland, to which belong the Herreds of Wenneborg, with twelve parishes, and Jerlef with the like number.

AB, *f.* the eleventh month of the civil year of the Hebrews, and the fifth of their ecclesiastical year, which begins with the month Nisan. It answers to the moon of July; that is, to part of our month of the same name, and to the beginning of August: it consists of thirty days. The Jews fast on the first of this month, in memory of Aaron's death; and on the ninth, because on that day both the temple of Solomon and that erected after the captivity, were burnt; the former by the Chaldeans, and the latter by the Romans. The same day is also remarkable among that people for the publication of Adrian's edict, wherein they were forbid to continue in Judea, or even to look back when at a distance from Jerusalem, in order to lament the desolation of that city. The 18th of the same month is also a fast among the Jews; because the lamp in the sanctuary was that night extinguished in the time of Ahaz.—In the Syriac calendar it is also the name of the last summer-month. The first day of this month they called *Suum Miriam*, the fast of the virgin, because the eastern Christians fasted from that day to the fifteenth, which was therefore called *Father-Miriam*, the cessation of the fast of the virgin.

ABA, or ABAU, HANIFAH or HANFA, surnamed Al-Nooma, was the son of Thabet, and born at Coufah in the eightieth year of the Hegira. This is the most celebrated doctor of the orthodox Mussulmans, and his sect holds the principal esteem among the four which they indifferently follow. Notwithstanding this, he was not very well esteemed during his life, inasmuch that the khaliff Almanzor caused him to be imprisoned at Bagdad, for having refused to subscribe to the opinion of absolute predestination, which the Mussulmans call Cadha. But afterwards Abou Joseph, who was the sovereign judge or chancellor of the empire under the khaliff Hadi, brought his doctrine into such credit, that it became a prevailing opinion, That to be a good Mussulman was to be a Hani-fite. He died in the hundred and fiftieth year of the Hegira,

gira, in the prison of Bagdad aforesaid: and it was not till 335 years after his death, that Melick Schah, a sultan of the Selgiucidan race, built for him a magnificent monument in the same city, whereto he adjoined a college peculiarly appropriated to such as made a profession of this sect. This was in the 485th year of the Hegira, and anno Christi 1092. The most eminent successors of this doctor were Ahmed Benali, Al Giasfas, and Al Razi, who was the master of Nassari; and there is a mosque particularly appropriated to them in the temple of Mecca.

ABA, a lofty mountain of Great Armenia, part of mount Taurus; the rivers Euphrates and Araxes have their rise here; also a city of the ancient kingdom of Phocis in Greece, famous for an oracle of Apollo, and for a rich temple plundered and burnt by the Persians.

ABACA, one of the Philippine Islands.

ABACENA, the ancient name of a town in Media, and another of Cana in the hither Asia.

ABACÆNUM, anciently a town of Sicily, whose ruins are supposed to be those lying near Trippi, a citadel on a high and steep mountain not far from Messina. The inhabitants were called *Abacæni*.

ABACATUAIA, *f.* in ichthyology, a barbarous name of the zeus vomer. See ZEUS.

ABACH, a market town of Germany, in Lower Bavaria, seated on the Danube. It is remarkable for Roman antiquities, and for springs of mineral waters, which are said to be good for various distempers. E. lon. 11. 56. lat. 48. 53.

ABACINARE, or ABBACINARE, *f.* a species of punishment exercised in the middle-ages, consisting in blinding of the criminal, by holding a hot basin or bowl of metal before his eyes.

ABACK, *adv.* a sea-term denoting the situation of the sails when the surfaces are flatted against the masts by the force of the wind. The sails are said to be *taken aback* when they are brought into this situation, either by a sudden change of the wind, or by an alteration in the ship's course. They are *laid aback*, to effect an immediate retreat, without turning to the right or left; or, in the seaphrase, to give the ship *stern-way*, in order to avoid some danger discovered before her in a narrow channel, or when she has advanced beyond her station in the line of battle, or otherwise. The sails are placed in this position by slackening their lee-braces, and hauling in the weather ones; so that the whole effort of the wind is exerted on the fore part of their surface, which readily pushes the ship astern, unless she is restrained by some counteracting force. It is also usual to spread some sail aback near the stern, as the mizen-top-sail, when a ship rides with a single anchor in a road, in order to prevent her from approaching it so near as to entangle the flukes with her slackened cable, and thereby loosen it from the ground.

ABACOT, *f.* the name of an ancient cap of state worn by the kings of England, the upper part whereof was in the form of a double crown.

ABACTOR, *f.* [Lat.] One who drives away or steals cattle in herds, or great numbers at once, in distinction from those that steal only a sheep or two.

ABACUS, *f.* [Lat.] in arithmetic, an ancient instrument used by most nations for casting up accounts, or performing arithmetical calculations: it is by some derived from the Greek *αβαξ*, which signifies a cupboard or buffet, perhaps from the similarity of the form of this instrument; and by others it is derived from the Phœnician *abah*, which signifies dust or powder, because it was said that this instrument was sometimes made of a square board or tablet, which was powdered over with fine sand or dust, in which were traced the figures or characters used in making calculations, which could thence be easily defaced, and the abacus refitted for use. But Lucas Pacioli, in the first part of his second distinction, thinks it is a corruption of Arabicus, by which he meant their Algorithm, or the method of numeral computation received from them.

We find this instrument for computation in use, under some variations, with most nations, as the Greeks, Romans, Germans, French, Chinese, &c.

The Grecian abacus was an oblong frame, over which were stretched several brass wires, strung with little ivory balls, like the beads of a necklace; by the various arrangements of which invention all kinds of computations were very easily made. Mahudel, in Hist. Acad. R. Inscr. t. 3. p. 390.

The Roman abacus was a little varied from the Grecian, having pins sliding in grooves, instead of strings or wires and beads. Philos. Transf. No. 180.

The Chinese abacus, or Shwan-pan, like the Grecian, consists of several series of beads strung on brass wires, stretched from the top to the bottom of the instrument, and divided in the middle by a cross piece from side to side. In the upper space every string has two beads, which are each counted for five; and in the lower space every string has five beads, of different values, the first being counted as one, the second as ten, the third as 100, and so on, as with us. See SHWAN-PAN.

The abacus chiefly used in European countries, is nearly upon the same principles, though the use of it is here more limited, because of the arbitrary and unequal divisions of money, weights, and measures, which, in China, are all divided in a tenfold proportion, like our scale of common numbers. This is made by drawing any number of parallel lines, like paper ruled for music, at such a distance as may be at least equal to twice the diameter of a calculus or counter. Then the value of these lines, and of the spaces between them, increases, from the lowest to the highest in a tenfold proportion. Thus, counters placed upon the first line, signify so many units or ones; on the second line 10's, on the third line 100's, on the fourth line 1000's, and so on: in like manner a counter placed in the first space, between the first and second line, denotes 5, in the second space 50, in the third space 500, in the fourth space 5000, and so on. See for example the following figure, where the same number, viz. 1788, is represented in both divisions of the abacus, by different dispositions of the counters:

Besides the above instruments for computation, there have been several others invented by different persons; as *Napier's rods or bones*, described in his *Rabdologia*; also the *Abacus Rhabdologicus*, a variation of Napier's, which is described in the first volume of *Machines et Inventions approuvées par l'Académie Royale des Sciences*. An ingenious and general one was also invented by Mr. Gamaliel Smethurst, and is described in the Philos. Transf. vol. xlvi. where the inventor remarks that computations by it are much quicker and easier than by the pen, are less burthensome to the memory, and can be performed by blind persons, or in the dark as well as in the light. A very comprehensive instrument of this kind was also contrived by the late learned Dr. Nicholas Saunderson, by which he performed very intricate calculations: an account of it is prefixed to the first volume of his *Algebra*, and is there by the editor called *Palpable Arithmetic*.

ABACUS, Pythagorean, so denominated from its inventor, Pythagoras; a table of numbers, contrived for readily learning the principles of arithmetic; and was probably what we now call the multiplication-table.

ABACUS, or ABACISCUS, in architecture, the upper part or member of the capital of a column; serving as a crowning both to the capital and to the whole column. Vitruvius informs us that the abacus was originally intended

tended to represent a square flat tile laid over an urn, or a basket; and the invention is ascribed to Calimachus, an ingenious statuary of Athens, who, it is said, adopted it on observing a small basket, covered with a tile, over the roof of an acanthus plant, which grew on the grave of a young lady; the plant shooting up, encompassed the basket all around, till meeting with the tile, it curled back in the form of scrolls: Calimachus passing by, took the hint, and immediately executed a capital on this plan; representing the tile by the abacus, the leaves of the acanthus by the volutes or scrolls, and the basket by the vase or body of the capital.

Abacus is also used by Scamozzi for a concave moulding in the capital of the Tuscan pedestal. And the word is used by Palladio for other members which he describes. Also, in the ancient architecture, the same term is used to denote certain compartments in the incrustation or lining of the walls of state-rooms, mosaic-pavements, and the like. There were abaci of marble, porphyry, jasper, alabaster, and even glass; variously shaped, as square, triangular, &c.

ABACUS LOGISTICUS is a right-angled triangle, whose sides, about the right angle, contain all the numbers from one to sixty; and its area the products of each two of the opposite numbers. This is also called a *canon of sexagesimals*, and is no other than a multiplication-table carried to sixty both ways.

ABACUS & PALMULÆ, in the ancient music, denote the machinery by which the strings of the polyplectra, or instruments of many strings, were struck, with a plectrum made of quills.

ABACUS HARMONICUS is used by Kircher for the structure and disposition of the keys of a musical instrument, either to be touched with the hands or feet.

ABACUS, in geometry, a table or slate upon which schemes or diagrams are drawn.

ABACUS MAJOR, in metallurgic operations, the name of a trough used in the mines, wherein the ore is washed.

ABADDON, is the name which St. John in the Revelation gives to the king of the locust, the angel of the bottomless pit. The inspired writer says, this word is Hebrew, and in Greek signifies *απολλων*, i. e. a destroyer. That angel-king is thought to be Satan: but M. le Clerc thinks with Dr. Hammond, that by the locust which came out of the abyss, may be understood the zealots and robbers, who miserably afflicted the land of Judea, and laid it in a manner waste, before Jerusalem was taken by the Romans; and that Abaddon, the king of the locust, may be John of Gischala, who having treacherously left that town a little before it was surrendered to Titus, came to Jerusalem, where he soon headed part of the zealots, who acknowledged him as their king, whilst the rest would not submit to him. This subdivision of the zealot party brought a thousand calamities upon the Jews.

ABADIR, a title which the Carthaginians gave to gods of the first order. In the Roman mythology, it is the name of a stone which Saturn swallowed, by the contrivance of his wife Ops, believing it to be his new-born son Jupiter: hence it ridiculously became the object of religious worship.

ABAFEDE, a mountain in Egypt, the residence, in antiquity, of the Egyptian magi; it was much revered by the Romans on their obtaining it, and was afterwards inhabited by Christian devotees who lived in caves dug out of the rock.

ABAPT, *adv.* [*abaftan*, Sax.] afeaterm, signifying the hinder part of a ship, or all those parts both within and without which lie towards the stern, in opposition to *ABORE*.—*Abast*, is also used as a preposition, and signifies *further aft, or nearer the stern*; as, the barricade stands *abast* the main-mast, i. e. behind it, or nearer the stern.

ABAISANCE, *f.* [*abaifer*, Fr.] to depress, to bring down.] An act of reverence, a bow. *Obeysance* is considered by Skinner as a corruption of *abaissance*, but is now universally used.

ABAKA-KHAN, the 18th emperor of the Moguls, a

wife and clement prince. He reigned 17 years, and is by some authors said to have been a Christian. It may be admitted, indeed, that he joined with the Christians in keeping the feast of Easter, in the city Hanadai, some short time before his death. But this is no proof of his Christianity; it having been common, in times of brotherly love, for Christians and Mahometans to join in keeping the same feasts, when each would compliment the other with doing honour to his solemnity.

ABAKAN, a river falling into the Jenesei, near its source in Asiatic Russia, near which stands the town of Abakankoi. Lat. 53. 5. N. lon. 94. 5. E.

ABALA, a city of the tribe of Judah; also a town of the Troglodytes in Africa, near the Red Sea.

ABALASKOI, a town of Siberia. It is yet frequented by pilgrims, on account of a statue, called the image of the Virgin Mary. Lat. 58. 11. N. lon. 68. 20. E.

To ABALIENATE, *v. a.* [*abalieno*, Lat.] To make that another's which was our own before. A term of the civil law, not much used in common speech.

ABALIENATION, *f.* [*abalienatio*, Lat.] The act of giving up one's right to another person; or making over an estate, goods, or chattels, by sale, or due course of law.

To ABANDON, *v. a.* [*abandonner*, Fr. derived, according to Menage, from the Italian *abandonare*, which signifies to forsake his colours; *bandum* [vexillum] *deserere*. Palquier thinks it a coalition of a *ban donner*, to give up to a proscription; in which sense we, at this day, mention the ban of the empire. Ban, in our own old dialect, signifies a curse; and to *abandon*, if considered as compounded between French and Saxon, is exactly equivalent to *divis devovere*.] To give up, resign, or quit; often followed by the particle *to*.—Who is he so *abandoned* to foolish credulity, as to think, that a clod of earth in a sack, may ever, by eternal shaking, receive the fabric of man's body? *Beauley*. To desert; to forsake: in an ill sense. To forsake, to leave.

To ABANDON OVER, *v. a.* [a form of writing not usual, perhaps not exact.] To give up, to resign.

Look on me as a man *abandon'd o'er*

To an eternal lethargy of love;

To pull and pinch, and wound me, cannot cure,

And but disturb the quiet of my death. *Dryden*.

ABANDONED, *participle adj.* Corrupted in the highest degree; as, an *abandoned wretch*. In this sense, it is a contraction of a longer form, *abandoned*, or given up to wickedness.

ABANDONING, [from *abandon*.] Deserting, forsaking.

ABANDONMENT, *f.* [*abandonnement*, Fr.] The act of abandoning; the state of being abandoned.

ABANNITION, *f.* [*abanitio*, Lat.] A banishment for one or two years, for manslaughter. *Obsolete*.

ABANO, a town of Padua in Italy, in the republic of Venice, much frequented on account of its warm baths. Lat. 45. 30. N. lon. 10. 47. E.

ABANTES, a people who came originally from Thrace, and settled in Phocæa, a country of Greece, where they built a town which they called *Abæ*, after the name of Abas their leader. The Abantes were a very warlike people, closing with their enemies, and fighting hand to hand.

ABANTIAS, or ABANTIS, anciently a name of the island Eubœa in the Egean sea, extending along the coast of Greece, from the promontory Sunium of Attica to Thessaly, and separated from Bœotia by a narrow strait called *Euripus*. The island was called *Abantias*, from the Abantes, a people originally of Thrace, called by Homer *οπισθεν Κομωσινες*, from wearing their hair long behind, having in a battle experienced the inconvenience of wearing long hair before. From cutting their hair before, they were called *Curetes*.

ABAPTISTON, *f.* in surgery, [from *α* and *βαπτίζω*, *immergo*, to sink under.] the perforating part of the instrument called a *TREPAN*.

ABARA, a town in the Greater Armenia, under the

dominion of the Turks: it is often the residence of the Archbishop of Nakhivan. Lon. 46. 25. lat. 39. 45.

ABARANER, a city of Turcomania in Asia, said to contain about 300 Christian families. Lat. 39. 0. N. lon. 63. 59. E.

ABARCA, *f.* an ancient kind of shoe used in Spain for passing the mountains with. It was made of raw hides, and bound with cords, which secured the feet of travellers against the snow.

To ABARE, *v. a.* [*abarian*, Sax.] To make bare, to uncover, or disclose.

ABARGALE a country of Abyssinia.

ABARIM, high mountains of steep ascent, separating the country of the Ammonites and Moabites from the land of Canaan where Moses died. Nebah and Pisgah were parts of these mountains.

ABARIS, the Hyperborean; a celebrated sage of antiquity, whose history and travels have been the subject of much learned discussion. Such a number of fabulous stories were told of him, that Herodotus himself seems to scruple to relate them. He tells us only, that this barbarian was said to have travelled with an arrow, and to have taken no sustenance: but this does not acquaint us with the marvellous properties which were attributed to that arrow; nor that it had been given him by the Hyperborean Apollo. With regard to the occasion of his leaving his native country, Harpocration tells us, that the whole earth being infested with a deadly plague, Apollo, upon being consulted, gave no other answer than that the Athenians should offer up prayers in behalf of all other nations; upon which, several countries deputed ambassadors to Athens, among whom was Abaris the Hyperborean. In this journey, he renewed the alliance between his countrymen, and the inhabitants of the island of Delos. It appears that he also went to Lacedæmon; since, according to Pausanias, he there built a temple consecrated to Proserpine the Salutary. It is asserted, that he was capable of foretelling earthquakes, driving away plagues, allaying storms, &c. The orator Himerius describes his person accurately, and gives him a very noble character: "They relate (says he) that Abaris the sage was by nation an Hyperborean, appeared a Grecian in speech, and resembled a Scythian in habit and appearance. He came to Athens, holding a bow in his hand, having a quiver hanging on his shoulders, his body wrapt up in a plaid, girt about the loins with a gilded belt, and wearing trowsers reaching from his waist downward." He was affable and pleasant in conversation, in dispatching great affairs secret and industrious, quick-sighted in present exigencies, in preventing future dangers circumspect, a searcher after wisdom, desirous of friendship, trusting little to fortune, and having every thing trusted to him for his prudence. Neither the Academy nor the Lyceum could have furnished a man with fitter qualities to travel so far abroad, and to such wise nations, about affairs no less arduous than important. And if we further attentively consider his moderation in eating, drinking, and the use of all those things which our natural appetites incessantly crave: joining the candour and simplicity of his manners with the solidity and wisdom of his mind; all which we find sufficiently attested; it must be owned, that the world at that time had few to compare with Abaris.

ABARTICULATION, *f.* [*ab*, and *articulus*, a joint, Lat.] A good and apt construction of the bones, by which they move strongly and easily; or that species of articulation that has manifest motion. In anatomy, it signifies a species of articulation, admitting of a manifest motion; called also Diarthrosis, and Dearticulatio, to distinguish it from that sort of articulation, which admits of a very obscure motion, and is called Synarthrosis.

ABAS, *f.* a weight used in Persia for weighing pearls. It is 1-8th less than the European carat.

ABAS, in the heathen mythology, was the son of Hypochoon and Meganira, who entertained Ceres, and offered a sacrifice to that goddess; but Abas ridiculing the cere-

mony, and giving her opprobrious language, she sprinkled him with a certain mixture, and he became a newt or water-lizard.

ABAS (Schah) the Great, was third son of Cötabendi, seventh king of Persia, of the race of the Sôphis. Succeeding to his father at eighteen, in 1585, he found the affairs of Persia at a low ebb, occasioned by the conquests of the Turks and Tartars. By his intrepid conduct and magnanimity, he regained several of the provinces they had seized; but death put a stop to his victories in 1629, after a reign of forty-four years. He was the prince who made Ispahan the metropolis of Persia.

ABAS (Schah) his grandson, ninth king of Persia, of the race of the Sôphis, succeeded his father Sefi at thirteen years of age; he was but eighteen when he made himself master of the city Candahar, which had surrendered in his father's reign to the Great Mögöl, and all the province about it; and he preserved it afterwards against this Indian emperor, though he besieged it more than once with an army of 300,000 men. He was a very merciful prince, and openly protected the Christians: he died at thirty-seven years of age, in 1666.

ABASA, a small town of Romania; it has an elegant mosque and a spacious kahé or inn, and is twelve miles from Adrianople, on the road to Constantinople. Lat. 42. 8. N. lon. 26. 35. E.

ABASCIA, or ABCAS, a country in Asia, tributary to the Turks, situated on the coast of the Black Sea. The people are poor, thievish, and treacherous, inasmuch that there is no trading with them without the utmost caution. Their commodities are furs, buck and tyger skins, linen yarn, boxwood and bees-wax: but their greatest traffic is in selling their own children, and even one another, to the Turks; inasmuch that they live in perpetual distrust. They are destitute of many necessities of life, and have nothing among them that can be called a town; though we find Anacopia, Dandar, and Czekorni, mentioned in the maps. They have the name of Christians; but have nothing left but the name, any more than the Mingrelians their northern neighbours. The men are robust and active, and the women are fair and beautiful; on which account the Turks give a great price for the female slaves, which they purchase very young.

ABASCUS, a river of Asiatic Sarmatio, which, rising from Mount Caucasus, falls into the Euxine, between Pityus to the east, and Nosis to the west.

To ABASE, *v. a.* [*abaïsser*, Fr. from the Lat. *basis*, or *bassus*, a barbarous word, signifying low, base.] To depress, to lower. To cast down, to depress, to bring low; in a figurative and personal sense, which is the common use.—Behold every one that is proud, and *abase* him. *Job*. xl. 11.—If the mind be curbed and humbled too much in children; if their spirits be *abased* and broken much by too strict an hand over them; they lose all their vigour and industry. *Locke*.

ABASED, *adj.* in heraldry, is a term used of the wings of eagles, when the tops look downwards towards the point of the shield; or when the wings are shut; the natural way of bearing them being spread with the top pointing to the chief of the angle.

ABASEMENT, *f.* The state of being brought low; the act of bringing low; depression.—There is an *abasement* because of glory; and there is that lifteth up his head from a low estate. *Eccles*. xx. 11.

To ABASH, *v. a.* [*abaïsser*, Fr.] To put into confusion; to make ashamed. It generally implies a sudden impression of shame.—They heard, and were *abashed*. *Milton*.—The passive admits the particle *at*, sometimes *of*, before the casual noun.—In no wise speak against the truth, but be *abashed* of the error of thy ignorance. *Ecclesi*. iv. 25.

The little Cupids hovering round,
(As pictures prove) with garlands crown'd,
Abash'd at what they saw and heard,
Flew off, nor ever more appear'd.

Swift.
ABASSI.

ABASSI, or **ABASSIS**, *f.* a silver coin current in Persia, equivalent in value to a French livre, or ten-pence half-penny sterling. It took its name from Schah Abas II. king of Persia, under whom it was struck.

To **ABATE**, *v. a.* [*abbatre*, Fr. to beat down.] To lessen, to diminish; to deject, or depress the mind. In commerce, to let down the price in selling, sometimes to beat down the price in buying.

To **ABATE**, *v. n.* To grow less; as, his passion *abates*; the storm *abates*. It is used sometimes with the particle *of* before the thing lessened.—In process of time some diseases have *abated* of their virulence. *Dryden*.—In horsemanship, a horse is said to abate or take down his curvets, when, working upon curvets, he puts his two hind legs to the ground both at once, and observes the same exactness in all the times.

ABATEMENT, *f.* [*abatement*, Fr.] The act of abating or lessening. The state of being abated.—Coffee has an oil strongly combined and entangled with earthy particles; the most noxious part of the oil exhales in roasting, to the *abatement* of near one quarter of its weight. *Arbuthnot*.—The sum or quantity taken away by the act of abating.—The law of works is that law, which requires perfect obedience, without remission or *abatement*. *Locke*.—The cause of abating; extenuation.—We cannot plead in *abatement* of our guilt, that we were ignorant of our duty, under the prepossession of ill habits, and the bias of a wrong education. *Atterbury*.

ABATEMENT in law, is used in three senses: The first is that of removing or beating down a nuisance. In which respect, the person aggrieved by the nuisance may *abate* or remove the same without the formality of an action, so as he commit no riot in the doing of it. If a house or wall is erected so near to mine, that it stops my ancient lights (which is a private nuisance), I may enter my neighbour's land and peaceably pull it down. Or if a new gate be erected across the king's highway (which is a public nuisance), any of the king's subjects passing that way may cut it down and destroy it. And the reason why the law allows this summary method of doing one's self justice is, because injuries of this kind require an immediate remedy, and cannot wait for the slow progress of the ordinary forms of justice. 3 *Blackst.* 5.

The second signification of abatement is, the defeating or overthrowing of an action, by some defect in the proceedings; as where exception is taken to the insufficiency of the matter; to the uncertainty of the allegation, by misnaming either of the parties, or the place; to the variance between the writ and the specialty or record; to the uncertainty of the writ or declaration; or to the death of either of the parties before judgment had. For these and many other causes, the defendant oftentimes prays, that the suit of the plaintiff may for that time cease. And in case of abatement in these respects, all writs and process must begin *de novo*. In the case of an indictment, on a criminal process, the defendant may plead in abatement, that his name is not as in the indictment specified, or that they have given him a wrong addition, as yeoman instead of gentleman; and if the jury find it so, the indictment shall abate. But in the end, there is little advantage accruing to the defendant by means of this kind of dilatory plea; because, if the exception be allowed, a new bill of indictment may be framed, according to what the prisoner in his plea avers to be the true name and addition. For it is a rule, upon all pleas in abatement, that he, who takes advantage of a flaw, must at the same time shew how it may be amended. 4 *Blackst.* 335.

The third species of abatement is, where the rightful possession or freehold of the heir or devisee is defeated or overthrown by the intervention of a stranger. And herein it differs from intrusion, which is the entry of a stranger after a particular estate of freehold is determined, before him in remainder or reversion. An abatement is always to the prejudice of the heir or immediate devisee; an intrusion is always to the prejudice of the remainder-man or

reversioner. For example: If a man dieth seized of lands in fee simple, and before the entry of his heir, a stranger enters thereon, this is an abatement; but if a man be tenant for life, with remainder to another in fee, and after the death of the tenant for life a stranger enters, this is an intrusion. The remedy in abatement or intrusion may be by entry, without the parties being put about to bring their action: for as the original entry of the wrong-doer was unlawful, this may therefore be remedied by the mere entry of him who hath right; unless a descent hath been cast, which gives the heir of the abator or intruder a colourable title, and therefore he shall not be ousted but by another making out a better claim. 3 *Blackst.* 175.

ABATEMENT, in heraldry, an accidental mark, which being added to a coat of arms, the dignity of it is abased, by reason of some stain or dishonourable quality of the bearer.

ABATEMENT, in the customs, an allowance made upon the duty of goods, when the quantum damaged is determined by the judgment of two merchants upon oath, and ascertained by a certificate from the surveyor and land-waiter.

ABATION, an erection at Rhodes, as a fence to the trophy of Artemisia, queen of Halicarnassus, Coos, &c. raised in memory of her victory over the Rhodians; or rather as a screen to conceal the disgrace of the Rhodians from the eyes of the world, the effacing or destroying the trophy being with them a point of religion.

ABATIS, or **ABATTIS**, *f.* [*abbatre*, Fr.] To throw down or beat down. In the military art, it denotes a kind of retrenchment made by a quantity of whole trees cut down, and laid lengthways beside each other, the closer the better, having all their branches pointed towards the enemy, which prevents his approach, at the same time that the trunks serve as a breast-work before the men. The abatis is a very useful work on most occasions, especially on sudden emergencies, when trees are near at hand; and has always been practised, with considerable success, by the ablest commanders in all ages and nations.

ABATIS, an ancient term for an officer of the stables.

ABATER, *f.* The agent or cause by which an abatement is procured; that by which any thing is lessened.

ABATOR, *f.* A law term. One who intrudes into houses or land, void by the death of the former possessor, and yet not entered upon or taken up by his heir, as described above.

ABATUDE, *f.* In old records, any thing diminished.

ABATURE, *f.* [*abatre*, Fr.] Those sprigs of grass which are thrown down by a stag in his passing by.

ABATOS, an island of Egypt, in the Lake Mæris. It was famous for being the sepulchre of Osiris, and for producing the papyrus plant, of which the ancients made their paper.

ABAVO, *f.* in botany, a synonyme of the **ADANSONIA**.

ABB, *f.* a term among clothiers, applied to the yarn of a weaver's warp. They say also *abb-wool* in the same sense.

ABBA, in the Syriac and Chaldee languages, signifies father; and figuratively, a superior, reputed as a father in respect of age, dignity, or affection. It is more particularly used in the Syriac, Coptic, and Ethiopic churches, as a title given to the bishops. The bishops themselves bestow the title *Abba* more eminently on the bishop of Alexandria; which occasioned the people to give him the title of *Baba* or *Papa*, that is, *Grandfather*; a title which he bore before the bishop of Rome. It is a Jewish title of honour given to certain rabbins called *Tanaites*; and it is also used, by some writers of the middle age, for the superior of a monastery, usually called **ABBOT**.

ABBACY, *f.* [*abbatia*, Lat.] The rights or privileges of an abbot.—According to Felinus, an abbacy is the dignity itself, since an abbot is a term or word of dignity and not of office; and, therefore, even a secular person, who has the care of souls, is sometimes, in the canon law, also styled an abbot.

ABBADIE (James), an eminent protestant divine, born at Nay in Bern, in 1654; first educated under the famous John

John la Placette, and afterwards at the university of Sedan. From thence he went into Holland and Germany, and was minister in the French church of Berlin. He left that place in 1690; came into England; and was some time minister in the French church in the Savoy, London; and was made dean of Killaloe in Ireland. He died in London, in 1727, aged 73. He was strongly attached to the cause of King William, as appears in his elaborate defence of the revolution, and his history of the assassination-plot. He had great natural abilities, which he improved by true and useful learning. He was a most zealous defender of the primitive doctrine of the protestants, as appears by his writings; and that strong nervous eloquence for which he was so remarkable; enabled him to enforce the doctrines of his profession from the pulpit with great spirit and energy. He published several works in French, that were much esteemed.

ABBAS, son of Abdalthothleb, and Mahomet's uncle, opposed his nephew with all his power, esteeming him an impostor and infidel; but, in the second year of the Hégira, being overcome and made a prisoner at the battle of Bendir in 623, and a great ransom being demanded for him, he represented to Mahomet, that his paying it would reduce him to poverty, which would redound to the dishonour of the family. But Mahomet having been informed of Abbas's having secreted large sums of money, asked him after the purses of gold he had left in his mother's custody at Mecca. Abbas, upon this, conceiving him to be really a prophet, embraced his new religion; became one of his principal captains; and saved his life when in imminent danger at the battle of Hainin, against the Thakefites, soon after the reduction of Mecca. But besides being a great commander, Abbas was also a famous doctor of the Mussulman law, inasmuch that he read lectures upon every chapter of the Koran, as his nephew pretended to receive them one by one from heaven. He died in 652, and his memory is held in the highest veneration among the Mussulmans to this day.

ABBAS (Abul), surnamed Sassah, was proclaimed khalif; and in him began the dynasty of the

ABBASIDES, who possessed the khalifate for 524 years; and there were thirty-seven khalifs of this race who succeeded one another without interruption.

ABBE, *f.* in a modern sense, the name of a curious popular character in France, of late very much mentioned, but very little known, in Britain. The term is not to be rendered in our language, as the existence of the class it denominates is posterior to the reformation, and no such character was known among the Romanists till about a century and a half ago.

Abbés, according to the strictest definition, are persons who have never obtained any precise or fixed settlement in church or state, yet possessed, till very lately, the most ready access to all tables, and to all communities in France. Their dress was rather that of an academic, or of a professed scholar, than of an ecclesiastic; and, by never varying in colour, was no incumbrance on the pocket. We are told these abbés were very numerous, and no less insinuating. They were, in colleges, the instructors of youth; in private families, the tutors of young gentlemen; and many procured a decent livelihood by their literary and witty compositions of all kinds, from the profoundest philosophy, to the most airy romances. They were in short, a body of men who possessed a fund of universal talents and learning, and were incessantly employed in the publication of the most witty sarcasms, and impressive truths. No subject escaped them; serious or gay, solid or ludicrous, sacred or profane, all were subservient to their researches; and, as they were conversant in the lowest as well as the highest political topics, their fame was equally great in the learned, and in the scribbling world. A distinguishing part of their character too was their devotion to the fair-sex: whose favourites, in return, they had the honour of being in the most enviable degree; the wit and smartness for which they were remarkable, being just the very thing

that suited the French ladies. In fine, these abbés were sought after by most people, on various accounts; as they were equally men of business and pleasure, not less expert in the most serious transactions, than fond of enjoying their share in whatever occupied the gay world. Hence they diligently frequented all public spectacles, which were thought incomplete without them; and they composed the most intelligent part of the company, as they were the most weighty approvers or condemnors of what passed in all places. And it is now said, that by the wit and subtlety of their writings,—by the poignancy of their satire, and the freedom of their speech, they were, in a great measure, the instruments of stirring up the public mind, and of bringing about that astonishing revolution, which will ever make the most prominent feature in the civil and political history of France.

ABBE, in a monastic sense, the same with ABBOT.

ABBEFIORD, a sea-port of Norway.

ABBERLOUGH, a beautiful lake in Argyleshire.

ABBERTON, near Loxden, Essex.—ABBERTON, near Pershore, seven miles from Worcester, famous for its mineral water.—ABBERWICK, near Alnwick, Northumberland.—ABBENHALL, twelve miles from Gloucester, three from Newnham, noted for a spring of water very efficacious in the cure of cutaneous eruptions.

ABBESS, *f.* the superior of an abbey or convent of nuns. The abbess has the same rights and authority over her nuns that the abbots regular have over their monks. The sex indeed does not allow her to perform the spiritual functions annexed to the priesthood, wherewith the abbot is usually invested; but there are instances of some abbesses who have a right or rather a privilege, to commission a priest to act for them. They have even a kind of episcopal jurisdiction, as well as some abbots who are exempted from the visitation of their diocessans. Martene, in his Treatise on the Rites of the Church, observes, that some abbesses have formerly consecrated their nuns. But he adds, that their excessive curiosity carried them such lengths, that there arose a necessity of checking it. However, St. Basil, in his rule, allows the abbess to be present with the priest at the confession of her nuns.

ABBEVILLE, a considerable city of France in Picardy, and the capital of Ponthieu; the river Somme runs through the middle of it, and divides it into two parts. It has a collegiate-church, and twelve parish-churches; the most considerable of which are St. George's and St. Giles's, besides a great number of monasteries and nunneries, a bailiwick, and a presidial court. It is a fortified town; the walls are flanked with bastions, and surrounded by large ditches. The country about it is low, marshy, and dirty. It is pretty well peopled, and is famous for its manufactory of soaps, and linen and woollen cloths. It is about fifteen miles east of the British channel, and ships may come by the river Somme to the middle of the town. This city is 52 miles S. of Calais, and 80 N. by W. of Paris. E. lon. 2. 6. lat. 50. 7.

ABBEY, or ABBY, *f.* [abbatia, Lat.] A monastery of religious persons, whether men or women; distinguished from religious houses of other denominations by larger privileges.

Abbeys differ from priories, in that the former are under the direction of an abbot, and the others of a prior; but abbot and prior (we mean a prior conventual) are much the same thing, differing in little but the name. These abbeys were at first nothing more than religious houses, whither persons retired from the bustle of the world to spend their time in solitude and devotion. But they soon degenerated from their original institution, and procured large privileges, exemptions, and riches. They prevailed greatly in England: and, as they increased in riches, so the state became poor; for the lands which these regulars possessed were in *mortua manu*, i. e. could never revert to the lords who gave them. This inconvenience gave rise to the statutes against gifts in *mortmain*, which prohibited donations to these religious houses: and Lord Coke

Coke tells us, that several lords, at their creation, had a clause in their grant, that the donor might give or sell his land to whom he would (*exceptis viris religiosis & Judæis*), excepting monks and Jews.

These places were wholly abolished in England at the time of the reformation; Henry VIII. having first appointed visitors to inspect into the lives of the monks and nuns, which were found in some places very disorderly: upon which, the abbots, perceiving their dissolution unavoidable, were induced to resign their houses to the king, who by that means became invested with the abbey-lands: these were afterwards granted to different persons, whose descendants enjoy them at this day: they were then valued at 2,853,000*l.* per annum,—an immense sum in those days.

Though the suppression of religious houses, even considered in a political light only, was of a very great national benefit, it must be owned that, at the time they flourished, they were not entirely useless. Abbeys or monasteries were then the repositories, as well as the seminaries of learning; many valuable books and national records, as well as private evidences, have been preserved in their libraries; the only places wherein they could have been safely lodged in those turbulent times. Many of those which had escaped the ravages of the Danes, were destroyed with more than Gothic barbarity at the dissolution of the abbeys. These ravages are pathetically lamented by John Bale, in his declaration upon Leland's Journal, 1549. "Covetousness (says he) was at that time so busy about private commodity, that public wealth, in that most necessary and of respect, was not any where regarded. A number of them which purchased these superstitious mansions, reserved of the library-books, some to serve their jacks, some to scour the candlesticks, and some to rub their boots; some they sold to the grocer and soap-feller; and some they sent over the sea to the book-binders, not in small numbers, but in whole ships full; yea, the universities of this realm are not clear of so detestable a fact. I know a merchant that bought the contents of two noble libraries for forty shillings price; a shame it is to be spoken! This stuff hath he occupied instead of grey paper, by the space of more than these ten years, and yet he hath store enough for as many years to come. I shall judge this to be true, and utter it with heaviness, that neither the Britons under the Romans and Saxons, nor yet the English people under the Danes and Normans, had ever such damage of their learned monuments as we have seen in our time."

In those days every abbey had at least one person whose office it was to instruct youth; and the historians of this country are chiefly beholden to the monks for the knowledge they have of former national events. In these houses also the arts of painting, architecture, and printing, were cultivated. The religious houses also were hospitals for the sick and poor; affording likewise entertainment to travellers at a time when there were no inns. In them the nobility and gentry who were heirs to their founders could provide for a certain number of ancient and faithful servants, by procuring them corodies, or stated allowances of meat, drink, and clothes. They were likewise an asylum for aged and indigent persons of good family. The neighbouring places were also greatly benefited by the fairs procured for them, and by their exemption from forest-laws; add to which, that the monastic estates were generally let at very easy rents, the fines given at renewals included.

The abbots who presided over these monasteries, were many of them called to parliament, and had seats and votes in the house of lords. Of abbots and priors who statedly and constantly enjoyed this privilege, there were twenty-nine in all, viz. the Abbot of Tewkesbury, the Prior of Coventry, the Abbots of Waltham, Cirencester, St. John's at Colchester, Croyland, Shrewsbury, Selby, Bardney, St. Bennet's of Hulme, Thorney, Hyde at Winchester, Winchester, Battel, Reading, St. Mary's in York, Ramsey, Peterborough, St. Peter's in Gloucester,

Glastonbury, St. Edmundsbury, St. Austin in Canterbury, St. Alban's, Westminster, Abingdon, Evesham, Malmesbury, and Tavistock, and the prior of St. John's of Jerusalem, who was styled the first baron of England, but it was in respect to the lay barons only, for he was the last of the spiritual barons.

The abbey-lands, before the dissolution of the monasteries, were many of them discharged from the payment of tithes; either by the pope's bulls; or by real composition with the parson, patron, and ordinary; or by their order, as Cistercians, Templars, Hospitalars, and Premonstratenses. But this was only so long as the lands remained in the hands of the several religious societies, and were cultivated by them, and not in the hands of their tenants or lessees. These exemptions by the dissolution had been abolished, if they had not been continued by the act of parliament 31 Henry VIII. c. 13. with respect to such of the monasteries as were dissolved by that act; which enacts, that they who shall have any lands belonging to the said religious houses, shall enjoy them discharged of the payment of tythes, in like manner as the abbots and others enjoyed the same at the time of their dissolution. Which act also created a new discharge, which was not before at the common law, that is, *unity of the possession* of the parsonage and land tithable in the same hand; for if the monastery, at the time of the dissolution, was seized of the lands and rectory, and had paid no tithes within the memory of man for the lands; those lands shall now be exempted from payment of tythe, by a supposed perpetual unity of possession; because the same persons that had the lands, having also the parsonage, could not pay tithes to themselves. And now, though the titles of discharge under 31 Henry VIII. are many of them lost, and cannot be made out at this day; yet if the lands of a religious house have been held since the dissolution freed from the payment of tythes, it shall be intended that they were held so before. Wood, b. 2. c. 2.

ABBEYBOYLE, a town of Ireland, in the county of Roscommon, and province of Connaught, situate on the river Buelle, over which there are two stone bridges. It is eighty-four miles from Dublin, and is remarkable for an old abbey. W. long. 8. 32. lat. 56. 54.

ABBEYHOLM, a town in Cumberland, so called from an abbey built there by David king of Scots. It stands on an arm of the sea, 16 miles from Carlisle. W. long. 2. 38. Lat. 54. 45.

ABBEY-LUBBER, *f.* A slothful loiterer in a religious house, under pretence of retirement and austerity.

ABBOT, *f.* [in the lower Latin *abbas*, from *ab* father, which sense was still implied; so that the abbots were called *patres*, and abbesses *matres monasterii*.] The chief of a convent, or fellowship of canons. Of these, some in England were mitred, some not: those that were mitred, were exempted from the jurisdiction of the diocesan, having in themselves episcopal authority within their precincts, and being also lords of parliament. The other sort were subject to the diocesan in all spiritual government. Some were called *croziered abbots*, from their bearing the crozier or pastoral staff. Others were styled *acumenical* or universal abbots, in imitation of the patriarch of Constantinople: while others were termed *cardinal abbots*, from their superiority over all other abbots. At present, in the Roman-catholic countries, the principal distinctions observed between abbots are those of *regular* and *commendatory*. The former take the vow and wear the habit of their order; whereas the latter are seculars, though they are obliged by their bulls to take orders when of proper age. Anciently, the ceremony of creating an abbot consisted in clothing him with the habit called *cuculus*, or cowl; putting the pastoral staff into his hand, and the shoes called *pedales* on his feet; but at present, it is only a simple benediction, improperly called, by some, consecration.

ABBOT (George), archbishop of Canterbury, was born Oct. 29, 1562, at Guildford in Surrey. He went through his

his studies at Oxford, and in 1597 was chosen principal of University College. In 1599, he was installed dean of Winchester: the year following, he was chosen vice-chancellor of the university of Oxford, and a second time in 1603. In 1604, that translation of the bible now in use was begun by the direction of king James; and Dr. Abbot was the second of eight divines of Oxford, to whom the care of translating the whole New Testament (excepting the epistles) was committed. The year following, he was a third time vice-chancellor. In 1608, he went to Scotland with George Hume earl of Dunbar, to assist in establishing an union betwixt the kirk of Scotland and the church of England; and in this affair he behaved with so much address and moderation, that it laid the foundation of all his future preferment. For king James ever after paid great deference to his advice and counsel; and upon the death of Dr. Overton bishop of Litchfield and Coventry, he named Dr. Abbot for his successor, who was accordingly constituted bishop of those two united sees in Dec. 1609. About a month afterwards he was translated to the see of London, and on the second of November following was raised to the archiepiscopal see.

His great zeal for the protestant religion made him a strenuous promoter of the match between the Elector Palatine and the princess Elizabeth; which was accordingly concluded and solemnized on the 14th of February, 1612, the archbishop performing the ceremony on a stage erected in the royal chapel. In the following year happened the famous case of divorce betwixt the lady Francis Howard, daughter of the earl of Suffolk, and Robert earl of Essex: an affair which has been by many considered as one of the greatest blemishes of king James's reign: but the part acted therein by the archbishop added much to the reputation he had already acquired for incorruptible integrity. He prepared a speech, which he intended to have spoken against the nullity of the marriage, in the court of Lambeth; but he did not make use of it, because the king ordered the opinions to be given in few words. He continued, however, inflexible in his opinion against the divorce; and drew up his reasons, which the king thought fit to answer himself. It need scarcely be added, that sentence was given in the lady's favour. In 1618, the king published a declaration, which he ordered to be read in all churches, permitting sports and pastimes on the Lord's day: this gave great uneasiness to the archbishop; who, happening to be at Croydon when it came thither, had the courage to forbid its being read.

Being now in a declining state of health, the archbishop used in the summer to go to Hampshire for the sake of recreation; and being invited by Lord Zouch to hunt in his park at Bramshill, he met there with the greatest misfortune that ever befel him; for he accidentally killed the game-keeper by an arrow from a cross-bow which he shot at one of the deer. The accident threw him into a deep melancholy; and he ever afterwards kept a monthly fast on Tuesday, the day on which this mischance happened, and he settled an annuity of 20l. on the widow. There were several persons who took an advantage of this misfortune, to lessen him in the king's favour; but his majesty said, "An angel might have miscarried in this fort." His enemies alleging that he had incurred an irregularity, and was thereby rendered unfit for performing the offices of a primate; the king directed a commission to ten persons to inquire into this matter.

The result, however, was not satisfactory to his grace's enemies; it being declared, that, as the murder was involuntary, he had not forfeited his archiepiscopal character. The archbishop thenceforward seldom assisted at the council, being chiefly hindered by his infirmities; but in the king's last illness he was sent for, and attended with great constancy till his majesty expired on the 27th of March 1625. He performed the ceremony of the coronation of King Charles I. though very infirm and much troubled with the gout. At length being worn out with cares and infirmities, he died at Croydon, the 5th of Aug.

1633, aged 71 years; and was buried at Guildford, the place of his nativity, where he had endowed an hospital with lands, to the amount of 300l. per annum. A stately monument is erected over the grave, with the effigy of the archbishop in his robes.

He showed himself, in most circumstances of his life, a man of great moderation to all parties; and was desirous that the clergy should attract the esteem of the laity by the sanctity of their manners, rather than claim it as due to their function.

ABBOT (Robert), elder brother to the former, born at Guildford in 1560, went through his studies in Baliol college, Oxford. In 1582, he took his degree of master of arts, and soon became a celebrated preacher; and to this talent he chiefly owed his preferment. Upon his first sermon at Worcester, he was chosen lecturer in that city, and soon after rector of All Saints in the same place. John Stanhope, Esq. happening to hear him preach at Paul's-cross, was so pleased with him, that he immediately presented him to the rich living of Bingham in Nottinghamshire. In 1597, he took his degree of doctor in divinity; and, in the beginning of king James's reign, was appointed chaplain in ordinary to his majesty; who had such an opinion of him as a writer, that he ordered the doctor's book *De Antichristo* to be printed with his own commentary upon part of the Apocalypse. In 1609, he was elected master of Baliol college; which trust he discharged with the utmost care and assiduity, by his frequent lectures to the scholars, by his continual presence at public exercises, and by promoting temperance in the society. In Nov. 1610, he was made prebendary of Normanton in the church of Southwell; and, in 1612, the king appointed him regius professor of divinity at Oxford. The fame of his lectures became very great; and those which he gave upon the supreme power of kings against Bellarmine and Suarez, so much pleased his majesty, that when the see of Salisbury became vacant, he named him to that bishopric, and he was consecrated by his own brother at Lambeth, Dec. 3, 1615. When he came to Salisbury, he found the cathedral in a state of decay, owing to the covetousness of the clergy belonging to it; however, he found means to draw five hundred pounds from the prebendaries, which he applied to the reparation of the church. He then gave himself up to the duties of his function with great diligence and assiduity, visiting his whole diocese in person, and preaching every Sunday whilst health would permit. But this was not long: for his sedentary life, and close application to study, brought upon him the gravel and stone; of which he died on the 2d of March 1618, in the fifty-eighth year of his age; having not filled the see quite two years and three months, and being one of the five bishops which Salisbury had in six years. He was buried opposite to the bishop's seat in the cathedral. Dr. Fuller, speaking of the two brothers, says, "that George was the more plausible preacher, Robert the greater scholar; George the abler statesman, Robert the deeper divine; gravity did frown in George, and smile in Robert." He published several pieces: he also left behind him sundry manuscripts, which Dr. Corbet made a present of to the Bodleian library.

ABBOTS, or APEWOOD-CASTLE, in Staffordshire, situated on a lofty round promontory, and a steep ridge of hills extending a mile in length, supposed to have been one continued fortification of the ancient Britons. It is in the parish of Seisdon, seven miles from Wolverhampton. —ABBOT'S-ANNE, near Andover, Hampshire. —ABBOT'S-BECKINGTON, on the river Towridge, Devonshire.

ABBOTS-BROMLEY, a market-town in Staffordshire. After the dissolution of the monasteries, it was given to the Lord Paget; and has since been called Paget's Bromley, and is so denominated in the county map. But it retains its old name in the king's books, and is a discharged vicarage of 30l. clear yearly value. W. long. 1. 53. lat. 52. 50.—The place consists chiefly of one street, about

the middle of which is the town-hall, wherein are annually held the court-leet and court-baron of the Right Hon. the Earl of Uxbridge, lord of the manor, and patron of the church; here is also a market-place, which is spacious and very clean. The houses are neat, and built in general of brick.

Bromley stands in a fine open fertile country, distant from Litchfield 11 miles; Rugely, Uttoxeter, and Wolfelley-bridge, 6; from Stafford 13; and from London 128. It has a free grammar-school, founded in 1603, by Mr. Richard Clarke. Also an alms-house well endowed, by Lambert Bagot, Esq. in 1703, for six poor old men; and several other charities, to a considerable amount. The market-day is on Tuesday; and there are three fairs held annually, for horses, cows, pigs, sheep, &c. viz. on the Tuesday after Midlent Sunday, the 22d of May, and the 4th of September.

ABBOTSBURY, a small town in Dorsetshire, 10 miles from Dorchester, 8 from Weymouth, 7 from Bridport, and 127 from London. The abbey, from which this town took its name, was founded by a Norman lady, about the year 1026; and Edward the Confessor, and William the Conqueror, were considerable benefactors to it. The church is a large and handsome structure, dedicated to St. Nicholas, and supposed to have been built not very long before the reformation; it is situated on the fourth side of the town, and the whole length is forty-eight feet. St. Catherine's chapel stands on an high round hill, half a mile S. W. of the town: it has two porches, a turret at the west end, and windows all round it. It is a strong handsome building, with a compass roof arched with stone, and is esteemed a great curiosity, and one of the most venerable pieces of antiquity this kingdom has to boast. By the stile of building, it seems to have been erected in the reign of Edward IV. It serves, by its high situation, both for a sea and land mark. This town formerly had a market on Fridays, afterwards changed to Thursdays, and two fairs; but the market and one of the fairs are, of late years, quite decayed. Here is still one fair yearly on St. Peter's day, the tutelar saint of the abbey. In 1706, the west part of the town was burnt down. The principal part of the inhabitants (which are not numerous) depend chiefly on fishing, or on the cultivation of small farms; and others are employed in spinning of cotton, which is here manufactured into stockings, the excellency of which has long acquired great reputation. There is a free-school for teaching twenty poor boys reading, writing, and arithmetic; at first endowed with 12l. per ann. since augmented to 20l. by the late Mrs. Horner. The town lies near the shore, where vast quantities of fine mackarel are caught from the middle of March till Midsummer; they have sometimes caught 30 or 40,000 at a draught, and 100 have been sold for a penny: there are many curious stones on the beach, and stone is dug in the quarries near the shore, very serviceable for flating or paving. About a quarter of a mile S. W. of Abbotbury is a large decoy, well covered with wood, where plenty of wild fowl resort, and are taken. A little west of the town is a noble swannery, much visited by strangers: in the open part of the fleet are kept 6 or 700, formerly 1500, swans: the royalty belonged anciently to the abbot; since to the family of the Strangers; now to the countess dowager of Ilchester, who has a small house upon the margin of the beach, where she usually resides some time in the summer months. About a mile and an half west of the town is an old fortification. The vicinity of this town to Weymouth, being a pleasant ride, occasions, in the bathing-season, frequent excursions of company from that place, particularly of such as are curious in monastic antiquities; or have a taste for romantic prospects; none of whom ever visit this place without expressions of the utmost satisfaction and pleasure. Lat. 50. 38. W. lon. 2. 42.

ABBOTSBURY, near Barley, Hertf. ABBOT'S-CARESWELL, Devon.—ABBOT'S-CROME, Worc.—ABBOT'S-FEE-TYTHING, near Sherborne, Dorset.—ABBOTSHAM,

near Biddeford, Devon.—ABBOT'S-LANGLEY, near Barkway, Hertf.—ABBOT'S-LEIGH, or ISLE, near Ilminster, Somerset.—ABBOTSLEY, near St. Neot's, Hunt. ABBOT'S-MORETON, Worcest.—ABBOTSTOCK, Devon.—ABBOTSTOKE, near Benifist, Dorset.—ABBOTSTONE, near Kingswood, Glou. called also WYKE, from a winding brook that runs by it.—ABBOTSTONE, near Sytton, Glou.—ABBOTSTONE, Wilts.—ABBOTSTONE, near Alresford, Hants.—ABBOTSTOOTH, Dorset. near Wimborne.—ABBOTSWOOD, Worcest. 4 miles N. W. of Pershore.—ABBOT'S WORTHY, near Winchester, Hants.—ABBOT'S-COURT, in Walton, Surrey.

ABBOTSHIP, *f.* The state or privilege of an abbot.

To ABBREVIATE, *v. a.* [*abbreviare*, Lat.] To shorten by contraction of parts without loss of the main substance; to abridge.—The only invention of late years, which hath contributed towards politeness in discourse, is that of *abbreviating* or reducing words of many syllables into one, by lopping off the rest. *Swift*.—To shorten, to cut short.

ABBREVIATION, *f.* The act of abbreviating. The means used to abbreviate, as characters signifying whole words; words contracted.—By statute 4 G. 2. c. 26. all law proceedings shall be in the English tongue, and written in a common legible hand and character, and in words at length and not *abbreviated*: but by 6 G. 2. c. 14. this is somewhat mitigated, which allows, that they may be written in the like manner of expressing numbers by figures as hath been commonly used, and with such *abbreviations* as are now commonly used in the English language.

ABBREVIATOR, *f.* [*abbreviator*, Fr.] One who abbreviates, or abridges.

ABBREVIATORS, a college of seventy-two persons in the chancery of Rome, who draw up the pope's briefs, and reduce petitions, when granted by him, into proper form for being converted into bulls.

ABBREVIATURE, *f.* [*abbreviatura*, Lat.] A mark used for the sake of shortening. A compendium or abridgement.—He who prays for him that wrongs him, forgiving all his faults; who sooner shews mercy than anger; who offers violence to his appetite, in all things endeavouring to subdue the flesh to the spirit: this is an excellent *abbreviature* of the whole duty of a Christian. *Taylor*.

ABBREUVOIR, *f.* [a watering-place. Ital. *abbeverato*, dal verbo *bevere*. Lat. *bibere*. This word is derived by Menage, not much acquainted with the Teutonic dialects, from *adbibere* for *adhibere*; but more probably it comes from the same root with *brew*.] Among masons, the joint or juncture of two stones, or the interstice between two stones to be filled up with mortar.

ABBS-HEAD, St. a promontory or head-land in Perwickshire, Scotland, in the division of Lamber Muir. It is the midway between Coldingham and Lumsden. This head-land is the southern extremity of the frith of Forth. Lat. 55. 55. lon. 1. 56. W.

ABBTENAU, a market town, in the archbishopric of Saltzburgh, in the circle of Bavaria, Germany, about ten miles N. W. of Radstadt, on a branch of the river Salzach.

ABCEDARY, or ABCEDARIAN, *adj.* an epithet given to compositions, the part of which are disposed in the order of the letters of the alphabet: thus we say, Abcedarian psalms, lamentations, hymns, &c.

ABCOUDE, a village, about nine miles from Amsterdam, on the road to Utrecht.

ABCOURT, a town near St. Germain's, four leagues from Paris. Here is a brisk chalybeate water impregnated with fixed air and the fossil alkali; and resembling the water of Spa and Ilmington.

ABDALLA, the son of Abdalmothleb, was the father of the prophet Mahomet. Several other Arabians of eminence bore the same name.

ABDALMALEK, the son of Mirvan, and the fifth khalif of the race of the Ommiades, surnamed *Rafsch al Hegianat*, i. e. the skinner of a stone, because of his extreme

treme avarice; as also *Aboulzebah*, because his breath was said to be so poisonous as to kill all the flies which rested on his face. Yet he surpassed all his predecessors in power and dominion; for in his reign the Indies were conquered in the east, and his armies penetrated Spain in the west: he likewise extended his empire toward the south, by making himself master of Medina and Mecca. He began his reign in the sixty-fifth year of the Hegira, A. D. 648; reigned fifteen years; and four of his sons enjoyed the khalifate one after another.

ABDALMOTHLEB, or **ABDAL MATELEB**, the son of Hassem, the father of Abdalla, and grandfather of Mahomet the prophet of the Mussulmans, was, it is said, of such wonderful comeliness and beauty, that all women who saw him became enamoured; which may have given occasion to that prophetic light which, according to the Arabians, shone on the forehead of him, his ancestors, and descendants; it being certain that they were very handsome and graceful men. He died when Mahomet, of whom he had taken particular care, was only eight or nine years old; aged, according to some, 110, and according to other writers 120.

ABDALONYMUS, or **ABDOLONYMUS** (in classic history), of the royal family of Sidon, and descended from king Cinyras, was contented to live in obscurity, and obtain his subsistence by cultivating a garden, while Strato was in possession of the crown of Sidon. Alexander the Great having deposed Strato, enquired whether any of the race of Cinyras was living, that he might set him on the throne. It was generally thought that the whole race was extinct: but at last Abdalonymus was thought of, and mentioned to Alexander; who immediately ordered some of his soldiers to fetch him. They found the good man at work, happy in his poverty, and entirely a stranger to the noise of arms, with which all Asia was at that time disturbed; and they could scarcely persuade him they were in earnest. Abdalonymus at first thought it an insult offered to his poverty. He requested them not to trouble him with their impertinent jests, and to find some other way of amusing themselves, which might leave him in the peaceable enjoyment of his obscure habitation. At length, however, they convinced him that they were serious in their proposal, and prevailed upon him to accept the regal office, and accompany them to the palace. No sooner was he in possession of the government, than pride and envy created him enemies, who whispered their murmurs in every place, till at last they reached the ear of Alexander; who, commanding the new-elected prince to be sent for, required of him, with what temper of mind he had borne his poverty. "Would to heaven," replied Abdalonymus, "that I may be able to bear my crown with equal moderation: for when I possessed little, I wanted nothing: these hands supplied me with whatever I desired." From this answer Alexander formed so high an idea of his wisdom, that he confirmed the choice he had before made, and annexed a neighbouring province to the government of Sidon.

ABDALS, in the eastern countries, a kind of saints supposed to be inspired to a degree of madness. The word comes, perhaps, from the Arabic *Abdallah*, the servant of God. They are often carried by excess of zeal, especially in the Indies, to run about the streets, and kill all they meet of a different religion; of which travellers furnish many instances. The English call this *running a muk*, from the name of the instrument, a sort of poniard, which they employ on those desperate occasions. If they are killed, as it commonly happens, before they have done much mischief, they reckon it highly meritorious; and are esteemed, by the vulgar, martyrs for their faith.

ABDARA, or **ABDERA**, anciently a town of Bœotia in Spain, a Phœnician colony; now Adra, to the west of Almeira in the kingdom of Granada.

ABDERA, was formerly a maritime town of Thrace, not far from the mouth of the river Nessus, on the east side. The foundation, according to Herodotus, was at-

tempted to be laid by Timefius the Clazomenian; but he was forced by the Thracians to quit the design. The Teians undertook it, and succeeded; settling there, in order to avoid the insults of the Persians. Several singularities are told of Abdera. The grass of the country round it was so strong, that such horses as ate of it ran mad. In the reign of Cassander king of Macedon, this city was so pestered with frogs and rats, that the inhabitants were forced to quit it for a time. The Abderites, or Abderitani, were very much derided for their want of wit and judgment: yet their city has given birth to several eminent persons; as Protagoras, Democritus, Anaxarchus, Hecateus the historian, Nicenæus the poet, and many others, who were mentioned among the illustrious men.

ABDERAHMA, a Saracen viceroy in Spain, who revolted and formed an independent principality at Cordova. He had several successors of the same name.

ABDEST, a Persian word, properly signifying the water placed in a basin for washing the hands; but is used to imply the legal purifications practised by the Mahometans before they enter on their religious ceremonies.

ABDIAS OF BABYLON, one of the boldest legend-writers, who boasted he had seen our Saviour, that he was one of the seventy-two disciples, had been eye-witness of the actions and prayers at the deaths of several of the apostles, and had followed into Persia St. Simon and St. Jude, who, he said, made him the first bishop of Babylon. His book intitled *Historia certaminis apostolici*, was published by Wolfgang Lazius, at Basil, 1551; and it has since borne several impressions in different places.

To **ABDICATE**, *v. a.* [*abdicō*, Lat.] To give up one's right; to resign; to lay down an office.

Old Saturn here, with upcast eyes,
Beheld his *abdicated* skies.

Addison.

ABDICATION, *f.* [*abdicatio*, Lat.] The act of abdicating; resignation; quitting an office by one's own proper act before the usual or stated expiration.

ABDICATION, in law, is where a magistrate or person in office renounces and gives it up. So on king James the Second's leaving the kingdom, the commons voted that he had *abdicated* the government, and thereby the throne was become vacant. The lords would have had the word *deserted* to be made use of, but the commons thought it was not comprehensive enough, for then the king might have liberty of returning.

ABDICATIVE, *adj.* [from *abdo*, Lat. to hide.] That which has the power or quality of hiding.

ABDOMEN, *f.* [from *abdo*, Lat. to hide.] A cavity commonly called the lower venter or belly. It contains the stomach, guts, liver, spleen, bladder, and is within lined with a membrane called the peritonæum. See **ANATOMY**.

ABDOMINALES, or **ABDOMINAL FISHES**, constitute the IVth Order of the Fourth Class of Animals, in the Linnæan system. See **ZOOLOGY**.

To **ABDUCE**, *v. a.* [*abduco*, Lat.] To draw to a different part; to withdraw one part from another. A word chiefly used in physic or science.

ABDUCENT, *adj.* Muscles abducent are those which serve to open or pull back divers parts of the body; their opposites being called adducent.

ABDUCTION, *f.* [*abductio*, Lat.] The art of drawing apart, or withdrawing one part from another.—In logic, a particular form of argument, by the Greeks called *apagogē*, wherein the greater extreme is evidently contained in the medium, but the medium not so evidently in the less extreme as not to require some farther medium or proof, to make it appear.—In surgery, a species of fracture, wherein the broken parts of the bone recede from each other.

ABDUCTOR, *f.* [*abductor*, Lat.] The name given by anatomists to those muscles which serve to lead, or draw back, the several members of the body.

ABECEDARIAN,

ABECEDARIAN, *f.* [from the names of *a, b, c*, the three first letters of the alphabet.] He that teaches or learns the alphabet, or first rudiments of literature.

ABEL, second son of Adam and Eve, was a shepherd. He offered to God some of the firstlings of his flock, at the same time that his brother Cain offered the fruits of the earth. God was pleased with Abel's oblation, but displeased with Cain's; which so exasperated the latter, that he rose up against his brother and killed him. These are the only circumstances Moses relates of him; though, were we to take notice of the several particulars to which curiosity has given birth on this occasion, they would run to a very great length. But this will not be expected. It is remarkable, that the Greek churches, who celebrate the feasts of every other patriarch and prophet, have not done the same honour to Abel. His name is not to be found in any catalogue of saints or martyrs till the tenth century; nor even in the new Romish martyrology. However he is prayed to, with some other saints, in several Romish litanies said for persons at the point of death.

ABEL KERAMIM, or **VINCARUM**, beyond Jordan, in the country of the Ammonites, where Jephthah defeated them, seven miles distant from Philadelphia, abounding in vines, and hence the name. It was also called Abela.

ABEL-MEHOLAH, the country of the prophet Elisha, situate on this side Jordan, between the valley of Jezreel and the village of Bethmaela in the plains of Jordan, where the Midianites were defeated by Gideon. Judges, vii. 22.

ABEL-MIZRAIM, called also the Threshing-floor of Atad; signifying the lamentation of the Egyptians; in allusion to the mourning for Jacob. Gen. i. 3, 10, 11. Supposed to be near Hebron.

ABEL-MOSCHUS, or **ABELMUSH**, *f.* in botany, the trivial name of a species of the **HIBISCUS**.

ABEL-SATTIM, or **SITTIM**, a town in the plains of Moab, to the north-east of the Dead Sea, not far from Jordan, where the Israelites committed fornication with the daughters of Moab. So called, probably, from the great number of sittim-trees there.

ABELARD (Peter), one of the most famous doctors of the twelfth century, was born at Palais near Nantz, in Brittany: he was well learned in divinity, philosophy, and the languages; but was particularly distinguished by his skill in logic, and his fondness for disputations, which led him to travel into several provinces in order to give public proof of his acuteness in that science.

After having baffled many antagonists, he read lectures in divinity with great applause at Paris, where he boarded with a canon whose name was Fulbert, and who had a very beautiful niece named Heloise. The canon ardently wished to see this young lady make a figure among the learned, and Abelard was made her preceptor; but, instead of instructing her in the sciences, he taught her to love. Abelard now performed his public functions very coldly, and wrote nothing but amorous verses. Heloise proving with child, Abelard sent her to a sister of his in Brittany, where she was delivered of a son. To soften the canon's anger, he offered to marry Heloise privately; and the old man was better pleased with the proposal than the niece; who, from a singular excess of passion, chose to be Abelard's mistress rather than his wife. She married, however; but used often to protest upon oath that she was single, which provoked the canon to use her ill. Upon this, Abelard sent her to the monastery of Argenteuil; where she put on a religious habit, but did not take the veil. Heloise's relations considering this as a second treachery, hired ruffians, who, forcing into his chamber in the dead of night, emasculated him. This infamous treatment made him fly to the gloom of a cloister. He assumed the monastic habit in the abbey of St. Dennis; but the disorders of that house soon drove him from thence. He was afterwards charged with heresy; but after several persecutions for his religious sentiments, he settled in a solitude in the diocese of Troies, where he

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built an oratory, to which he gave the name of the Paraclet. He was afterwards chosen superior of the abbey of Ruis, in the diocese of Vannes; when the nuns being expelled from the nunnery in which Heloise had been placed, he gave her his oratory, where she settled with some of her sister nuns, and became their prioress.—Abelard died in the priory of Marcellus at Chalons, April 21, 1142, aged sixty-three. His corpse was sent to Heloise, who buried it in the Paraclet. He left several works: the most celebrated of which are those tender letters that passed between him and Heloise, with an account of their misfortunes prefixed; which have been translated into English, and immortalized by the harmony of Mr. Pope's numbers.

ABEL-TREE, *f.* or **ABELE-TREE**, an obsolete name for a species of the poplar. See **POPULUS**.

ABELLIANS, **ABEOLITES**, or **ABELONIANS**, *f.* in church-history, a sect of heretics mentioned by St. Austin, which arose in the diocese of Hippo in Africa, and is supposed to have begun in the reign of Arcadius, and ended in that of Theodosius. Indeed it was not calculated for being of any long continuance. Those of this sect regulated marriage after the example of Abel; who, they pretended, was married, but died without ever having known his wife. They therefore allowed each man to marry one woman, but enjoined them to live in continence; and, to keep up the sect, when a man and woman entered into this society, they adopted a boy and a girl, who were to inherit their goods, and to marry upon the same terms of not begetting children, but of adopting two of different sexes.

ABELLA, anciently a town of Campania, near the river Clanius. The inhabitants were called Abellani, and said to have been a colony of Chalcidians. The nux Avellana, called also Prænestina, or the hazel-nut, takes its name from this town, according to Macrobius. Now Avella.

ABELLINUM, anciently a town of the Hirpini, a people of Apulia; distant about a mile from the rivulet Sabbato, between Beneventum and Salernum. Pliny calls the inhabitants Abellinates, with the epithet Protopi, to distinguish them from the Abellinates Marsi. Now Avellino.—E. lon. 15. 20. lat. 21.

ABEN EZRA (Abraham), a celebrated rabbi, born at Toledo, in Spain, called by the Jews, The wise, great, and admirable, Doctor, was a very able interpreter of the Holy Scriptures; and was well skilled in grammar, poetry, philosophy, astronomy, and medicine. He was also a perfect master of the Arabic. His principal work is, Commentaries on the Old Testament, which is much esteemed: these are printed in Bomberg's and Buxtorf's Hebrew Bibles. His style is clear, elegant, concise, and much like that of the Holy Scriptures: he almost always adheres to the literal sense, and every where gives proofs of his genius and good sense: he, however, advances some erroneous sentiments. The scarcest of all his books is intitled Jesud Mora; which is a theological work, intended as an exhortation to the study of the Talmud. He died in 1174, aged 75.

ABEN MELLER, a learned rabbi, who wrote a commentary on the Old Testament in Hebrew, intitled, The Perfection of Beauty.

ABENAS, a town of France, in Languedoc and in the Lower Vivarais, seated on the river Ardesch, at the foot of the Cevennes. E. lon. 4. 43. lat. 44. 40.

ABENEL GAUBY, a fixed star of the second or third magnitude, on the south scale of the constellation **LIBRA**.

ABENOW, a mountain of Suabia, in Germany, twenty-three miles from Friburg. It is the source of the Danube, and gives name to a chain of mountains, extending from the Rhine to the Neckar, and from the Forest-Towns to the city of Thorheim.

ABENRADE, a mountainous district of Slewick; it has for its capital

ABENRADE, or **APENRADE**, a flourishing town, on a spacious

spacious bay, with a good harbour, where they build large ships. Lat. 55. 6. N. lon. 9. 14. E.

ABENSBURG, a small town of Germany, in the circle and duchy of Bavaria, and in the government of Munich. It is seated on the river Abentz, near the Danube. E. lon. 11. 38. lat. 48. 45.

ABERAVON, a borough-town of Glamorganshire, in Wales, governed by a portreeve. It had a market, which is now discontinued. The vicarage is discharged, and is worth 45*l.* clear yearly value. It is seated at the mouth of the river Avon, 194 miles west of London. W. lon. 3. 21. lat. 51. 40.

ABERBROTHWICK, or ABERBROATH, one of the royal boroughs of Scotland, situated in the county of Angus, about forty miles N. N. E. of Edinburgh; its W. lon. being 2. 29. and N. lat. 56. 36. It is seated on the discharge of the little river Brothie into the sea, as the name imports, *Aber* in the British implying such a situation. It is a small but flourishing place, well built, and still increasing.—The glory of this place was the abbey, whose very ruins give some idea of its former magnificence. It was founded by William the Lion in 1173, and dedicated to our celebrated primate Thomas à Becket.

ABERCONWAY, or CONWAY, Caernarvonshire, North Wales; so called from its situation at the mouth of the river Conway. It is a handsome town, pleasantly situated on the side of a hill, and has many conveniences for trade; notwithstanding which it is the poorest town in the county. It was built by Edward I. and had not only walls, but a strong castle which is now in ruins. Here is an inscription on the tomb of one Nicholas Hooker, importing that he was the one-and-fortieth child of his father, and had twenty-seven children himself. It is 235 miles from London. W. lon. 3. 47. N. lat. 53. 20.

ABERCORN, a town of West Lothian, near the Edinburgh Frith; here began the Roman wall, said to have been built by Severus, which ran west across the country to the Frith of Clyde.

ABERCORN, a small town of Georgia, North America, thirteen miles north-west of Savannah.

ABERDEEN, the name of two cities in Scotland, called the Old and New Town, situated on the German ocean, in W. lon. 1. 40. and N. lat. 57. 19.—Aberdeen is a place of great antiquity. According to tradition, it was of note in the reign of Gregory, who conferred on it some privileges about the year 893. In 1004, Malcolm II. founded a bishopric at a place called Mortlich in Banffshire, in memory of a signal victory which he there gained over the Danes: which bishopric was translated to Old Aberdeen by David I. and in 1163, the then bishop of Aberdeen obtained a new charter from Malcolm IV. There is extant a charter of Alexander II. by which, in 1217, the king grants to Aberdeen the same privileges he had granted to his town of Perth.

The Old Town lies about a mile to the north of the New, at the mouth of the river Don, over which is a fine Gothic bridge, of a single arch, greatly admired, which rests at both sides on two rocks. The Old Town was formerly the seat of the bishop, and had a large cathedral commonly called St. Machar's. Two very antique spires, and one aisle, which is used as a church, are now the only remains of it. The bishopric was founded in the time of David I. as above-mentioned. The cathedral had anciently two rows of stone pillars across the church, and three turrets; the steeple, which was the largest of these turrets, rested upon an arch, supported by four pillars. In this cathedral there was a fine library; but, about the year 1560, it was almost totally destroyed. But the capital building is the King's College on the south side of the town, which is a large and stately fabric. It is built round a square, with cloisters on the south side. The chapel is very ruinous within; but there still remains some wood-work of exquisite workmanship, which was preserved by the spirit of the principal at the time of the reformation, who armed his people and checked the blind

zeal of the barons of the Mearns; who, after stripping the cathedral of its roof, and robbing it of the bells, were going to violate this feat of learning. They shipped their sacrilegious booty, with an intention of exposing it to sale in Holland: but the vessel had scarcely gone out of port, when it perished in a storm with all its ill-gained lading. The steeple is vaulted with a double cross arch; above which is an imperial crown, supported by eight stone pillars, and closed with a globe and two gilded crosses. In the year 1631 this steeple was thrown down by a storm, but was soon after rebuilt in a more stately form. This college was founded in 1494, by William Elphinston bishop of this place, lord chancellor of Scotland in the reign of James III. and lord privy seal in that of James IV. But James V. claimed the patronage of it, and it has since been called the King's College. This college, and the Marischal-college in the New Town, form one university, called the University of King Charles. The library is large, but not remarkable for many curiosities. Hector Boethius was the first principal of the college; and sent for from Paris for that purpose, on an annual salary of forty merks Scots, at thirteen-pence each. The square tower on the side of the college was built by contributions from General Monk and the officers under him then quartered at Aberdeen, for the reception of students; of which there are about a hundred belonging to the college, who lie in it.

The New Town is the capital of the shire of Aberdeen. For largeness, trade, and beauty, it greatly exceeds any town in the north of Scotland. It is built on a rising ground, and lies on a small bay formed by the Dee, deep enough for a ship of 200 tons, and above two miles in circumference. The buildings (which are of granite from the neighbouring quarries) are generally four stories high; and have, for the most part, gardens behind them, which gives it a beautiful appearance. In the High-street is a large church which formerly belonged to the Franciscans. This church was begun by Bishop William Elphinston; and finished by Gavinus Dunbar, bishop of Aberdeen, about the year 1500. Bishop Dunbar is said likewise to have built the bridge over the Dee, which consists of seven arches. In the middle of Castle-street is an octagon building, with neat bas-reliefs of the kings of Scotland from James I. to James VII. The town-house makes a good figure, and has a handsome spire in the centre. The grammar-school is a low, but neat building. Gordon's hospital is handsome; in front is a good statue of the founder, and it maintains forty boys, who are apprenticed at proper ages. The infirmary is a large plain building, and sends out between eight and nine hundred cured patients annually. But the chief public building in the New Town is the Marischal-college, founded by George Keith earl of Marischal, in the year 1593, but since greatly augmented by additional buildings, which has about 140 students belonging to it. In both the Marischal and King's colleges, the languages, mathematics, natural philosophy, divinity, &c. are taught by very able professors. The convents in Aberdeen were: One of Mathurines, or of the order of the Trinity, founded by William the Lion, who died in 1214; another of Dominicans, by Alexander II. a third of Observantines, a building of great length in the middle of the city, founded by the citizens and Mr. Richard Vans, &c. and a fourth of Carmelites, or White Friars, founded by Philip de Arbuthnot in 1350.—Aberdeen, including the Old Town, is supposed to contain 25,000 people. Its trade is considerable, but might be greatly extended by an attention to the white fisheries.

The harbour was long a great detriment to its trade, and occasioned the loss of many lives and much property. A stranger could never depend upon finding it as he left it; while vessels lay at anchor in the road till the tide should make, they have often been wrecked by storms which suddenly arose. It was very narrow at the mouth, having the easterly rocky point of the Grampian mountains on the

the fourth, and a flat blowing sand on the north, extending along the coast for many miles. By the easterly and northeasterly storms the sand was driven in a long ridge across the harbour's mouth, and formed what was called the bar. Upon this bar the depth of water at low tide was sometimes not above three feet. Clearing away the sand, though but a partial and temporary remedy, was a matter of great expence to the community. If it was cleared one week so as to have five or six feet of water at ebb, a fresh storm the next week undid all that had been done. The town at last came to the resolution of erecting a strong pier on the north side of the harbour. This pier is 1200 feet in length, and gradually increases in thickness and height as it approaches to the sea, where the head or rounding is sixty feet in diameter at the base, and the perpendicular elevation is thirty-eight feet. The whole is built of granite, the most durable stone known; many of the outside stones are above three tons weight, with hewn beds. It was built under the direction of Mr. Smeaton; and the expence, amounting to above 17,000*l.* is defrayed by doubling the harbour-dues, which are chiefly paid by the inhabitants.—A little to the south of the bar, they have now a depth of seventeen fathoms at low water; and at the harbour's mouth, from eight to nine fathoms, where they had formerly but a few feet.

Aberdeen once enjoyed a good share of the tobacco trade. At present its imports are from the Baltic, and a few merchants trade to the West Indies and North America. Its exports are stockings, thread, salmon, and oatmeal. The first is a most important article, as appears by the following state of it: for, for this manufacture, 20,800 pounds worth of wool is annually imported, and 1600 pounds worth of oil. Of this wool are annually made 69,333 dozen pairs of stockings; worth, at an average, 1*l.* 10*s.* per dozen. These are the work of the country-people in almost all parts of this great county, who get 4*s.* per dozen for spinning, and 14*s.* per dozen for knitting; so that there is annually paid them 62,329*l.* 14*s.* There is, besides, about 2000*l.* value of stockings manufactured from the wool of the county.—The thread manufacture is another considerable article, though trifling in comparison of the woollen.—The salmon-fisheries on the Dee and the Don are a good branch of trade. About forty-six boats and 130 men are employed on the first; and, in some years, 167,000*lb.* of fish have been sent pickled to London, and about 930 barrels of salted fish exported to France, Italy, &c.—The fishery on the Don is far less considerable. The fish of this river are taken in cruises above the bridge; a practice contrary to the ancient laws of the kingdom, unless where the nature of the water rendered the net-fishery impracticable. The inhabitants likewise export considerable quantities of pickled pork, which they sell to the Dutch for victualling their East-India ships and men of war; the Aberdeen pork having the reputation of being the best cured of any in Europe for keeping on long voyages.—“It is however remarkable, (Mr. Knox observes,) that there is not a single decked vessel fitted out from Aberdeen for the herring or white fisheries. Here is now an excellent harbour: an active people, conversant in trade, and possessed of capital; seated within six hours sailing of the Long Portys, and two days sailing of the Shetland Isles. This inattention is the more extraordinary, as the exports of Aberdeen, though very considerable, do not balance the imports in value. The herring and white fisheries, therefore, if prosecuted with vigour, and cured and dried with judgment, would not only extend the scale of exports, but also furnish the outward-bound vessels with freights, and better affortments for the foreign markets. The salmon of the Dee and Don are taken in great abundance, cured in the highest perfection, and greatly valued at the European markets. If the merchants, in addition to these, should also export the cargoes of fifty or sixty vessels constantly employed in the herring and white fisheries, the port of Aberdeen would in a few years become the most celebrated mart of fish now existing.”

From a round hill at the west of the city, flow two springs, one of pure water, and the other of a quality resembling German Spa. Aberdeen, with Aberbrothwick, Brechin, Montrose, and Inverberrie, returns one member to parliament.

ABERDEENSHIRE, comprehends the districts of Mar, Gariech, Strathbogie, and the greater part of Burchan; and sends one member to parliament. It is washed on the east and north by the ocean, and abounds in sea-ports; from whence there is a safe and ready passage to the Orkneys and Shetland Isles, the Greenland fisheries, Norway, and the regions round the Baltic; the German coast, Holland, Flanders, and France. It is watered by numerous streams, all of them the resort of salmon, and whose banks display very extensive plantations of natural woods.

ABERDOUR, a small town in Fifeshire, Scotland, on the frith of Forth, about ten miles N. W. of Edinburgh. In old times it belonged to the Viponts; but in 1126 it was transferred to the Mortimers by marriage, and afterwards to the Douglasses. William lord of Liddefdale, surnamed the *Flower of Chivalry*, in the reign of David II. by charter conveyed it to James Douglas, ancestor to the present noble owner the Earl of Morton.

ABERFORD, a market-town in the West Riding of Yorkshire, 188 miles from London. It stands on the great Roman causeway, which, all the way to Cattleford-bridge, appears as entire as when first made, though it is upwards of seventeen hundred years old. Under the town runs the river Cock; and near it may be seen the foundation of an old fort, called Castle-cary. Here was formerly a priory of Franciscan friars.—This town has been many years noted for its manufactory of pins; but otherwise it is a place of no trade. It has a market on Wednesday, and five annual fairs, viz. the last Monday in April, the last Monday in May, the first Monday in October, the first Monday after St. Luke, and the first Monday after All Souls. W. lon. 2. 45. lat. 53. 52.

ABERFRAW, a small town in Anglesea, North Wales, twenty miles from Holyhead. It derives its name from the river Aber, on the banks of which it is situated. On one side it is surrounded by sand-banks; and, on the opposite, by fine fertile land, producing, in particular, remarkable fine barley. Though Aberfraw is now an inconsiderable place, it was formerly the residence of the famous prince Llewellyn, the remains of whose house are yet to be seen. The river is navigable, in the summer season, for vessels from thirty to forty tons burthen, up to its quay. The living is in the king's gift, and worth 300*l.* per annum.

ABERGAVENNY, a large, populous, and flourishing, town, in Monmouthshire, seated at the confluence of the rivers Usk and Gavenny. It has a fine bridge over the Usk, consisting of fifteen arches; and being a great thoroughfare from the west part of Wales to Bath, Bristol, Gloucester, and other places, is well furnished with accommodation for travellers. It is surrounded with a wall, and had once a castle. It carries on a considerable trade in flannels, which are brought hither for sale from the other parts of the county. It is governed by a bailiff, recorder, and twenty-seven burgesses.—The environs of Abergavenny are rich and beautiful, and, like the rest of the vale from Brecknock, abound with the most charming variety of landscape. The prospects are terminated at proper distances with mountains, among which, at the opposite side of the town, Skirid-vawr and Blorench raise their conspicuous heads. The mountains in this neighbourhood abound with iron-ore, coal, and lime; and thereon have been lately erected several capital iron-works. Abergavenny is 16 miles from Monmouth, and 144 from London. W. lon. 2. 45. lat. 5. 50. Abergavenny appears to have been the *Gibbanium* of Antoninus, and the town of Usk his *Burrium*.

ABERGELY, a village of Denbighshire.—ABERGUILLY, or ABERGERLECH, a town of Carmarthenshire.

ABERLADY,

ABERLADY, a village in East Lothian.—ABERLEMON, in the shire of Angus.—ABERLEY, ABURLEY, or ABBOTSLEY, Worcestershire.—ABERLOUR, in the shire of Elgin.

ABERNETHY (John), an eminent dissenting minister, born at Colrairie on the 19th of October, 1680. He studied at the university of Glasgow, till he took the degree of master of arts; and, in 1708, he was chosen minister of a dissenting congregation at Antrim, where he continued above twenty years. About the time of the Bangorian controversy, a dissent arose among his brethren in the ministry at Belfast, on the subject of subscription to the Westminster confession; in which he became a leader on the negative side, and incurred the censure of a general synod. Being in consequence deserted by the greatest part of his congregation, he accepted an invitation to settle in Dublin, where his preaching was much admired. He was distinguished by his candid, free, and generous, sentiments; and died of the gout, December 1740, in the 60th year of his age. He published a volume of Sermons on the Divine Attributes; after his death a second volume was published by his friends; and these were succeeded by four other volumes on different subjects: all of which have been greatly admired.

ABERNETHY, a town on the river Spey, in Murrayshire, near which was erected a famous monument, called Macduff's cross; where if any, within the ninth degree to Macduff, fled, for manslaughter, he was pardoned on paying a few heads of cattle, by way of fine.

ABERNETHY, a town in Strathern, a district of Perthshire, in Scotland. It is seated on the river Tay, a little above the mouth of the Erne. It is said to have been the seat of the Pictish kings; and was afterwards the see of an archbishop, since transferred to St. Andrew's. It is now greatly decayed.

ABERRANCE, or ABERRANCY, *f.* [from *aberro*, Lat. to wander from the right way.] A deviation from the right way; an error; a mistake; a false opinion.—Could a man be composed to such an advantage of constitution, that it should not at all adulterate the images of his mind; yet this second nature would alter the crasis of his understanding, and render it as obnoxious to *aberrances* as now. *Glanville.*

ABERRANT, *adj.* [from *aberrans*, Lat.] Deviating, wandering from the right or known way.

ABERRATION, *f.* [*aberratio*, Lat.] The act of deviating from the common or accustomed track.

ABERRATION, in astronomy, an apparent motion of the celestial bodies, observed in the last century by M. Picard, Dr. Hook, Flamsteed, and others; but explained only of late years, by the ingenious Dr. Bradley, who, for the purpose of discovering the true causes of this remarkable phenomenon, erected an apparatus for the zenith of Kew, and another for that of Wanstead, in order to observe more accurately such stars as he judged likely to throw some light upon the subject.

On the 3d of December 1725, the bright star in the head of Draco, marked γ by Bayer, was for the first time observed, as it passed near the zenith, and its situation carefully taken with the instrument; and, about the beginning of March following, the star was found to be $20''$ more southerly than at the time of the first observation. It now seemed to have arrived at its utmost limit southward; for in several trials, made by Dr. Bradley about this time, no sensible difference was observed in its situation. By the middle of April, however, it appeared to be returning back again towards the north; and, about the beginning of June, it passed at the same distance from the zenith as it had done in December, when it was first observed.

From the quick alteration in the declination of the star at this time, increasing about one second in three days, it was conjectured that it would now proceed northward, as it had before gone southward, of its present situation; and it happened accordingly; for the star continued to move northward till September following, when it became

stationary again; being then near $20''$ more northerly than in June, and upwards of $39''$ more northerly than it had been in March. From September the star again returned towards the south, till, in December, it arrived at the same situation in which it had been observed twelve months before, allowing for the difference of declination on account of the precession of the equinox.

After continuing these observations a few months longer, Dr. Bradley discovered what he then apprehended to be a general law observed by all the stars, namely, that each of them became stationary, or was farthest north or south, when it passed over his zenith at six of the clock, either in the evening or morning. He perceived also that whatever situation the stars were in, with respect to the cardinal points of the ecliptic, the apparent motion of every one of them tended the same way, when they passed his instrument about the same hour of the day or night; for they all moved southward when they passed in the day, and northward when in the night; so that each of them was farthest north, when it came in the evening about six of the clock, and farthest south when it came about six in the morning.

After two years had been employed in these observations, he at last discovered, through an amazing sagacity, that this apparent motion of the stars was only a deception on the optic nerve, occasioned by the progressive motion of light, and the earth's annual motion in her orbit: for he perceived; that if light were propagated in time, the apparent place of a fixed object would not be the same when the eye is at rest, as when it is moving in any other direction but that of the line passing through the object and the eye; and that, when the eye is moving in different directions, the apparent place of the object would be different.

M. de Maupertuis, in his Elements of Geography, gives a familiar and ingenious idea of the aberration, in this manner: "It is just the same, (says he,) concerning the direction in which a gun must be pointed to strike a bird in its flight; instead of pointing it straight to the bird, the fowler will point a little before it, in the path of its flight, and that so much the more as the flight of the bird is more rapid, with respect to the flight of the shot." In this way of considering the matter, the flight of the bird represents the motion of the earth, and the flight of the shot represents the motion of the rays of light.

M. Clairaut too, in his Memoires of the Academy of Sciences for the year 1746, illustrates this effect in a familiar way, by supposing drops of rain to fall rapidly and quickly after each other from a cloud, under which a person moves with a very narrow tube; in which case it is evident that the tube must have a certain *inclination*, in order that a drop which enters at the top may fall freely through the axis of the tube, without touching the sides of it; which inclination must be more or less, according to the velocity of the drops in respect to that of the tube: then the angle made by the direction of the tube and of the falling drops, is the aberration arising from the combination of those two motions.—This discovery is certainly one of the brightest of the present age.

ABERRATION of the Planets, is equal to the geocentric motion of the planet, the space it appears to move as seen from the earth, during the time that light employs in passing from the planet to the earth. Thus in the sun, the aberration in longitude is constantly 20 sec. that being the space moved by the sun, or, which is the same thing, by the earth, in the time of 8 min. 7 sec. which is the time in which light passes from the sun to the earth. In like manner, knowing the distance of any planet from the earth, by proportion it will be, as the distance of the sun is to the distance of the planet, so is 8 min. 7 sec. to the time of light passing from the planet to the earth: then computing the planet's geocentric motion in this time, that will be the aberration of the planet, whether it be in longitude, latitude, right ascension, or declination.

ABERRATION, in optics, the deviation or dispersion of the rays of light when reflected by a speculum, or refracted

fracted by a lens, by which they are prevented from meeting or uniting in the same point, called the geometrical focus, but are spread over a small space, and produce a confusion of images. Aberration is either lateral or longitudinal: the lateral aberration is measured by a perpendicular to the axis of the speculum or lens, drawn from the focus to meet the refracted or reflected ray: the longitudinal aberration is the distance, on the axis, between the focus and the point where the ray meets the axis.—There are two species of aberration, distinguished according to their different causes: the one arises from the figure of the speculum or lens, producing a geometrical dispersion of the rays, when these are perfectly equal in all respects; the other arises from the unequal refrangibility of the rays of light themselves; a discovery that was made by Sir Isaac Newton, and for this reason it is often called the Newtonian aberration. As to the former species of aberration, or that arising from the figure, it is very small, and easily remedied, in comparison with the other, arising from the unequal refrangibility of the rays of light, which is very great; and, hence it may seem strange that objects appear through telescopes so distinct as they do, considering that the error arising from the different refrangibility is almost incomparably larger than that of the figure.

In consequence of the discovery of the unequal refrangibility of light, and the apprehension that equal refractions must produce equal divergencies in every sort of medium, it was supposed that all spherical object-glasses of telescopes would be equally affected by the different refrangibility of light, in proportion to their aperture, of whatever materials they might be constructed: and therefore that the only improvement that could be made in refracting telescopes, was that of increasing their length. So that Sir Isaac Newton, and other persons after him, despairing of success in the use and fabric of lenses, directed their chief attention to the construction of reflecting telescopes. However, about the year 1747, M. Euler applied himself to the subject of refraction; and pursued a hint suggested by Newton, for the design of making object-glasses with two lenses of glass inclosing water between them; hoping that, by constructing them of different materials, the refractions would balance one another, and so the usual aberration be prevented. Mr. John Dollond, an ingenious optician in London, minutely examined this scheme, and found that M. Euler's principles were not satisfactory. M. Clairaut likewise, whose attention had been excited to the same subject, concurred in opinion that Euler's speculations were more ingenious than useful. This controversy, which seemed to be of great importance in the science of optics, engaged also the attention of M. Klingenstierna of Sweden, who was led to make a careful examination of the eighth experiment in the second part of Newton's Optics, with the conclusions there drawn from it. The consequence was, that he found that the rays of light, in the circumstances there mentioned, did not lose their colour, as Sir Isaac had imagined. This hint of the Swedish philosopher led Mr. Dollond to re-examine the same experiment; and after several trials it appeared, that different substances caused the light to diverge very differently, in proportion to their general refractive powers. In the year 1757, therefore, he procured wedges of different kinds of glass, and applied them together so that the refractions might be made in contrary directions, that he might discover whether the refraction and divergency of colour would vanish together. The result of his first trials encouraged him to persevere; for he discovered a difference far beyond his hopes in the qualities of different kinds of glass, with respect to their divergency of colours. The Venice glass and English crown glass were found to be nearly allied in this respect: the common English plate glass made the rays diverge more; and the English flint glass most of all. But without enquiring into the cause of this difference, he proceeded to adapt wedges of crown glass, and of white flint glass, ground to different angles, to each other, so as to refract in different directions; till

the refracted light was entirely free from colours. Having measured the refractions of each wedge, he found that the refraction of the white glass was to that of the crown glass, nearly as 2 to 3: and he hence concluded in general, that any two wedges made in this proportion, and applied together so as to refract in contrary directions, would refract the light without any aberration of the rays.

Mr. Dollond's next object was to make similar trials with spherical glasses of different materials, with the view of applying his discovery to the improvement of telescopes: and here he perceived that, to obtain a refraction of light in contrary directions, the one glass must be concave, and the other convex; and the latter, which was to refract the most, that the rays might converge to a real focus, he made of crown glass, the other of white flint glass. And as the refractions of spherical glasses are inversely as their focal distances, it was necessary that the focal distances of the two glasses should be inversely as the ratios of the refractions of the wedges; because that, being thus proportioned, every ray of light that passes through this compound glass, at any distance from its axis, will constantly be refracted, by the difference between two contrary refractions, in the proportion required; and therefore the different refrangibility of the light will be entirely removed. But in the applications of this ingenious discovery to practice, Mr. Dollond met with many and great difficulties. At length, however, after many repeated trials, by a resolute perseverance, he succeeded so far as to construct refracting telescopes much superior to any that had hitherto been made; representing objects with great distinctness, and in their true colours.

M. Clairaut, who had interested himself from the beginning in this discovery, now endeavoured to ascertain the principles of Mr. Dollond's theory, and to lay down rules to facilitate the construction of these new telescopes. With this view he made several experiments, to determine the refractive power of different kinds of glass, and the proportions in which they separated the rays of light: and from these experiments he deduced several theorems of general use. M. d'Alembert made likewise a great variety of calculations to the same purpose; and he shewed how to correct the errors to which these telescopes are subject, sometimes by placing the object-glasses at a small distance from each other, and sometimes by using eye-glasses of different refractive powers. But though foreigners were hereby supplied with the most accurate calculations, they were very defective in practice. And the English telescopes, made, as they imagined, without any precise rule, were greatly superior to the best of their construction.

M. Euler, whose speculations had first given occasion to this important and useful enquiry, was very reluctant in admitting Mr. Dollond's improvements, because they militated against a pre-conceived theory of his own. At last however, after several altercations, being convinced of their reality and importance by M. Clairaut, he assented; and he soon after received farther satisfaction from the experiments of M. Zeiher, of Petersburg.—M. Zeiher shewed by experiments that it is the lead, in the composition of glass, which gives it this remarkable property, namely, that while the refraction of the mean rays is nearly the same, that of the extreme rays considerably differs. And, by increasing the lead, he produced a kind of glass, which occasioned a much greater separation of the extreme rays than that of the flint glass used by Mr. Dollond, and at the same time considerably increased the mean refraction. M. Zeiher, in the course of his experiments, made glass of minium and lead, with a mixture also of alkaline salts; and he found that this mixture greatly diminished the mean refraction, and yet made hardly any change in the dispersion: and he at length obtained a kind of glass greatly superior to the flint glass of Mr. Dollond for the construction of telescopes; as it occasioned three times as great a dispersion of the rays as the common glass, whilst the mean refraction was only as

1.61 to 1.—Other improvements have since been made on the new or achromatic telescopes by the inventor Mr. John Dollond, and by his son Peter Dollond; which see at large under the article OPTICS.

ABERRATION, (Crown of,) is a luminous circle surrounding the real disk of the sun, and depending on the aberration of the solar rays, whereby his apparent diameter is enlarged.

To **ABERUNCATE**, *v. a.* [*averunco*, Lat.] To pull up by the roots; to extirpate utterly.

ABERYSTWITH, a market-town of Cardiganshire, in Wales, seated on the Ridal, near its confluence with the Iſtwith, where it falls into the sea. It is a populous and rich town, and has a great trade in lead, and a considerable fishery of whiting, cod, and herrings. It was formerly surrounded with walls, and fortified with a castle; but both are now in ruins. It is 30 miles distant from Cardigan, and 203 south-west of London. Lat 52. 30. lon. 4. 0. W.

ABESTA, *f.* the name of one of the sacred books of the Persian magi, which they ascribe to their great founder Zoroaster. The abesta is a commentary on two others of their religious books called Zend and Pazend; the three together including the whole system of the Ignicold or worshippers of fire.

To **ABET**, *v. a.* [from *betan*, Sax. signifying to enkindle or animate.] To push forward another, to support him in his designs by connivance, encouragement, or help. It was once indifferent, but is almost always taken by modern writers in an ill sense.

ABETMENT, *f.* The act of abetting.

ABETTER, or **ABETTOR**, *f.* He that abets; the supporter or encourager of another.—In law, it implies one who encourages another to the performance of some criminal action. Abettors of murder, are such as command, procure, or counsel, others to commit a murder; and, in case they are present when the murder is committed, they shall be taken as principals, but if absent at the time of committing the fact, they shall be considered as accessaries only. Treason is the only crime in which abettors are excluded by law, every individual concerned being considered as a principal.

ABEX, a country in Africa, bordering on the Red Sea. It is subject to the Turks, and has the name of the Beglerbeg of Habeleth. It is about five hundred miles in length and one hundred in breadth, and is a wretched barren country. The heat here is almost insupportable, and the air is so unhealthy, that an European cannot stay long in it without the utmost hazard of his life. It is very mountainous, and there are many more wild beasts than men. Here are forests, in which grow a great number of ebony-trees.

ABEYANCE, *f.* [law-term, from *bayer*, Fr. to expect,] is that which is in expectation, remembrance, and intentment, of the law. By a principle of law, in every land there is a fee-simple in somebody, or else it is in *abeyance*; that is, though for the present it be in no man, yet it is in expectancy belonging to him that is next to enjoy the land. Thus if a man be patron of a church, and presenteth a clerk to the same, the fee of the lands and teneaments pertaining to the rectory is in the parson: but if the parson dies, and the church becometh void, then is the fee in *abeyance*, until there be a new parson presented, instituted, and inducted. 1 *Inſt.* 342. And though where no person is seen or known in whom the inheritance can vest, it may be in *abeyance*, as in a limitation to several persons, and the survivor, and the heirs of such survivor, because it is uncertain who will be survivor: yet the freehold cannot, because there must be a tenant to the præcipe always. 1 *Vezy*, 174.

ABGAR, or **ABGARUS**, a name given to several of the kings of Edeſſa in Syria. The most celebrated of them is one who, it is said, was cotemporary with our Saviour; and who having a distemper in his feet, and hearing of Christ's miraculous cures, requested him by letter to come

and cure him. Eusebius, who believed that this letter was genuine, and also an answer our Saviour is said to have returned to it, has translated them both from the Syriac, and asserts that they were taken out of the archives of the city of Edeſſa. The first is as follows:—"Abgarus, prince of Edeſſa, to Jesus the holy Saviour, who hath appeared in the flesh in the confines of Jerusalem, greeting. I have heard of thee, and of the cures thou hast wrought without medicines or herbs. For it is reported thou makest the blind to see, the lame to walk, lepers to be clean, devils and unclean spirits to be expelled, such as have long been diseased to be healed, and the dead to be raised; all which when I heard concerning thee, I concluded with myself, That either thou wast a god come down from heaven, or the Son of God sent to do these things. I have therefore written to thee, beseeching thee to vouchsafe to come unto me, and cure my disease. For I have also heard that the Jews use thee ill, 'and lay snares to destroy thee. I have here a little city, pleasantly situated, and sufficient for us both. **ABGARUS**." To this letter, Jesus, it is said, returned an answer by Annanias, Abgarus's courier; which was as follows: "Blessed art thou, O Abgarus: who hast believed in me whom thou hast not seen; for the scriptures say of me, They who have seen me have not believed in me, that they who have not seen, may, by believing, have life. But whereas thou writest to have me come to thee, it is of necessity that I fulfill all things here for which I am sent; and having finished them, to return to him that sent me: but when I am returned to him, I will then send one of my disciples to thee, who shall cure thy malady, and give life to thee and thine. **JESUS**." After Christ's ascension, Judas, who is also named Thomas, sent Thaddeus, one of the seventy, to Abgarus; who preached the gospel to him and his people, cured him of his disorder, and wrought many other miracles: which was done, says Eusebius, A. D. 43.—Though the above letters are acknowledged to be spurious by the candid writers of the church of Rome; several Protestant authors, as Dr. Parker, Dr. Cave, and Dr. Grabe, have maintained that they are genuine, and ought not to be rejected.

ABGILLUS (John), surnamed Preſter-John, was son to a king of the Frisicii; and, from the austerity of his life, obtained the name of *Preſter*, or Priest. He attended Charlemagne in his expedition to the Holy Land; but, instead of returning with that monarch to Europe, it is pretended that he gained mighty conquests, and founded the empire of the Abyssines, called, from his name, the empire of Preſter-John.

ABGREGATION, *f.* [*abgregatio*, Lat.] A separation from the flock.

ABHEL, *f.* in botany, a name given to the shrub called SAVIN.

ABHER, **HABAR**, or **EBHER**, a city of Persian-irak, or ancient Parthia, with a small river of the same name running through the middle of it, which makes it very pleasant. Its mosques, bazars, inns, &c. are elegant, and their gardens are of immense extent. It contains 2500 houses, and is governed by a deroga. Lat. 36. 14. N. lon. 50. 59. E.

To **ABHOR**, *v. a.* [*abhorreo*, Lat.] To hate with acrimony; to detest to extremity; to loath; to abominate. A church-of-England man *abhors* the humour of the age, in delighting to sling scandals upon the clergy in general; which, besides the disgrace to the reformation, and to religion itself, casts an ignominy upon the kingdom. *Swift*.

ABHORRENCE, or **ABHORRENCY**, *f.* The act of abhorring, detestation; the disposition to abhor, hatred. The first tendency to any injustice that appears, must be suppressed with a show of wonder and *abhorrency* in parents and governors. *Locke*.

ABHORRENT, *adj.* Struck with abhorrence; loathing; contrary to; foreign; inconsistent with. It is used with the particles *from* or *to*, but more properly with *from*.—This I conceive to be an hypothesis, well worthy a rational

tional belief; and yet it is so *abhorrent* from the vulgar, that they would as soon believe Anaxagoras, that snow is black, as him that should affirm it is not white. *Glanville.*

ABHORRER, *f.* The person that abhors; a hater, a detester.

ABHORRING, the object of abhorrence. This seems not to be the proper use of the participial noun.—They shall go forth, and look upon the carcases of the men that have transgressed against me: for their worm shall not die, neither shall their fire be quenched, and they shall be an *abhorring* unto all flesh. *Isaiah*, lvi. 44.

ABIAD, a town on the coast of Abex, seated on a high mountain, remarkable for its trade in ebony and aromatic plants.

ABIANS, anciently a people of Thrace, or (according to some authors) of Scythia. They had no fixed habitations; they led a wandering life. Their houses were wagons, which carried all their possessions. They lived on the flesh of their herds and flocks, on milk, and cheese, chiefly on that of mare's milk. They were unacquainted with commerce, and only exchanged commodities with their neighbours. They possessed lands, but they did not cultivate them; for they assigned their agriculture to any who would undertake it, reserving only to themselves a tribute; which they exacted, not with a view to live in affluence, but merely to enjoy the necessities of life. They never took arms but to oblige those to make good a promise to them by whom it had been broken. They paid tribute to none of the neighbouring states. They deemed themselves exempt from such an imposition; for they relied on their strength and courage, and consequently thought themselves able to repel any invasion. The Abians, we are told, were a people of great integrity. This honourable eulogium is given them by Homer. *Strabo.*

ABIATHAR, high-priest of the Jews, son to Abimelech, who had borne the same office, and received David into his house. This so enraged Saul, who hated David, that he put Abimelech to death, and eighty-one priests; Abiathar alone escaped the massacre. He afterwards was high-priest; and often gave king David testimonies of his fidelity, particularly during Absalom's conspiracy, at which time Abiathar followed David, and bore away the ark. But after this he conspired with Adonijah, in order to raise him to the throne of David his father; this so exasperated Solomon, that he afterwards divested him of the priesthood, and banished him, A. M. 3021, before Christ 1014.

ABIB, *f.* signifying an ear of corn, a name given by the Jews to the first month of their ecclesiastical year, afterwards called Nisan. It commenced at the vernal equinox; and according to the course of the moon, by which their months were regulated, answered to the latter part of our March and beginning of April.

To **ABIDE**, *v. n.* I abode or abid, [from *bidian*, or *abidian*, Sax.] To stay in a place; not to remove.—Those who apply themselves to learning, are forced to acknowledge one God, incorruptible and unbegotten; who is the only true being, and *abides* for ever above the highest heavens, from whence he beholds all the things that are done in heaven and earth. *Stillingfleet.*—To remain; not cease or fail; to be immovable. To continue in the same state. To endure without offence, anger, or contradiction. It is used with the particle *with* before a person, and *at* or *in* before a place.—It is better that I give her to thee, than I give her to another man: *abide with me.* *Gen.* xxix. 19.—For thy servant vowed a vow, while I *abode at* Gethur in Syria, saying, if the Lord shall bring me again indeed to Jerusalem, then I will serve the Lord. *2 Sam.* xv. 8.—It is used with *by* before a thing; as, to *abide by* his testimony; to *abide by* his own skill; that is, to rely upon them. To *abide by* an opinion, to maintain it; to *abide by* a man, is also to defend or support him. But these forms are something low.—Of the participle *abid*, I have found only the example in Woodward, and should rather determine that

abide in the active sense has no passive participle, or compounded preterite. *Johnson.*

To **ABIDE**, *v. a.* To wait for, expect, attend, wait upon, await: used of things prepared for persons, as well as of persons expecting things. To bear or support the consequences of a thing. To bear or support, without being conquered or destroyed.—But the Lord he is the true God, he is the living God, and an everlasting king: at his wrath the earth shall tremble, and the nations shall not be able to *abide* his indignation. *Jer.* x. 10.—To bear without aversion; in which sense it is commonly used with a negative. To bear or suffer:

—Girt with circumfluous tides,
He still calamitous constraint *abides*.

Pope.

ABIDER, *f.* The person that abides or dwells in a place; perhaps that lives or endures. A word little in use.

ABIDING, *f.* Continuance; stay; fixed state.—We are strangers before thee and sojourners, as were all our fathers: our days on the earth are as a shadow, and there is none *abiding*. *1 Chron.* xxix. 15.

ABJECT, *adj.* [*abjectus*, Lat. thrown away as of no value.] Mean; worthless; base; groveling: spoken of persons, or their qualities.—Honest men, who tell their sovereigns what they expect from them, and what obedience they shall be always ready to pay them, are not upon an equal foot with base and *abject* flatterers. *Addison.*—Being of no hope or regard: used of condition.—We see man and woman in the highest innocence and perfection, and in the most *abject* state of guilt and infirmity. *Addison.*—Mean and despicable: used of actions:

To what base ends, and by what *abject* ways,
Are mortals urg'd, through sacred lust of praise? *Pope.*

ABJECT, *f.* A man without hope; a man whose miseries are irretrievable; one of the lowest condition.—Yea, the *abjects* gathered themselves together against me. *Psalms* xxxv. 15.

ABJECTEDNESS, *f.* The state of an abject.

ABJECTION, *f.* Meanness of mind; want of spirit; servility; baseness.—That this should be termed baseness, *abjection* of mind, or servility, is it credible? *Hooker.*

ABJECTLY, *adv.* In an abject manner, meanly, basely, servilely, contemptibly.

ABJECTNESS, *f.* Abjection, servility, meanness.—Servility and *abjectness* of humour is implicitly involved in the charge of lying.

ABIES, *f.* the fir-tree. See **PINUS**.

ABIGEAT, *f.* an old law-term, denoting the crime of stealing cattle by droves or herds. This crime was severely punished; the delinquent being often condemned to the mines, banishment, or something capital.

ABIHU, brother to Nadab, and son to Aaron. The two former had the happiness to ascend mount Sinai with their father, and there to behold the glory of God; but afterward putting strange fire into their censers, instead of the sacred fire commanded by God, fire rushed upon them, and killed them. Though all the people bewailed this terrible catastrophe, Moses forbid Aaron and his two sons Eleazar and Ithamar to join in the lamentation.

ABIH SCYTHÆ, taken by Strabo to denote the European Sarmatæ, bordering on the Thracians and Bastianæ: they were commended by Curtius for their love of justice, and by Ammiesius for their contempt of earthly things.

ABILITY, *f.* [*habileté*, Fr.] The power to do any thing, whether depending upon skill, or riches, or strength, or any other quality. Capacity of mind; force of understanding; mental power. When it has the plural number, *abilities*, it frequently signifies the faculties or powers of the mind, and sometimes the force of understanding given by nature, as distinguished from acquired qualifications.

ABIMELECH, king of Gerar, a country of the Philistines, was cotemporary with Abraham. This patriarch and his family being there, his wife Sarah, though ninety years

years of age, was not safe in it; for Abimelech carried her off, and was so enamoured of her, that he resolved to marry her. Abraham did not declare himself Sarah's husband; but gave out she was his sister. But the king being warned in a dream, that she was married to a prophet, and that he should die if he did not restore her to Abraham, the king obeyed, at the same time reproving Abraham for his dissimulation; who, thereupon, among other excuses, said she was really his sister, being born of the same father, though of a different mother. Abimelech afterwards gave considerable presents to Abraham; and a covenant was entered into between them.—After the death of Abraham, there being a famine in the neighbouring countries, Isaac his son also withdrew into Gerar, which was then likewise governed by a king called

ABIMELECH, probably the successor of the former. Here Rebecca's beauty forced her husband to employ Abraham's artifice. Abimelech discovering that they were nearly related, chid Isaac for calling his wife his sister; and at the same time forbade all his subjects, upon pain of death, to do the least injury to Isaac or Rebecca.—Isaac's prosperity lost him the king's friendship, and he was desired to go away from among them. He obeyed; but Abimelech afterwards entered into a covenant with him.

ABIMELECH, the natural son of Gideon, by Drumahis concubine. His violent acts and death are recorded in Judges, chap. ix.

ABINGDON, the county-town of Berkshire, seated on a branch of the Thames, is of great antiquity. It had its name and principal glory from the abbey, founded by the father of King Ina, about the year of Christ 675, which was one of the finest and richest in England. Henry I. furnished Beauderk, was educated in this monastery. Kenulphus, King of the West Saxons, gave to the monastery of Abingdon fifteen mansions, called Oulnam, with all profits to the same belonging, as an inheritance for ever, and that it should be for ever free from all episcopal jurisdiction; and that all discussions of causes should be subject to the decree of the abbot of that monastery only. From this charter Sir Edward Coke inferred, that the ecclesiastical jurisdiction was always invested in the imperial crown of England; and, therefore, the statute made under Henry VIII. concerning the king's spiritual authority, was not introductory of a new law, but declaratory only of an old one.

The town, (which has two churches and three meeting-houses for dissenters,) consists of several streets, which centre in a spacious area, where the market is kept on Monday and Friday, toll-free, and is very considerable for barley, as there are great quantities of malt made here, and sent down the Thames in barges to London. The market-house is a stately edifice, of most curious workmanship, and claims the preference of most others in the kingdom; over which there is a noble hall, where the summer assize is held; the Lent assize being held at Reading. The county-court is kept here once a month, at which the members for the county are elected; as also the coroners, and verdurers of Windsor forest. It had formerly an elegant cross, but it was quite demolished in the civil wars. It is a free borough, and sends one member to parliament; the first of which it sent to parliament in the 4th year of the reign of Philip and Mary. The right of election is in the inhabitants paying scot and lot, and not receiving alms, or any charity, by a resolution of the house of commons the 18th of January, 1708. The supposed number of voters is 600. It is a town-corporate, consisting of a mayor, recorder, two bailiffs, twelve principal burgesses, sixteen secondary burgesses, two sergeants, and a beadle.

Here is a good free-school, founded in 1563, by Mr. John Roys; also several alms-houses well endowed; and about 900l. per ann. left for charitable uses. Also a large manufactory, which employs a great number of hands in the packing, bagging, and floor and sail cloths, which are principally sent to London. Here are seven fairs annually, viz. on the first Monday in Lent, May the 6th, June 20,

August 5, September 19; Monday before Old Michaelmas-day, for servants, &c. and on December 11.

Abingdon is distant from Oxford six miles, from Wantage ten, Farringdon fourteen, Wallingford ten, Newbury twenty-one, Reading twenty-six, and fifty-six from London. This town is supposed by Bishop Gibson to be the place called, in the Saxon annals, *Clovesho*, where two synods are said to have been held, one in 742, and the other in 822. Lat. 51. 42. lon. 1. 20.

ABINGDON, a pretty town of Philadelphia county, in Pennsylvania; also a small town in Ireland, seven miles east of Limerick, and ninety miles from Dublin.

ABINTESTATE, *adj.* [of *ab*, from, and *intestatus*, Lat.] A term of law, implying him that inherits from a man, who, though he had the power to make a will, yet did not make it.

ABIPONIANS, a tribe of American Indians, who formerly inhabited the districts of *Chaks*, in Paraguay; but the hostilities of the Spaniards have now obliged them to remove southward into the territory lying between Santa Fe and St. Jago. The only account we have of them is that published by M. Dobrizhoffer in 1785. This gentleman, who lived seven years in their country, informs us, that they are not numerous, the whole nation not much exceeding 5000; for which he assigns as a reason an unnatural custom among their women of sometimes destroying their own children from motives of jealousy, lest their husbands should take other mates during the long time they give suck, which is not less than two years. They are naturally white, but, by exposure to the air and smoke, become of a brown colour. They are a strong and hardy race of people; which our author attributes to their marrying so late, an Abiponian seldom or never thinking of marriage till thirty years of age. They are greatly celebrated on account of their chastity and other virtues; though they seem to have no knowledge of a Deity. They make frequent incursions into the territories of the Spaniards, mounted on the horses which run wild in those parts. They have a kind of order of chivalry for their warriors; and are so formidable, that a hundred of their enemies will fly before ten of these horsemen. The hatred which these savages, whose manners, though rude and uncultivated, are in many respects pure and virtuous, bear to the Spaniards, is invincible. "These pretended Christians, (says our author,) who are the scum of the Spanish nation, practise every kind of fraud and villany among these poor barbarians; and their corrupt and vicious morals are so adapted to prejudice the Abiponians against the Christian religion, that the Jesuit missionaries have, by a severe law, prohibited any Spaniard from coming, without a formal permission, into any of their colonies."—From this account of the success of the Jesuits in converting them to Christianity, it does not appear that they have been able to make any impression on their minds; so that in general they are quite ignorant and uncivilized: a most striking instance of which is, that in counting they can go no farther than three; and all the art of the Jesuits to teach them the simplest use and expression of numbers, has proved unsuccessful.

ABIRAM, a seditious Levite, who, in concert with Korah and Dathan, rebelled against Moses and Aaron, in order to share with them in the government of the people; when Moses ordering them to come with their censers before the altar of the Lord, the earth suddenly opened under their feet, and swallowed up them and their tents; and at the same instant fire came from heaven, and consumed 250 of their followers. Numb. xvi.

ABISHAI, son of Zeruah, and brother to Job, was one of the celebrated warriors who flourished in the reign of David. He killed with his own hand 300 men, with no other weapon but his lance; and slew a Philistine giant, the iron of whose spear weighed 300 shekels. 1 Samuel, xxvi. 2 Samuel, xxiii.

To ABJUGATE, *v. a.* [*abjugo*, Lat.] To unyoke, to uncouple.

ABIUL,

ABIUL, a town of Baira, containing 1300 inhabitants. Lat. 40. 20. lon. 7. 10. W.

To ABJURE, *v. a.* [*abjuro*, Lat.] To cast off upon oath, to swear not to do or not to have something. To retract, recant, or abnegate a position upon oath.

ABJURATION, *f.* The act of abjuring. The oath taken for that end in law; by which it was anciently the custom, that if a person had committed a felony, and could fly to a church or church-yard before he was apprehended, he could not be taken from thence to be tried for his crime; but on confession thereof before the coroner, he was admitted to his oath to *abjure* the realm. But by the 21 J. c. 28. all privilege of sanctuary, and abjuration consequent thereupon, is utterly abolished. 2 *Infl.* 628.

But there is one kind of abjuring the realm which yet remains, as not depending on any privilege of sanctuary; and that is, with respect to popish recusants convicted, removing from the place of their habitation without licence, and not conforming in three months after notice: in which case, they are required by statute 35 Eliz. c. 2. to abjure the realm before two justices of the peace or the coroner; the form of which abjuration, according to the old books, is this: "This hear you, Sir Coroner, that I, A. B. am a popish recusant, and, in contempt of the laws and statutes of England, I have and do refuse to come to their church. I do therefore, according to the intent and meaning of the statute made in the 35th year of queen Elizabeth late queen of this realm of England, abjure the realm of England. And I shall haste me towards the port of C. which you have given and assigned to me, and that I shall not go out of the highway leading thither, nor return back again; and if I do, I will that I be taken as a felon of the king. And that at C. I will diligently seek for passage, and will tarry there but one flood and ebb, if I can have passage; and unless I can have it in such place, I will go every day into the sea up to my knees, affaying to pass over. So help me God and his doom." *Stamf.* 116. *Offic. Cor.* 49.

There is also an oath of abjuration, whereby every person in any office, trust, or employment, *abjures* the pretender, and recognises the right of his majesty under the act of settlement, engaging to support him, and promising to disclose all treasons and traitorous conspiracies against him.

ABKAS, one of the seven nations, in the countries comprehended between the Black Sea and the Caspian. Its capital is Anakopir, tributary to the Turks.

To ABLACTATE, *v. a.* [*ablacto*, Lat.] To wean from the breast.

ABLACTATION, *f.* in medicine, the taking a child from the milk of the breast; also called *apogalactismus*. When the mother wants health, or strength; hath too small nipples, or ill formed ones; when the infant will not take the breast; the mother's milk is bad or in too small a quantity; when the mother hath weak nerves, is apt easily to be surprised; these defects spoil the milk, and render it advisable to wean the child. It can never be useful to continue the breast more than eight or nine months; but generally, if a child is favoured with a good supply by suckling, during its first three or four months, and is in a tolerably healthful state, it will rarely be the worse for weaning at this early period; so that if difficulties attend its being suckled, there need not be any hesitation about taking it from the breast. If it feeds tolerably with the spoon, and is free from disorders in its bowels, a tendency to convulsions, &c. weaning may be attempted at any time. But, if feeding with the spoon is difficult; if the child is much subject to the gripes, &c. another nurse should be sought for, and weaning must be deferred until more favourable circumstances attend. In general, the sooner a child is weaned, the more easy it parts with the breast. Prudence directs to accustom infants to early feeding with the spoon, and to continue the same until the breast may be wholly omitted. They should only be fed once in six hours, at the most, during the first two months; and should be entirely weaned from the breast, and from all feeding in the night; for

night-feeding bloats them, and if they are not used to it in the first week, they will never want it: if they are not disturbed from their birth, in a week or two, they will be formed to a habit of sleeping most of the night very quietly.

The food should be simple and light; not spoiled with sugar, wine, and such-like additions, for they produce the diseases with which children are most troubled, acidities in the *prima via*. Unfermented flour makes a viscid food that turns sour before it digests, and well fermented bread soon turns sour; but if this latter is made into fresh panada every night and morning, or, in cool weather, every morning, the inconvenience of souring is prevented. To avoid acidity in the child's stomach by a daily use of vegetable food, give now and then a little fresh broth, made from either veal, mutton, or beef, once or twice in the day; suppose, for example, a mixture of equal parts of the gravy which is discharged in cutting a joint that is brought hot on the table, and warm water, to which may be added a little salt, and thus an excellent broth is readily made. This fills children with humours, only of the most nourishing kind. Cows milk, a little diluted with water, is an excellent substitute for the mother's; yet, as it is apt to turn sour, add to it a little Lisbon sugar. Rice is not so apt to turn sour as wheat bread is; it therefore would be a more convenient food for children, and deserves to be attended to. Toasted bread boiled in water till it is almost dry, then mixed with fresh milk, not boiled, is an agreeable change. As the teeth advance, the diet may increase in its solidity. As to the quantity, let the appetite be the measure of it; observing to satisfy hunger, but no more, which may be thus managed; feed the child no longer than he eats with a degree of eagerness. In feeding, let the child be held in a sitting posture, and thus continue it until the stomach has nearly digested its contents. The practice of violently dancing and shaking the child should be avoided, though moderate exercise is essentially necessary.—Keep the child awake until it breaks wind after each time it is fed; divert it during the day as much as you can, and thus it will soon lie quiet all the night. Never awaken a child when it is asleep, for thus sickness and peevishness are often produced. As soon as teeth appear, give the child now and then a piece of flesh meat in its hand to chew; but never give it any confectionaries.

ABLACTATION, *f.* One of the methods of grafting; and, according to the signification of the word, as it were a weaning of a scion by degrees from its mother stock; not cutting it off wholly from the stock, till it is firmly united to that on which it is grafted.

ABLAÏ, a country of Great Tartary, the inhabitants of which, called *Buchars* or *Buchares*, are subject to Russia, but that only for protection. It is governed by a Calmuc prince, and lies eastward of the river Irty, extending five hundred leagues along the southern frontiers of Siberia.

ABLANIA, *f.* in botany. See *TRICHOCARPUS*.

ABLAQUEATION, *f.* [*ablaqueatio*, Lat.] The art or practice of opening the ground about the roots of trees, to let the air and water operate upon them.

ABLATION, *f.* [*ablatio*, Lat.] The act of taking away.

ABLATIVE, *adj.* in grammar, [*ablatus*, Lat.] That which takes away. It is the sixth case of Latin nouns. Priscian also calls it the *comparative case*; as serving among the Latins for comparing as well as for taking away. The ablative is opposite to the DATIVE; the first expressing the action of taking away, and the latter that of giving. In English, French, &c. there is no precise mark whereby to distinguish the ablative from other cases; and we only use the term in analogy to the Latin. Thus, in the two phrases, *the magnitude of the city*, and *to speak much of the city*; we say, that of the city in the first is *genitive*, and in the latter *ablative*; because it would be so, if the two phrases were expressed in Latin.

The question concerning the Greek ablative has been the subject of a famous literary war between two great grammarians, Frischlin and Crusius; the former of whom maintained, and the latter opposed, the reality of it. The dis-

pute still subsists among their respective followers. The chief reason alleged by the former is, that the Roman writers often joined Greek words with the Latin prepositions, which govern ablative cases, as well as with nouns of the same case. To which their opponents answer, that the Latins anciently had no ablative themselves; but instead thereof, made use, like the Greeks, of the dative case: till at length they formed an ablative, governed by prepositions, which were not put before the dative: that, at first, the two cases had always the same termination, as they still have in many instances: but that this was afterwards changed in certain words. It is no wonder then, that the Latins sometimes join prepositions which govern an ablative case, or nouns in the ablative case, with Greek datives, since they were originally the same; and that the Greek dative has the same effect as the Latin ablative.

ABLE, *adj.* [*habile*, Fr. *habilis*, Lat. skilful, ready.] Having strong faculties, or great strength or knowledge, riches or any other power of mind, body, or fortune. Having power sufficient; enabled.—Before a verb, with the particle *to*, it signifies generally having the power. Wrath is cruel, and anger is outrageous; but who is *able* to stand before envy? *Prov.* xxvii. 4.—With *for* it is not often nor very properly used.

ABLE, or **ABEL** (Thomas), chaplain to queen Catharine consort to Henry VIII. distinguished himself by his zeal in opposing the proceedings against that unfortunate princess for a divorce. He took the degree of bachelor of arts at Oxford on the 4th of July, 1513, and that of master of arts on the 27th of July, 1516. In 1534 he fell under a prosecution for being concerned in the affair of Elizabeth Barton, called the *Holy Maid of Kent*. This was an infamous impostor, suborned by the monks to use some strange gesticulations, and to pretend to inspiration by the spirit of prophecy; and so well did she act her part, that some people of consequence gave credit to her; but being at last detected, she was condemned and executed, after discovering the names of her principal accomplices and instigators. On her account Able was accused of misprision of treason, by stat. 25 Henry VIII. and, being also one of those who denied the king's supremacy over the church, he was apprehended and imprisoned; during which time his confinement was so rigorous, that the keeper of Newgate was committed to the Marshalsea prison for suffering him to go out upon bail. He was afterwards hanged, drawn, and quartered, at Smithfield, in 1540.

To **ABLE**, *v. a.* To make able; to enable, which is the word commonly used.

ABLE-BODIED, *adj.* Strong of body.—It lies in the power of every fine woman, to secure at least half a dozen *able-bodied* men to his majesty's service. *Addison*.

ABLECTI, in Roman antiquity, a select body of soldiers chosen from among those called *EXTRAORDINARIII*.

To **ABLEGATE**, *v. a.* [*ablego*, Lat.] To send abroad upon some employment; to send out of the way.

ABLEGATION, *f.* The act of sending abroad.

ABLEGMINA, *f.* in Roman antiquity, those choice parts of the entrails of victims which were offered in sacrifice to the gods. They were sprinkled with flour, and burnt upon the altar; the priests pouring some wine on them.

ABLENESS, *f.* Ability of body or mind, vigour, force.

ABLEPSY, *f.* [*αβληψια*, Gr.] Want of sight, blindness; unadvisedness.

ABLIGURITION, *f.* [*abliguritiio*, Lat.] Prodigal expence on meat and drink.

ABLIGATE, *v. a.* [from *abligo*, Lat.] To tie up from.

To **ABLOCATE**, *v. a.* [*abloco*, Lat.] To let out to hire.—Perhaps properly by him who has hired it from another.

ABLOCATION, *f.* A letting out to hire.

ABLOE, a town of Little Tartary, between the river Dnieper and the Black Sea. Lat. 46. 20. N. lon. 33. 15. E.

To **ABLUDE**, *v. n.* [*abludo*, Lat.] To be unlike.

ABLUENT, *adj.* [*abluens*, Lat. from *abluo*, to wash

away.] That which washes clean; that which has the power of cleansing.

ABLUTION, *f.* [*ablutio*, Lat.] The act of cleansing, or washing clean. The water used in washing:

Wash'd by the briny wave, the pious train
Are cleans'd, and cast th' *ablutions* in the main. *Pope*.

The rinsing of chemical preparations in water, to dissolve and wash away any acrimonious particles.

ABLUTION, in a religious sense, a ceremony in use among the ancients, and still practised in several parts of the world: it consisted in washing the body, which was always done before sacrificing, or even entering their houses.—Ablutions appear to be as old as any ceremonies, and external worship itself. Moses enjoined them; the heathens adopted them; and Mahomet and his followers have continued them: thus they have got footing among most nations, and make a considerable part of many established religions. The Egyptian priests had their diurnal and nocturnal ablutions; the Grecians their sprinklings; the Romans their lustrations and lavations; the Jews their washing of hands and feet, beside their baptisms. The ancient Christians had their ablutions before communion; which the Romish church still retain before their mass, sometimes after: the Syrians, Cophts, &c. have their solemn washings on Good-Friday: the Turks their greater and lesser ablutions; their Ghast and Wodou, their Aman, Taharat, &c.—The Indians practise ablution, and have a high veneration for the waters of the Ganges. But as they cannot at all times be near enough to wash themselves in its sacred waters, the bramins tell them that all other waters will have the same virtue, if, whilst they are bathing, they pronounce these words, "O Ganges, purify me."

No doubt ablutions might be designed to represent inward purity; but they were at the same time calculated for the preservation of health. However whimsical these washings may appear to some, few things would tend more to prevent diseases than a proper attention to many of them. Were every person, for example, after visiting the sick, handling a dead body, or touching any thing that might convey infection, to wash before he went into company, or sat down to meat, he would run less hazard of catching the infection himself, or of communicating it to others.

ABNAKIS, a tribe of Indians between Canada and New England, who dislike labour, and prefer hunting and fishing to tillage.

To **ABNEGATE**, *v. a.* [*abnego*, Lat.] To deny.

ABNEGATION, *f.* [*abnegatio*, Lat. denial, from *abnegare*, to deny.] Denial, renunciation.

ABNER, the son of Ner, father-in-law to Saul, and general of all his forces, who served him on all occasions with fidelity and courage. After the death of that prince, Abner set Ishbosheth, Saul's son, on the throne. A war breaking out between the tribe of Judah who had elected David king, and Israel, Abner marched against that prince with the flower of his troops, but was defeated. Abner afterward, being disguised, went over to David, and disposed the chiefs of the army and the elders of Israel to declare for him; and was received by David with such testimonies of affection, as gave umbrage to Joab, who killed him traitorously.

ABNODATION, *f.* [*abnodatio*, Lat.] The act of cutting away knots from trees: a term of gardening.

ABNORMOUS, *adj.* [*abnormis*, Lat. out of rule.] Irregular, misshapen.

ABO, a maritime town in Sweden: it is the capital of the province of Finland, and lies upon the point where the gulphs of Bothnia and Finland unite. It is a good port; and is the see of a bishop, suffragan of Upsal. It has an university; founded by queen Christina in 1640, and endowed with the same privileges as that of Upsal. There is also a school here, which was founded by Gustavus Adolphus, for 300 scholars. This town is tolerably well built, and contains several brick buildings; but the generality are of wood painted red. The inhabitants export linen,

linen, corn, and planks. It lies 140 miles north-east from Stockholm. Lat. 60. 27. lon. 22. 18. E.

ABOARD, *adv.* a sea-term, but adopted into common language; [derived immediately from the French *à bord*, as *aller à bord*, *envoyer à bord*.] *Bord* is itself a word of very doubtful original, and perhaps, in its different acceptations, deducible from different roots. *Bord*, in the ancient Saxon, signified a *house*; in which sense to *go aboard*, is to take up residence in a ship. Hence any person who enters a ship is said to *go aboard*; but when an enemy enters in the time of battle, he is said to *board*; a phrase which always implies hostility.—To *fall aboard of*, is to strike or encounter another ship when one or both are in motion, or to be driven upon a ship by the force of the wind or current.—*Aboard main-tack*, the order to draw the main-tack, i. e. the lower corner of the main-sail, down to the CHESS-TREE.

ABODE, *f.* Habitation, dwelling, place of residence:

Others may use the ocean as their road,
Only the English make it their *abode*;
Whose ready sails with every wind can fly,
And make a cov'nant with th' inconstant sky. *Waller.*
Stay, continuance in a place:

The woodcocks early visit, and *abode*
Of long continuance in our temperate clime,
Foretell a liberal harvest. *Phillips.*

To *make abode*. To dwell, to reside, to inhabit.

To **ABODE**, *v. a.* [See **BODE**.] To foretoken or foreshow; to be a prognostic, to be ominous. It is taken, with its derivatives, in the sense either of good or ill.

ABODEMENT, *f.* A secret anticipation of something future; an impression upon the mind of some event to come; prognostication; omen:

I like not this.

For many men that fumble at the threshold;
Are well foretold that danger lurks within.—
—Tush! man, *abodelements* must not now affright us.

Shakespeare.

To **ABOLISH**, *v. a.* [*aboleo*, Lat.] To annul; to make void: applied to laws or institutions. To put an end to, to destroy.—Fermented spirits contract, harden, and consolidate, many fibres together, *abolishing* many canals; especially where the fibres are the tenderest, as in the brain. *Arbuthnot.*

ABOLISHABLE, *adj.* That which may be abolished.

ABOLISHER, *f.* He that abolishes.

ABOLISHMENT, *f.* The act of abolishing.

ABOLITION, *f.* The act of abolishing. This is now more frequently used than *abolishment*.—An apoplexy is a sudden *abolition* of all the senses, and of all voluntary motion, by the stoppage of the flux and reflux of the animal spirits through the nerves destined for those motions. *Arbuthnot.*

ABOLLA, *f.* a kind of garment worn by the Greeks and Romans, chiefly out of the city, in following the camp.—Critics and antiquaries are greatly divided as to the form, use, kinds, &c. of this garment. Papias makes it a species of the toga, or gown; but Nonius, and the generality, a species of the pallium, or cloak. The *abolla* seems rather to have stood opposed to the toga, which was a garment of peace, as the *abolla* was of war; at least Varro and Martial place them in this opposite light. There seem to have been different kinds of *abollas*, fitted to different occasions. Even kings appear to have used the *abolla*: Caligula was affronted at king Ptolemy for appearing at the shows in a purple *abolla*, and by the éclat thereof turning the eyes of the spectators from the emperor upon himself.

ABOMASUS, **ABOMASUM**, **ABOMASIUS**, *f.* names of the fourth stomach of ruminating animals. It is in the *abomasus* of calves and lambs that the runnet is formed wherewith milk is curdled.

ABOMINABLE, *adj.* [*abominabilis*, Lat.] Hateful, detestable; to be loathed. Unclean. In low and ludicrous language, it is a word of loose and indeterminate censure.

ABOMINABLENESS, *f.* The quality of being abominable; hatefulness, odiousness.—Till we have proved, in its proper place, the eternal and essential difference between virtue and vice, we must forbear to urge atheists with the corruption and *abominableness* of their principles. *Bentley.*

ABOMINABLY, *adv.* A word of low or familiar language, signifying excessively, extremely, exceedingly; in an ill sense. It is not often seriously used.

To **ABOMINATE**, *v. a.* [*abominor*, Lat.] To abhor, detest, hate utterly.—Pride goes hated, cursed, and *abominated* by all. *Hammond.*

ABOMINATION, *f.* Hatred, detestation. The object of hatred. Pollution, defilement. Wickedness; hateful or shameful vice. The cause of pollution.

It is used in scripture with regard to the Hebrews, who, being shepherds, are said to have been an *abomination* to the Egyptians, because they sacrificed the sacred animals of that people, as oxen, goats, sheep, &c. which the Egyptians esteemed as abominations, or things unlawful. The term is also applied in the sacred writings to idolatry and idols, because the worship of idols is in itself an abominable thing, and at the same time ceremonies observed by idolaters were always attended with licentiousness and other odious and abominable actions. The *abomination of desolation*, foretold by the prophet Daniel, is supposed to imply the statue of Jupiter Olympius, which Antiochus Epiphanes caused to be placed in the temple of Jerusalem. And the *abomination of desolation*, mentioned by the Evangelists, signifies the ensigns of the Romans, during the last siege of Jerusalem by Titus, on whom the figures of their gods and emperors were embroidered, and placed upon the temple after it was taken.

ABORAM, a small island on the coast of Morocco, whose inhabitants live chiefly by fishing.

ABORIGINES, *f.* [Lat.] The earliest inhabitants of a country; those of whom no original is to be traced; as, the Welsh in Britain. Dionysius Halicarnassus, Livy, and Virgil, gave this name to a certain people in Italy, who inhabited the ancient Latium, or country now called *Campagna di Roma*. Whence this people came by the appellation, is much disputed. St. Jerom says they were so called, as being *absque origine*, the primitive planters of the country after the flood: Dion of Halicarnassus accounts for the name, as denoting them the founders of the race of inhabitants of that country: others think them so called, as being originally Arcadians, who claimed to be earth-born, and not descended from any people. Aurelius Victor suggests another opinion, viz. that they were called *Aborigines*, q. d. *Aberrigines*, from *ab* "from," and *errare* "to wander:" as having been before a wandering people. Pausanias rather thinks they were thus called *απο ορεσι*, from "mountains;" which opinion seems confirmed by Virgil, who, speaking of Saturn, the legislator of this people, says,

*Is genus indocile ac dispensum montibus altis
Composuit, legesque dedit.*

The Aborigines were either the original inhabitants of the country, settled there by Janus, as some imagine; or by Saturn, or Cham, as others; not long after the dispersion, or even, as some think, before it: or they were a colony sent from some other nation; who, expelling the ancient inhabitants the Siculi, settled in their place. The term Aborigines, though so famous in antiquity, is used in modern geography only occasionally as an appellative. It is given to the primitive inhabitants of any country, in contradistinction to colonies, or new races of people.

To **ABORT**, *v. n.* [*aborto*, Lat.] To bring forth before the time; to miscarry.

ABORTION, *f.* [*abortio*, Lat.] The act of bringing forth untimely; the produce of an untimely birth; in which sense it is used for the unseasonable exclusion of an imperfect human foetus, either alive or dead, before the natural time of delivery.

If abortion happens before the second month of pregnancy, it is called a *false conception*. Abortions are seldom dangerous.

dangerous in the first three months; but a frequent habit of miscarriage debilitates the system, flattens the constitution, and lays the foundation of chronic diseases of the most obstinate and dangerous nature. In the advanced months, the prognosis will be more or less favourable, according to the patient's former state of health. The proximate cause of abortion is the same with that of real travail, namely, a contracting effort of the uterus, and abdominal muscles, assisted by the other expulsive powers. The remote causes cannot be explained with precision, as many circumstances, with regard to the nature of impregnation and connection of the fœtus with the placenta and uterus, are subjects involved in many difficulties; so that the general maxims which follow, are the heads that require particular attention. 1. Whatever interrupts the regular circulation between the uterus and placenta. 2. Every thing that excites the spasmodic contraction of the uterus, or other assisting powers. 3. All accidents, or occasions, that deprive the fœtus of life.

In consequence of the great abridgment of the human race by abortion, and of the ill health it induces to those unfortunate females who become subject to it, the late Dr. Hunter bestowed infinite pains to investigate its cause, and to check its progress. He dissected three abortions, which happened at the most usual time women are subject to this misfortune, namely, toward the end of the third month; whence it appeared that there is an extinction of life in the fœtus for some time before any symptoms of abortion occur. For instance, if the miscarriage happens about the end of the third month, the age of the fœtus is generally no more than eight or nine weeks; or if it perishes in the fifth, sixth, or seventh, month, it will still be retained in the uterus, and the expulsion will rarely happen until near the completion of its full time.

Previous to opening these abortions, Dr. Hunter had made several useful discoveries relative to the human pregnant uterus, which see under ANATOMY. His brother, Mr. John Hunter, had likewise, by a number of surgical operations, manifested, that "the blood is the life of the body;" which see under BLOOD. Hence Dr. Hunter concluded, that a careful investigation of the minuter vessels of the uterine system, with their ramifications, would be the likeliest means of obtaining satisfactory information on this delicate subject. This also led him to the discovery of the *Decidua*, which is a membrane of a very peculiar nature, the knowledge of which throws great light upon the contents of the pregnant womb, and upon the connection between the mother and child. It appears to be an efflorescence of the internal coat of the uterus; and is therefore shed, as often as a woman bears a child, or suffers a miscarriage. It consists of two parts, called *decidua vera*, and *decidua reflexa*. In separating it from the chorion, and from the muscular fibres of the uterus, an infinite number of small veins and arteries are discovered full of blood, which ramify from its outer surface inwards through its whole substance, blending itself inseparably with the umbilical portion of the placenta. Its principal arteries run in winding convolutions, like the coils of a snake; forming an appearance much resembling that of lace; and considering the number and size of the vessels, which are necessarily broken upon the expulsion of the fœtus, we cannot longer wonder at those frequent fatal bleedings, which accompany miscarriages in an advanced state of pregnancy. The subjects of these curious and masterly dissections are represented on the annexed plate, of which the following is an explanation.

Fig. 1. An abortion of about nine weeks old, seen on that side which is membranous. The decidua is torn, and turned somewhat aside, to shew the smooth and opaque decidua reflexa. A, the rough external surface of the decidua, which exfoliated from the womb. B, the outside of a small portion of the placenta, the rest of which was situated on the back part of this object. CC, the internal cribriform surface of the decidua, which, in the first months of pregnancy, does not adhere to the membranes which it

encloses. DD, the lacerated edge of the decidua which had been continued into the edge EE of the same membrane. F, the decidua reflexa spread over the outside of the chorion. GG, the angle of reflection at the edge of the placenta, where the inner layer of the decidua is turned over the chorion; much in the same manner as the inner lamella of the pericardium is reflected, to cover the outer surface of the heart. H, the termination of the decidua at the cervix uteri.

Fig. 2. shews a vertical section of the same subject. AA, the section of the placenta; which, we must suppose, had adhered to the upper and back part of the womb. B, the section of the anterior portion of the decidua. C, the section of the posterior portion of the decidua. D, the termination of the decidua at the cervix uteri. E, the cavity of the amnion, in which the embryo hangs by a slender navel-string, from the inside of the placenta. F, the section of the three membranes, which are not only contiguous, but adhere to one another, viz. the amnion, the chorion, and the decidua reflexa. GG, the angle at the edge of the placenta where the inner layer of the decidua is reflected over the outside of the chorion. H, here those three membranes are a little separated, to shew their course at the placenta.

Fig. 3. represents an abortion of about eight weeks old. A small strap of the decidua is cut out, and turned up, to shew the cavity between it and the other membranes. A, the cut slip of the decidua. B, the part of the conception where there is no decidua, viz. opposite to the passage through the cervix uteri. CC, the external surface of the decidua. D, the decidua reflexa covering the chorion and amnion, which project and fill up the cavity of the decidua. E, the outside of the upper part of the placenta.

Fig. 4. represents the same subject, when the decidua had been opened by a crucial incision, and the four angles had been turned off, and then a round piece of the decidua reflexa dissected off, and turned to one side, to shew the loose vessels on the outside of the chorion. AA, the inside of the four angles or flaps into which the decidua was reduced by a crucial incision. BB, the decidua reflexa covering the other membranes. C, the angle at the edge of the placenta where the interior lamella of the decidua is continued over the outside of the chorion, forming the decidua reflexa. D, a round portion of the decidua reflexa dissected from the outside of the chorion and turned aside. E, the chorion, with its shaggy vessels, laid bare. These vessels adhered firmly to the decidua reflexa, and parts of them were cut off with that membrane.

Fig. 5. shews an abortion of the same age, consisting of the chorion only, with its vessels and contents; that is, without the decidua, or uterine part of the secundines. A, the larger and more crowded branches of the shaggy vessels which shoot from the external surface of one part of the chorion, to mix with the decidua, or uterine part, to form the placenta. B, that portion of the chorion which afterwards becomes the uniform transparent membrane. It is covered with fewer and more delicate floating vessels, which lose themselves in the decidua reflexa. The embryo is seen through it. C, the vesicula umbilicalis on the outside of the amnion, seen through the chorion; with a whitish thread, (the remains of an artery and vein,) leading from it, towards the navel of the embryo.

Fig. 6. represents the same abortion opened. The membranes, which were at the fore-part, being cut from the placenta, and turned up, the embryo is distinctly seen. A, the vesicula umbilicalis, from which B, the remains of an artery and vein, in the form of a white thread, pass to C, the navel of the embryo, with some turns of the intestines lodged in the beginning of the navel-string.

The common causes of abortion are, the death of the child; weakness or relaxation of the mother; or too great evacuations. It however proceeds oftener from a violent distention, or rupture, of the minuter vessels of the uterine system, occasioned by too strong exercise; raising great weights;

and without tricks. *L'Étrange*.—Without disguise or concealment.

ABOVE-CITED, *adv.* Cited before. A figurative expression, taken from the ancient manner of writing books on scrolls; where whatever is cited or mentioned before in the same page, must be *above*.

ABOVE-GROUND, *adv.* An expression used to signify alive; not in the grave.

ABOVE-MENTIONED, *adv.* The same as above-cited.—I do not remember, that Homer any where falls into the faults *above-mentioned*, which were indeed the false refinements of latter ages. *Addison*.

ABOUKIR, a small town of Egypt, situate in the desert between Alexandria and Rosetta. It is the ancient Canopus, and is situated, according to Mr. Savary, six leagues from Pharos. The town is built upon a rock, which forms a handsome road for shipping, and is out of the reach of inundations. See **CANOPUS**.

To ABOUND, *v. n.* [*abundo*, Lat. *abonder*, Fr.] To have in great plenty; to be copiously stored. It is used sometimes with the particle *in*, and sometimes the particle *with*. To be in great plenty:

Words are like leaves, and where they most *abound*,
Much fruit of sense beneath is rarely found. *Pope*.

ABOUT, *prep.* [*abutan*, or *abuton*, Sax. which seems to signify encircling on the outside.] Round, surrounding, encircling.—Let not mercy and truth forsake thee. Bind them *about* thy neck; write them upon the table of thy heart. *Proverbs*, iii. 3.—Near to. Concerning; with regard to, relating to.—The painter is not to take so much pains *about* the drapery as *about* the face, where the principal resemblance lies. *Dryden*.—In a state of being engaged in, or employed upon.—Our armies ought to be provided with secretaries, to tell their story in plain English, and to let us know, in our mother tongue, what it is our countrymen are *about*. *Addison*.—Appendant to the person, as clothes. Relating to the person, as a servant or dependant. Relating to person, as an act or office.—Good corporal, for my old dame's sake, stand my friend: she hath nobody to do any thing *about* her when I am gone, and she is old and cannot help herself. *Shakespeare*.

ABOUT, *adv.* Circularly, in a round; *circum*. In circuit, in compass. Nearly; *circiter*. Here and there; every way; *circa*.—A wolf that was past labour, in his old age, borrows a habit, and so *about* he goes, begging charity from door to door, under the disguise of a pilgrim. *L'Étrange*.—With *to* before a verb; as *about to fly*, upon the point, within a small distance of:

These dying lovers, and their floating sons,
Suspend the fight, and silence all our guns:
Beauty and youth, *about to perish*, finds
Such noble pity in brave English minds. *Waller*.

Round; the longest way, in opposition to the short straight way. *To bring about*; to bring to the point or state desired; as, *he has brought about his purposes*. *To come about*; to come to some certain state or point. It has commonly the idea of revolution, or gyration.—Wherefore it came to pass, when the time was *come about*, after Hannah had conceived, that she bare a son. 1 *Sam.* i. 20.

One evening it befel, that looking out,
The wind they long had wish'd was *come about*;
Well pleas'd they went to rest; and if the gale
Till morn continu'd, both resolv'd to fail. *Dryden*.

To go about; to prepare to do it. In common language, they say, *to come about* a man, *to circumvent* him. Some of these phrases seem to derive their original from the French *à bout*; *venir à bout d'une chose*; *venir à bout de quelqu'un*.

ABOUT, *adv.* in sea-language, the situation of a ship immediately after she has tacked, or changed her course by going about and standing on the other tack.—*About ship!* the order to the ship's crew for tacking.

ABOUTIGE, a town in Upper Egypt, in Africa, near the Nile, where they make the best opium in all the Le-

vant. It was formerly a large, but now is a mean place. *N. Lat.* 26. 50.

ABRA, a silver coin struck in Poland, worth about one shilling sterling. It is current in several parts of Germany, Constantinople, Astracan, Smyrna, and Grand Cairo.

ABRABANEL, **ABARBANEL**, or **AVRAVANEL**, (*I-faac*), a celebrated rabbi, descended from King David, and born at Lisbon A. D. 1437. He became counsellor to Alphonso V. king of Portugal, and afterwards to Ferdinand the catholic; but in 1492 was obliged to leave Spain with the other Jews. And, after residing at Naples, Corsou, and several other cities, he died at Venice in 1508, aged 71. Among other works he wrote a Treatise on the World; in which he refutes Aristotle, who imagined that the world was eternal. Though Abrabanel discovers his implacable aversion to Christianity in all his writings, yet he treated Christians with politeness and good manners in all the common affairs of life.

ABRACADABRA, a magic word, recommended by Serenius Sammonicus, supposed to have the virtue of a charm, or amulet, in curing agues, and preventing other diseases, particularly the fever called by the physicians *hemitratatus*. To have this effect, the word must be wrote on paper, and repeated, omitting each time the last letter in the former, so that the whole may form a kind of inverted cone: in which there was this property, that which way soever the letters be taken, beginning from the *apex* and ascending from the left to the right, they make the same word, or, as some would have it, the same sentiment, as is found in the first whole line. According to Julius Africanus, another ancient writer, the pronouncing of the word in the same manner, will do as well.

To ABRADE, *v. a.* [*abrado*, Lat.] To rub off; to wear away from the other parts; to waste by degrees.

ABRAHAM, the father and stock from whence the faithful sprung, was the son of Terah. He was descended from Noah by Shem, from whom he was nine degrees removed. Some fix his birth in the 130th year of Terah's age, but others place it in his father's 70th year. It is highly probable he was born in the city of Ur, in Chaldaea, which he and his father left when they went to Canaan, where they remained till the death of Terah; after which Abraham resumed his first design of going to Palestine. The Scriptures mention the several places he stopped at in Canaan; his journey into Egypt, where his wife was carried off from him; his going into Gerar, where Sarah was again taken from him; but restored as before; the victory he obtained over the four kings who had plundered Sodom; his compliance with his wife, who insisted that he should make use of their maid Hagar in order to raise up children; the covenant God made with him, sealed with the ceremony of circumcision; his obedience to the command of God, who ordered him to offer up his only son as a sacrifice, and how this was prevented; his marriage with Keturah; his death at the age of 175 years; and his interment at the cave of Macpelah, near the body of Sarah his first wife. It would be of little use to dwell long upon these particulars, since they are so well known. But tradition has supplied numberless others, the mention of one or two of which may not be unacceptable.

Many extraordinary particulars have been told relating to his conversion from idolatry. It is a pretty general opinion, that he sucked in the poison with his milk; that his father made statues, and taught that they were to be worshipped as gods. Some Jewish authors relate, that Abraham followed the same trade with Terah for a considerable time. Maimonides says, that he was bred up in the religion of the Sabæans, who acknowledged no deity but the stars; that his reflections on the nature of the planets, his admiration of their motions, beauty, and order, made him conclude there must be a Being superior to the machine of the universe, a Being who created and governed it; however, according to an old tradition, he did not renounce Paganism till the fiftieth year of his age. It is related, that his father, being gone a journey, left him to sell the statues

statues in his absence; and that a man, who pretended to be a purchaser, asked him how old he was: Abraham answered, "Fifty."—"Wretch that thou art (said the other), for adoring at such an age a being which is but a day old!" These words greatly confounded Abraham. Some time afterwards, a woman brought him some flour, that he might give it as an offering to the idols; but Abraham, instead of doing so, took up a hatchet and broke them all to pieces, excepting the largest, into the hand of which he put the weapon. Terah, at his return, asked whence came all this havoc? Abraham made answer, that the statues had had a great contest which should eat first of the oblation; "Upon which (said he) the god you see there, being the stoutest, hewed the others to pieces, with that hatchet." Terah told him this was bantering; for those idols had not the sense to act in this manner. Abraham retorted these words upon his father against the worshipping of such gods. Terah, stung with this raillery, delivered up his son to the cognizance of Nimrod, the sovereign of the country: who exhorted Abraham to worship the fire; and, upon his refusal, commanded him to be thrown into the midst of the flames: "Now let your God (said he) come and deliver you." But (adds the tradition) Abraham came safe and found out of the flames.—This tradition is not of modern date, since it is told by St. Jerome; who seems to credit it in general, but disbelieves that part of it which makes Terah so cruel as to be the informer against his own son. Perhaps the word *Ur* might have given rise to the fiction altogether. Such as lay stress on the following words which God says to Abraham (Gen. xv. 7.), *I am the Lord that brought thee out of Ur of the Chaldees*, imagine that he saved him from a great persecution, since he employed the very same words in the beginning of the decalogue to denote the deliverance from Egypt.

Abraham is said to have been well skilled in many sciences, and to have written several books. Josephus tells us that he taught the Egyptians arithmetic and geometry; and, according to Eupolemus and Artapan, he instructed the Phœnicians, as well as the Egyptians, in astronomy. A work which treats of the creation has been long ascribed to him: it is mentioned in the Talmud, and the Rabbis Chanina and Hofchia used to read it on the eve before the sabbath. In the first ages of Christianity, according to St. Epiphanius, an heretical sect, called *Sethinians*, dispersed a piece which had the title of *Abraham's Revelation*. Origen mentions also a treatise supposed to be wrote by this patriarch. All the several works which Abraham composed in the plains of Mamre, are said to be contained in the library of the monastery of the Holy Cross on Mount Amara in Ethiopia. The book on the creation was printed at Paris in 1552, and translated into Latin by Postel: Rittangel, a converted Jew, and professor at Königsberg, gave also a Latin translation of it, with remarks, in 1642.

ABRAHAM USQUE, a Portuguese Jew, who translated the Bible out of Hebrew into Spanish. It was printed at Ferrara in 1553, and reprinted in Holland in 1630. This Bible, especially the first edition, which is most valuable, marked with stars at certain words, which are designed to shew that these words are difficult to be understood in the Hebrew, and that they may be used in a different sense.

ABRAHAM (Nicholas), a learned Jesuit, born in the diocese of Toul, in Lorraine, in 1589. He obtained the rank of divinity professor in the university of Pont-a-Mousson, which he enjoyed seventeen years, and died September 7, 1655. He wrote Notes on Virgil and on Nonnius; A Commentary on some of Cicero's Orations, in two vols. folio; an excellent collection of theological pieces in folio, intitled *Pharus Veteris Testamenti*; and some other works.

ABRAHAMITES, an order of monks exterminated for idolatry by Theophilus in the ninth century. Also the name of another sect of heretics who had adopted the errors of Paulus.

ABRAHAM'S BALM. The name of an herb.

ABRANTES, a town of Portugal, in Estremadura, seated on the river Tajo, belongs to a marquis of the same

name. It stands high, is surrounded with gardens and olive-trees, and contains thirty-five thousand inhabitants. It has four convents, an alms-house, and an hospital. Lat. 39. 13. W. lon. 7. 13.

ABRASION, *f.* The act of abrading or rubbing off. In medicine, the wearing away of the natural mucus, which covers the membranes, particularly those of the stomach and bowels, by corrosive or sharp medicines, or humours. The matter worn off by the attrition of bodies.

ABRAUM, *f.* in natural history, a name given by some writers to a species of red clay, used in England by the cabinet-makers, &c. to give a red colour to new mahogany wood. We have it from the Isle of Wight; but it is also found in Germany and Italy.

ABRAXAS, *f.* or ABRASAX, the supreme god of the Basilidian heretics. It is a mystical word, composed of the Greek numerals $\alpha, \beta, \gamma, \delta, \epsilon, \zeta, \eta, \theta$, which together make up the number CCCLXV. For Basilides taught, that there were 365 heavens between the earth and the empyrean; each of which heavens had its angel or intelligence, which created it; each of which angels likewise was created by the angel next above it; thus ascending by a scale to the Supreme Being, or first Creator. The Basilidians used the word *Abrahas* by way of charm or amulet.

ABRAXAS, *f.* an antique stone with the word *abraxas* engraved on it. They are of various sizes, and most of them as old as the third century. They are frequent in the cabinets of the curious; and a collection of them, as complete as possible, has been desired by several. There is a fine one in the abbey of St. Genévieve, which has occasioned much speculation. Most of them seem to have come from Egypt; whence they are of some use for explaining the antiquities of that country. Sometimes they have no other inscription besides the word: but others have the names of saints, angels, or Jehovah himself, annexed; though most usually the name of the Basilidian god. Sometimes there is a representation of Isis sitting on a lobe, or apsis, surrounded with stars; sometimes monstrous compositions of animals, obscene images, Phalli, and Ithyfalli. The graving is rarely good, but the word on the reverse is sometimes said to be in a more modern taste than the other. The characters are usually Greek, Hebrew, Coptic, or Heterian, and sometimes of a mongrel kind, invented, as it would seem, to render their meaning the more inscrutable. It is disputed whether the Veronica of Montreuil, or the granite obelisk mentioned by Gori, be *Abrahas*.

ABREAST, *adv.* Side by side; in such a position that the breasts may bear against the same line. In sea language it denotes a situation in which two or more ships lie, with their sides parallel to each other, and their heads equally advanced. This term more particularly regards the line of battle at sea, where, on the different occasions of attack, retreat, or pursuit, the several squadrons or divisions of a fleet are obliged to vary their dispositions, and yet maintain a proper regularity by sailing in right or curved lines. When the line is formed abreast, the whole squadron advances uniformly, the ships being equally distant from and parallel to each other, so that the length of each ship forms a right angle with the extent of the squadron or line abreast. The commander in chief is always stationed in the centre, and the second and third in command in the centres of their respective squadrons.—*Abreast*, within the ship, implies on a line with the beam, or by the side of any object aboard; as, the frigate sprung a leak abreast of the main hatch-way, *i. e.* on the same line with the main hatch-way, crossing the ship's length at right angles, in opposition to AFORE or ABAFT the hatch-way.—We discovered a fleet abreast of Beachy-head; *i. e.* off, directly opposite to it.

To ABRIDGE, *v. a.* [*abreger*, Fr. *abbrevio*, Lat.] To make shorter in words, keeping still the same substance. To contract, to diminish, to cut short. To deprive of; to cut off from. In which sense it is followed by the particle *from*, or *of*, preceding the thing taken away.

ABRIDGED OF, *part.* Deprived of, debarred from, cut short.

ABRIDGER,

ABRIDGER, *f.* He that abridges; a shortener. A writer of compendiums or abridgments.

ABRIDGMENT, *f.* [*abregement*, Fr.] The epitome of a larger work contracted into a small compass; a compend; a summary. A diminution in general. Contraction; reduction. Restraint from any thing pleasing; contraction of any thing enjoyed.

ABRIDGMENT, in literature, is the art of conveying much sentiment in few words, and the happiest talent an author can be possessed of. This talent is peculiarly necessary in the present state of literature; for many writers have acquired the dexterity of spreading a few trite thoughts over several hundred pages. When an author hits upon a thought that pleases him, he is apt to dwell upon it, to view it in different lights, to force it in improperly, or upon the slightest relations. Though this may be pleasant to the writer, it tires and vexes the reader. There is another great source of diffusion in composition. It is a capital object with an author, whatever be the subject, to give vent to all his best thoughts. When he finds a proper place for any of them he is peculiarly happy. But rather than sacrifice a thought he is fond of, he forces it in by way of digression, or superfluous illustration. If none of these expedients answer his purpose, he has recourse to the margin, a very convenient apartment for all manner of pedantry and impertinence. There is not an author, however correct, but is more or less faulty in this respect.—An abridger, however, is not subject to these temptations. The thoughts are not his own; he views them in a cooler and less affectionate manner; he discovers an impropriety in some, a vanity in others, and a want of utility in many. His business, therefore, is to retrench superfluities, digressions, quotations, pedantry, &c. and to lay before the public only what is really useful.

Abridging is peculiarly useful in taking the substance of what is delivered by professors, &c. It is impossible, even with the assistance of short-hand, to take down *verbatim*, what is said by a public speaker. Besides, although it were practicable, such a talent would be of little use. Every public speaker has circumlocutions, redundancies, lumber, which deserve not to be copied. All that is really useful may be comprehended in a short compass. If the plan of the discourse, and arguments employed in support of the different branches, be taken down, you have the whole. These you may afterwards extend in the form of a discourse dressed in your own language. This would not only be a more rational employment, but would likewise be an excellent method of improving young men in composition; an object too little attended to in all our universities.

ABROACH, *adv.* In a posture to run out, or yield the liquor contained; properly spoken of vessels. In a figurative sense: in a state to be diffused or extended, in a state of such beginning, as promises a progress:

That man, that sits within a monarch's heart,
And ripens in the sunshine of his favour,
Would he abuse the countenance of the king,
Alack! what mischiefs might be set *abroach*,
In shadow of such greatness! *Shakespeare.*

ABROAD, *adv.* Without confinement; widely; at large:

Again, the lonely fox roams far *abroad*,
On secret rapine bent, and midnight fraud;
Now haunts the cliff, now traverses the lawn,
And flies the hated neighbourhood of man.

Prior.

In another country. Out of the house. In all directions, this way and that; with wide expansion. Without, not within.—Bodies politic, being subject, as much as natural, to dissolution by divers means, there are undoubtedly more states overthrown through diseases bred within themselves, than through violence from *abroad*. *Hooker.*

To **ABROGATE**, *v. a.* [*abrogo*, Lat.] To take away from a law its force; to repeal; to annul.

ABROGATION, *f.* [*abrogatio*, Lat.] The act of abrogating; the repeal of a law.—*Abrogation* stands opposed to

rogation: it is distinguished from *derogation*, which implies the taking away only some part of a law; from *subrogation*, which denotes the adding a clause to it; from *obrogation*, which implies the limiting or restraining it; from *dispensation*, which only sets it aside in a particular instance; and from *antiquation*, which is the refusing to pass a law.

ABROHANI, or **MALLEMOLLI**, a kind of muslin, or clear white cotton cloth, brought from the East Indies, particularly from Bengal; being in length 16 and $\frac{3}{4}$ French ells, and in breadth five-eighths.

ABROLKOS, the name of certain shelves, or banks of sand, about twenty leagues from the coast of Brazil.

ABROMA, [*a* and *βρωμα*, no food, not fit for food; in opposition to *Theobroma*, with which it ranks in the system.] In botany, a genus of the polyadelphia dodecandria class, and of the natural order of columniferae. The generic characters are—Calyx: perianth five-leaved; leaflet lanceolate, acute, spreading, permanent. Corolla: petals five, larger than the calyx; claws obovate, arched, concave, obtuse, hairy at the end, erect, inserted at the base into the nectary; borders oval, obtuse, spreading, ciliate, contracted at the base into very short, ciliate, recurved, little claws, on which the principal claws are placed. Nectary, short, small, pitcher-shaped, divided into five segments, which are obcordate, hairy, erect, recurved and arched, alternate with the claws of the petals. Stamina: filaments five, membranaceous, very small, growing on the nectary between the segments, emarginate-trifid. Antheræ on each filament three, twin, kidney-form. Pistillum: germ subcylindrical. Styles five, subulate, approximating. Stigmas acute. Pericarpium: capsule ovate, membranaceous, veined, five-winged, five-beaked, five-celled, gaping at top into five parts between the beaks; partitions folded. Seeds: very many, subovate, within an oblique membranaceous aril, fixed in a double row to the central edge of the partitions, which is thickened and longitudinally bearded. Receptacle of the seeds, none.—*Essential Character.* Pistils five; capsule five-celled, one-valved, gaping at top; seeds subovate, incompletely arilled.

Species. 1. *Abroma augusta*, or maple-leaved *abroma*: leaves cordate or angular, sharply serrulate. This is a tree, with a straight trunk, yielding a gum when cut, and filled with a white pith, like the elder. Some of the leaves are heart-shaped and acuminate; others, especially almost all of the first year, are angular, and have five or seven lobes, which are acute, and the anterior ones most produced; they are all veined, alternate, green on both sides, but paler underneath, and the petioles are round. The whole plant is covered with stiff, whitish, shining, decumbent, bristles, scarcely visible to the naked eye, easily separating, and sticking to the hands, but harmless. The peduncles are generally bifid, and bear two flowers. There is one stipule on each side to every petiole; but four at the division of the peduncles, lanceolate and acute. The flower nods, is elegant, but has little smell. The corolla is of a dark purple. The time of flowering is from June to October. In September and October the fruit ripens, and the peduncle is erect. It is a native of New South-Wales, and the Philippine islands; and was brought into England about the year 1770.

2. *Abroma Wheleri*, or *Wheeler's abroma*: leaves ovate-lanceolate acuminate slightly toothed. This is a shrub with a brown bark; the extreme branches tomentose. Leaves alternate, some having a few teeth about the edge, others entire; the nerves are tomentose. Peduncles opposite to the leaves, having one joint curved back and woody when bearing fruit: they have an involucre consisting of several lanceolate deciduous leaflets. The flowers are of a dusky purple colour. Nectary bearded on each side with parallel hairs; the inner one consisting of obcordate scales. Antheræ in threes, sitting in the sinuses between the divisions or scales of the inner nectary. Capsule large, with five membranaceous valves. Receptacle five-parted, bearded, fastened to the sutures of the valves. Seeds ovate, dark-coloured, scabrous with raised points.

Native of the East Indies, where it was observed by Koenig, who gave it the trivial name in compliment to Edw. Wheeler, Esq. member of the supreme council in Bengal.

Propagation and Culture. The first sort requires the protection of a hot-house; and is propagated here by cuttings; the seeds will not easily ripen with us, and seldom arrive in a state fit for vegetation, unless great care be taken of them; the plant requires a strong heat and abundance of water. The second is not known in Europe.

ABROTANOIDES, *f.* in botany. See **ARTEMISIA**, **PROTEA**, and **SERIPHIMUM**.

ABROTANUM, *f.* in botany. See **ARTEMISIA**, **ERIOCEPHALUS**, **SANTOLINA**, and **TANACETUM**.

ABROTANUM, anciently a town and harbour on the Mediterranean, in the district of Syrtis Parva, in Africa, one of the three cities that went to form Tripoli.

ABRUG-BANYA, a well-inhabited town of Transylvania, on the river Ompay; near which there are mines of gold and silver, and the mine-court is held there. Lat. 46. 50. N. lon. 23. 24. E.

ABRUPT, *adj.* [*abruptus*, Lat. broken off.] Broken, craggy. Divided, without any thing intervening. Sudden, without the customary or proper preparatives:

Resiffling, roaring, dreadful, down it comes
From the rude mountain, and the mossy wild,
Tumbling through rocks *abrupt*. *Thomson.*

ABRUPTED, *adj.* [*abruptus*, Lat. a word little in use.] Broken off suddenly.

ABRUPTION, *f.* [*abruptio*, Lat.] Breaking off, violent and sudden separation.

ABRUPTLY, *adv.* Hastily, without the due forms of preparation.—They punctually observed the time agreed upon, and in whatever company or business they were engaged, they left it *abruptly*, as soon as the clock warned them to retire. *Addison.*

ABRUPTNESS, *f.* An abrupt manner, haste, suddenness, untimely vehemence. The state of an abrupt or broken thing; roughness, craggy; as of a fragment violently disjoined.

ABRUS, *f.* [*αβρος*, soft, delicate; from the extreme tenderness of the leaves.] In botany, a genus of the diadelphia decandria class, and of the natural order of leguminosae. The generic characters are—Calyx: perianthone-leaved, bell-shaped, obscurely four-lobed; teeth blunt, the upper one broader than the rest. Corolla: papilionaceous. Banner roundish, entire, ascending, flattened at the sides, longer than the wings and keel. Wings oblong, blunt. Keel oblong, sickle-shaped, gibbous, longer than the wings. Stamina: Filaments nine, united into a sheath, cloven above, free at the end, unequal, rising. Antherae oblong, erect. Pistillum: germ cylindrical, hairy. Style subulate, rising shorter than the stamina. Stigma in form of a head, and small. Pericarpium: legume like a rhomb, compressed, coriaceous, bivalved, four or five celled, acuminate, with a little subulate deflex claw. Seeds: solitary subglobose.—*Essential Character.* Calyx: obscurely four lobed; the upper lobe broadest. Filaments nine, united into a sheath at bottom, gaping at the back. Stigma blunt. Seeds subglobose.

There is only one species which grows naturally in both Indies, Guinea, and Egypt. It was also found by the late circumnavigators in the Society islands, about the year 1769. This is a perennial plant, with slender, shrubby, twining, branching, stalks, by which it will rise to the height of eight or ten feet. The leaves are pinnate, ending abruptly, and have from twelve to sixteen pairs of small, smooth, oblong, blunt, leaflets, set close together; these have the taste of liquorice, whence the inhabitants of the West Indies have given it the name of wild liquorice, and they use the herb for the same purpose as we do the liquorice in Europe. The flowers are produced from the side of the stalks in short spikes or bunches; they are of a pale purple colour, and shaped like those of the kidney-bean; these are succeeded by short smooth pods, each containing

three or four hard seeds, very smooth, of a glowing scarlet colour, with a black spot or eye on that side which is fastened to the pod. The legume or pod is sometimes of an oblong form, and contains six seeds, scarce apparently divided by a membrane, which indeed frequently disappears as the pods ripen. There are two varieties, one with a white, and the other with a yellow seed; but these do not differ from the former in leaf or stalk. The seeds of this plant are commonly strung, and worn as ornaments by the natives of those countries where the plant grows wild; they are frequently brought to Europe from Guinea, and the East and West Indies, and wrought into various forms with other hard seeds, and shells. A few years since an attempt was made, both at London and Paris, to introduce them into ear-rings and other female ornaments, but without much success. This, like most others, was only the revival of a fashion which prevailed for a short time in Holland, at the latter end of the last century. In their native countries they are commonly used for weighing precious commodities; they are also strung as beads for rosaries; whence the trivial name of *precatorius*. They are frequently thrown, with other West-Indian seeds, on the north west coast of Scotland. Linnaeus affirms that they are extremely deleterious. Abrus was accounted a species of glycine, until Linnaeus made it a separate genus in the twelfth edition of his *Systema Vegetabilium*, on account of a difference in its stature and appearance from the other species. The abrus was cultivated before 1680, by Bishop Compton, at Fulham.

Propagation and Culture. This plant is propagated by seeds, which must be sown upon a good hot-bed in the spring; but, as the seeds are very hard, unless they are soaked in water twelve or fourteen hours before they are sown, they frequently lie in the ground a whole year before they vegetate; but when soaked, the plants will appear in a fortnight, if the seeds be good, and the bed in a proper temperature of heat. When the plants are two inches high, they should be transplanted each into a separate pot, filled with light earth, and plunged into a hot-bed of tanner's bark, where they should be shaded from the sun until they have taken new root; after which they must be treated in the same manner as other tender plants from the same countries, always keeping them in the bark stove. They will flower the second year, and sometimes ripen their seeds in England.

ABRUZZO, a province in Naples. The river Pescara divides it into two parts; one of which is called Ulterior, whereof Aquila is the capital; and the other Citerior, whose capital is Solomona. Besides the Appenines, there are two considerable mountains, the one called Monte Cavallo, and the other Monte Majello; the top of which last is always covered with snow. Abruzzo is a cold country; but the rigour of the climate is not so great as to prevent the country from producing in abundance every thing requisite for the support of life. Vegetables, fruits, animals, and numberless other articles of sustenance, not only furnish ample provision for the use of the natives, but also allow of exportation. There is so large a quantity of wheat reaped, that many thousands of quarters are annually shipped off. Much Turkey wheat is sent out, and the province Teramo sells a great deal of rice little inferior in goodness to that of Lombardy. Oil is a plentiful commodity, and wines are made for exportation on many parts of the coast; but wool has always been, and still is, their staple commodity: the flocks, after passing the summer in the fine pastures of the mountains, are driven for the winter into the warm plains of Puglia, and a few spots near their own coast, where the snow does not lie; there are no manufactures of woollens in the province, except two small ones of coarse cloth, and the greatest part of the wool is sent out unwrought. No silk is made here, though mulberry-trees would grow well on the low grounds.

The antiquary and the naturalist may travel here with exquisite pleasure and profit; the former will find treasures of inscriptions, and inedited monuments appertaining to the

the warlike nations that once covered the face of the country: the natural philosopher will have a noble field for observation in the stupendous monuments that rise on all sides. Monte-corno and Majella are among the most interesting; the first is like an aged monument of nature, bald, and horribly broken on every aspect: from various appearances, it is evident that its bowels contain many valuable veins of metallic ore; but the great difficulty of access renders the search of them almost impracticable. Majella has other merits, and of a gayer kind:—nature has clothed its declivities and elevated fields with an infinite variety of her most precious plants; vulnerary herbs grow there in as great perfection as on the Alps of Swisserland, and are applied by the natives to wounds with equal success.

ABSALOM, the son of David by Maacah, was brother to Thamar, David's daughter, who was ravished by Amnon their eldest brother by another mother. Absalom waited two years for an opportunity of revenging the injury done to his sister; and at last procured the assassination of Amnon at a feast which he had prepared for the king's sons. He took refuge with Talmai king of Geshur; and, was no sooner restored to favour, but he engaged the Israelites to revolt from his father. Absalom was defeated in the wood of Ephraim: as he was flying, his hair caught hold of an oak, where he hung till Joab came and thrust him through with three darts. David had expressly ordered his life to be spared; and he lamented his death extremely.

ABSCISS, *f.* [*abscissus*, Lat.] in surgery, a cavity containing pus; or, a gathering of matter in a part; so called, because the parts which were joined are now separated; one part recedes from another, to make way for the collected matter. For the cure, see **SURGERY**.

To ABSCOND, *v. a.* To cut off, either in a natural or figurative sense.

ABSCISSA, [*Lat.*] Part of the diameter of a conic section, intercepted between the vertex and a semi-ordinate.

ABSCISSION, *f.* [*abscisso*, Lat.] The act of cutting off. The state of being cut off.

To ABSCOND, *v. n.* [*abscondo*, Lat.] To hide one's self; to retire from the public view: generally used of persons in debt, or criminals eluding the law.—The marmotte or mus alpinus, which *absconds* all winter, lives on its own fat: for in autumn, when it shuts itself up in its hole, it is very fat; but, in the spring-time, when it comes forth again, very lean. *Ray*.

ABSCONDER, *f.* The person that absconds.

ABSCONSA, *f.* a dark lantern used by the monks at the ceremony of burying their dead.

ABSENCE, *f.* [*absentia*, Lat.] The state of being absent, opposed to presence. Inattention, heedlessness, neglect of the present object. Want of appearance in a legal sense.—*Absence* is of a fourfold kind or species. The first is a necessary *absence*, as in banished persons; this is entirely necessary. A second, necessary and voluntary; as, upon the account of the commonwealth; or in the service of the church. The third kind the civilians call a probable *absence*; as, that of students on the score of study. And the fourth, an *absence* entirely voluntary; as, on the account of trade, merchandize, and the like. Some add a fifth kind of *absence*, which is committed *cum dolo & culpa*, by a man's non-appearance on a citation; as, in a contumacious person, who, in hatred to his contumacy, is, by the law, in some respects, reputed as a person present. *Ayliffe*.

ABSENT, *adj.* [*absens*, Lat.] Not present. Absent in mind, inattentive; regardless of the present object. It is used with the particle *from*:

In spring the fields, in autumn hills I love;
At morn the plains, at noon the shady grove;
But Delia always: *absent from* her sight,
Nor plains at morn, nor groves at noon delight. *Pope*.

To ABSENT, *v. a.* To withdraw, to forbear to come in to presence:

Go—for thy stay, not free, *absents* thee more. *Milton*.

ABSENTANEOUS, *adj.* Relating to absence; absent.

ABSENTEE, *f.* He that is absent from his station or employment, or country. A word used commonly with regard to Irishmen living out of their country.—Then was the first statute made against *absentees*, commanding all such as had land in Ireland, to return and reside thereupon.

Davies.—A great part of estates in Ireland are owned by *absentees*, and such as draw over the profits raised out of Ireland, refunding nothing. *Child*.

ABSINTHIATED, *part.* [from *absinthium*, Lat. wormwood.] Imbittered; impregnated with wormwood. Bartholin mentions a woman whose milk was become absinthiated, and rendered as bitter as gall, by the too liberal use of wormwood.

Vinum absinthites, or *poculum absinthiatum*, “wormwood wine,” is much spoke of among the ancients as a wholesome drink, and even an antidote against drunkenness. Ray makes it a preventative of venery. It is made by infusing the leaves of the plant in wine; but, according to Fehr, it ought to be prepared by fermentation, in order to correct the crudities, and call forth a volatile salt; which last, however, does not exist in wormwood. Some prefer the distilled water; but whatever virtues wormwood possesses reside entirely in its essential oil.

ABSINTHIUM, *f.* in botany. See **ARTEMISIA**, **ACHILLEA**, **ANTHEMIS**, **PARTHENIUM**, **SENECIO**, **TANACENTUM**.

ABSIS, *f.* in astronomy, the same with **APSIS**.

To ABSIST, *v. n.* [*absisto*, Lat.] To stand off, to leave off.

To ABSOLVE, *v. a.* [*absolvo*, Lat.] To clear, to acquit of a crime in a judicial sense. To set free from an engagement or promise. To pronounce sin remitted, in the ecclesiastical sense:

But all is calm in this eternal sleep;
Here grief forgets to groan, and love to weep;
E'en superstition loses every fear;
For God, not man, *absolves* our frailties here. *Pope*.

ABSOLUTE, *adj.* [*absolutus*, Lat.] Complete; applied as well to persons as things. Unconditional; as, an *absolute* promise. Not relative; as, *absolute* space.—An *absolute* mode is that which belongs to its subject, without respect to any other beings whatsoever; but a relative mode is derived from the regard that one being has to others. *Watts*.—In this sense we speak of the ablative case *absolute* in grammar. Not limited; as, *absolute* power. Positive; certain; without any hesitation. In this sense it rarely occurs.

ABSOLUTE, in metaphysics, is more particularly understood of a being or thing which does not proceed from any cause, or does not subsist by virtue of any other being, considered as its cause; in which sense, God alone is *absolute*. Absolute, in this sense, is synonymous with *independent*, and stands opposed to *dependent*.

ABSOLUTE also denotes a thing's being free from conditions or limitations; in which sense, the word is synonymous with *unconditional*. We say, an *absolute* decree, *absolute* promise, *absolute* obedience.

ABSOLUTE GOVERNMENT, *adj.* that wherein the prince is left solely to his own will, not being limited to the observance of any laws except those of his own discretion.

ABSOLUTE EQUATION, in astronomy, is the aggregate of the optic and eccentric equations. The apparent inequality of a planet's motion arising from its not being equally distant from the earth at all times, is called its optic equation, and would subsist even if the planet's real motion were uniform. The eccentric inequality is caused by the planet's motion being uniform. To illustrate which, conceive the sun to move, or to appear to move, in the circumference

circumference of a circle, in whose centre the earth is placed. It is manifest, that if the sun moves uniformly in this circle, it must appear to move uniformly to a spectator on the earth, and in this case there will be no optic nor eccentric equation; but suppose the earth to be placed out of the centre of the circle, and then, though the sun's motion should be really uniform, it would not appear to be so, being seen from the earth; and in this case there would be an optic equation, without an eccentric one. Imagine farther, the sun's orbit to be not circular, but elliptic, and the earth in its focus; it will be as evident that the sun cannot appear to have a uniform motion in such ellipse: so that his motion will then be subject to two equations, the optic and the eccentric.

ABSOLUTE NUMBER, in algebra, is any pure number standing in any equation without the conjunction of literal characters; as $2x + 36 = 48$; where 36 and 48 are *absolute numbers*, but x is not, as being joined by the letter x .

ABSOLUTELY, *adv.* Completely, without restriction. Without relation: in a state unconnected. Without limits or dependance. Without condition. Peremptorily, positively:

Being as I am, why didst not thou
Command me *absolutely* not to go,
Going into such danger, as thou said'st?

Milton.

ABSOLUTENESS, *f.* Completeness. Freedom from dependance, or limits.—There is nothing that can raise a man to that generous *absoluteness* of condition, as neither to cringe, to fawn, or to depend meanly; but that which gives him that happiness within himself, for which men depend upon others. *South.*—Despoticism.—He kept a strait hand upon his nobility, and chose rather to advance clergymen and lawyers, which were more obsequious to him, but had less interest in the people; which made for his *absoluteness*, but not for his safety. *Bacon.*

ABSOLUTION, *f.* [*absolutio*, Lat.] Acquittal.—*Ab-solution*, in the civil law, imports a full acquittal of a person by some final sentence of law; also, a temporary discharge of his farther attendance upon a mesne process, through a failure or defect in pleading; as it does likewise in the canon law, where, and among divines, it likewise signifies a relaxation of him from the obligation of some sentence pronounced either in a court of law, or else in *foro penitentiali*. Thus there is, in this kind of law, one kind of *absolution*, termed judicial, and another, styled a declaratory or extrajudicial *absolution*. *Ayliffe.*—The remission of sins, or penance, declared by ecclesiastical authority.—The Romanists hold absolution a part of the sacrament of penance: the council of Trent, sess. xiv. cap. iii. and that of Florence, in the decree *ad Armenos*, declare the form or essence of the sacrament to lie in the words of *absolution*, "I absolve thee of thy sins." The formula of absolution in the Romish church, is absolute: in the Greek church, it is deprecatory; and, in the churches of the reformed, declarative.

ABSOLUTORY, *adj.* [*absolutorius*, Lat.] That which absolves.—Though an *absolutory* sentence should be pronounced in favour of the persons, upon the account of nearness of blood; yet, if adultery shall afterwards be truly proved, he may again be proceeded against as an adulterer. *Ayliffe.*

ABSONANT, *adj.* Contrary to reason, wide from the purpose.

ABSONOUS, *adj.* [*absonus*, Lat. ill-sounding.] Absurd, contrary to reason. It is not much in use, and it may be doubted whether it should be followed by *to* or *from*.—To suppose an union of a middle constitution, that should partake of some of the qualities of both, is unwarranted by any of our faculties; yea, most *absonous* to our reason. *Glanville.*

To **ABSORB**, *v. a.* [*absorbo*, Lat. preter. *absorbed*; part. pret. *absorbed*, or *absorpt*.] To swallow up.—Moses imputed the deluge to the disruption of the abyss; and St. Peter to the particular constitution of that earth, which

made it obnoxious to be *absorpt* in water. *Burnet.*—To suck up.—While we perspire, we *absorb* the outward air. *Arbutnot.*

ABSORBENT, *f.* [*absorbens*, Lat.] In general, any thing possessing the faculty of *absorbing*, or swallowing up another.

ABSORBENT MEDICINES, *adj.* testaceous powders, as chalk, crabs-eyes, &c. which are taken inwardly for drying up or absorbing any acid or redundant humours in the stomach or intestines. They are likewise applied outwardly to ulcers or sores with the same intention.

ABSORBENT VESSELS, a name given promiscuously to the lacteal vessels, lymphatics, and inhalent arteries. See **ANATOMY**.—Naturalists also define similar absorbents in plants, the fibrous or hairy roots of which are as a kind of vasa absorbentia, which attract and imbibe the nutritious juices from the earth. See **PLANTS**.

ABSORBING, *part.* the swallowing up, sucking up, or imbibing, any thing: thus black bodies are said to absorb the rays of light; luxuriant branches, to absorb or waste the nutritious juices which should feed the fruit of trees, &c.

ABSORPT, *part.* Swallowed up; used as well, in a figurative sense, of persons, as, in the primitive, of things.

ABSORPTION, *f.* the act of swallowing up; and, in the animal economy, is the power whereby the absorbent vessels imbibe the juices, &c.

ABSORPTIONS OF THE EARTH, *f.* a term used by Kircher and others for the sinking in of large tracts of land by means of subterranean commotions, and many other accidents. Pliny tells us, that in his time the mountain Cymbotus, with the town of Eurites, which stood on its side, were wholly absorbed into the earth, so that not the least trace of either remained; and he records the like fate of the city Tantalus in Magnesia, and after it of the mountain Sypelus, both thus absorbed by a violent opening of the earth. Galanis and Garnatus, towns once famous in Phœnicia, are recorded to have met the same fate; and the vast promontory, called Phlegium, in Ethiopia, after a violent earthquake in the night-time, was not to be seen in the morning, the whole having disappeared, and the earth closed over it. These and many other histories, attested by authors of the greatest credit among the ancients, abundantly prove the fact in the earlier ages; and there have not been wanting too many instances of more modern date. Kircher's Mund. Subter. p. 77. See **EARTH** and **EARTHQUAKE**.

ABSORUS, **APSORUS**, **ABSYRTIS**, **ABSYRTIDES**, **APSYRTIDES**, **APSYRTIS**, and **ABSYRTIUM**, (Strabo, Mela, Ptolomy;) islands in the Adriatic, in the gulph of Carnero; so called from Absyrtus, Medea's brother, there slain. They are either one island or two, separated by a narrow channel, and joined by a bridge; and are now called *Cherso* and *Osero*.

To **ABSTAIN**, *v. n.* [*abstineo*, Lat.] To forbear, to deny one's self any gratification; with the particle *from*:

If thou judge it hard and difficult,
Conversing, looking, loving, to *abstain*
From love's due rites, nuptial embraces sweet;
And, with desires, to languish without hope. *Milton.*

ABSTEINEN, a district and village of Prussia, in a mountainous and pleasant country, so fertile in corn and cattle, that it is called the storehouse of Lithuania.

ABSTEMII, in church-history, a name given to such persons as could not partake of the cup of the eucharist on account of their natural aversion to wine. Calvinists allow these to communicate in the species or bread only, touching the cup with their lip; which, on the other hand, is by the Lutherans deemed a profanation.

ABSTEMIOUS, *adj.* [*abstemius*, Lat.] Temperate, sober, abstinent, refraining from excess of pleasures. It is used of persons; as, an *abstemious* hermit: and of things, as, an *abstemious* diet. It is spoken likewise of things that cause temperance.—The History of Mr. Wood, in the

Medic.

Medic. Transf. vol. ii. p. 261. art. 18. is a very remarkable exemplification of the very beneficial alterations which may be effected on the human body by a strict course of abstemiousness.—The Roman ladies, in the first ages of the republic, were all enjoined to be abstemious; and that it might appear, by their breath, whether or no they kept up to the injunction, it was one of the laws of the Roman civility, that they should kiss their friends and relations whenever they accosted them.

ABSTEMIOUSLY, *adv.* Temperately, soberly, without indulgence.

ABSTEMIOUSNESS, *f.* The quality of being abstemious.

ABSTENTION, *f.* [from *abstineo*, Lat.] The act of holding off, or refraining; restraint.

TO ABSTERGE, *v. a.* [*abtergo*, Lat.] To cleanse by wiping; to wipe.

ABSTERGENT, *adj.* Cleansing; having a cleansing quality.—Abstergent medicines are those employed for resolving obstructions, concretions, &c. such as soap, &c.

TO ABTERSE, *v. a.* To cleanse, to purify; a word very little in use, and less analogical than *abterge*.—Nor will we affirm, that iron receiveth, in the stomach of the ostrich, no alteration; but we suspect this effect rather from corrosion than digestion; not any tendency to chilification by the natural heat, but rather some attrition from an acid and vitriolous humidity in the stomach, which may *abterse* and shave the scorious parts thereof. *Brown.*

ABTERSION, *f.* [*abterfio*, Lat.] The act of cleansing.

ABTERSIVE, *adj.* That has the quality of absterging or cleansing.

ABSTINENCE, *f.* [*abstinentia*, Lat.] Forbearance of anything; with the particle *from*. Fasting, or forbearance of necessary food. It is generally distinguished from temperance, as the greater degree from the less; sometimes as single performances from habits; as, a day of *abstinence*, and a life of temperance.—Among the Jews, various kinds of abstinence were ordained by their law. Among the primitive Christians, some denied themselves the use of such meats as were prohibited by that law, others looked upon this abstinence with contempt; as to which, St. Paul gives his opinion, Rom. xiv. 1—3. The council of Jerusalem, which was held by the Apostles, enjoined the Christian converts to abstain from meats strangled, from blood, from fornication, and from idolatry. Abstinence, as prescribed by the gospel, is intended to mortify and restrain the passions, to humble our vicious natures, and by that means raise our minds to a due sense of devotion. But there is another sort of abstinence, which may be called *ritual*, and consists in abstaining from particular meats at certain times and seasons. It was the spiritual monarchy of the western world which first introduced this ritual abstinence; the rules of which were called *rogations*; but grossly abused from the true nature and design of fasting.—In England, abstinence from flesh has been enjoined by statute even since the reformation, particularly on Fridays and Saturdays, on vigils, and on all commonly called *fish-days*. The like injunctions were renewed under Queen Elizabeth: but at the same time it was declared, that this was done not out of motives of religion, as if there were any difference in meats; but in favour of the consumption of fish, and to multiply the number of fishermen and mariners, as well as spare the stock of sheep. The great fast, says St. Augustin, *is to abstain from sin*.

ABSTINENCE is more particularly used for a spare diet, or a slender parsimonious use of food, below the ordinary standard of nature. The physicians relate wonders of the effects of abstinence in the cure of many disorders, and protracting the term of life. The noble Venetian, Cornaro, after all imaginable means had proved vain, so that his life was despaired of at 40, recovered, and lived to near 100, by mere dint of abstinence; and he himself gives the account. It is indeed surprising to what a great age the primitive Christians of the east, who retired from the persecutions into the deserts of Arabia and Egypt, lived

healthful and cheerful on a very little food. Cassian assures us, that the common rate for twenty-four hours was twelve ounces of bread and mere water: with this St. Anthony lived 105 years; James the Hermit 104; Arsenius, tutor of the Emperor Arcadius, 120; St. Epiphanius, 115; Simeon the Stylite, 112; and Romauld, 120. Indeed, we can match these instances of longevity at home. Buchanan writes, that one Lawrence preserved himself to 140 by force of temperance and labour; and Spottwood mentions one Kentigern, afterwards called St. Mongah or Mungo, who lived to 185 by the same means. Other instances see under the article **LONGEVITY**.—**Abstinence**, however, is to be recommended only as it means a proper regimen; for in general it must have had consequences when observed without a due regard to constitution, age, strength, &c. According to Dr. Cheyne, most of the chronic diseases, the infirmities of old age, and the short lives of Englishmen, are owing to repletion; and may be either cured, prevented, or remedied, by abstinence: but then the kinds of abstinence which ought to obtain, either in sickness or health, are to be deduced from the laws of diet and regimen.

Among the brute creation, we see extraordinary instances of long abstinence. The serpent-kind, in particular, bear abstinence to a wonderful degree. We have seen rattlesnakes that had subsisted many months without any food, yet still retained their vigour and fierceness. Dr. Shaw speaks of a couple of cerastes (a sort of Egyptian serpents), which had been kept five years in a bottle close corked, without any sort of food, unless a small quantity of sand wherein they coiled themselves up in the bottom of the vessel may be reckoned as such: yet when he saw them, they had newly cast their skins, and were as brisk and lively as if just taken. But it is even natural for divers species to pass four, five, or six, months, every year, without either eating or drinking. Accordingly, the tortoise, bear, dormouse, serpent, &c. are observed regularly to retire, at those seasons, to their respective cells, and hide themselves, some in the caverns of rocks or ruins; others dig holes under ground; others get into woods, and lay themselves up in the clefts of trees; others bury themselves under water, &c. And these animals are found as fat and fleshy after some months abstinence as before.—Sir G. Ent weighed his tortoise several years successively, at its going to earth in October, and coming out again in March; and found, that, of four pounds four ounces, it used only to lose about one ounce.—Indeed, we have instances of men passing several months as strictly abstinent as other creatures. In particular, the records of the Tower mention a Scotchman imprisoned for felony, and strictly watched in that fortress for six weeks: in all which time he took not the least sustenance; for which he had his pardon. Numberless instances of extraordinary abstinence, particularly from morbid causes, are to be found in the different periodical Memoirs, Transactions, Ephemerides, &c.—It is to be added, that, in most instances of extraordinary human abstinence related by naturalists, there were said to have been apparent marks of a texture of blood and humours, much like that of the animals above-mentioned. Though it is no improbable opinion, that the air itself may furnish something for nutrition; it is certain, there are substances of all kinds, animal, vegetable, &c. floating in the atmosphere, which must continually be taken in by respiration. And that an animal body may be nourished thereby, is evident in the instance of vipers; which, if taken when first brought forth, and kept from every thing but air, will yet grow very considerably in a few days. So the eggs of lizards are observed to increase in bulk, after they are produced, though there be nothing to furnish the increment but air alone; in like manner as the eggs or spawn of fishes grow and are nourished with the water. And hence, say some, it is that cooks, turnspit-dogs, &c. though they eat but little, yet are usually fat. See **FASTING**.

ABSTINENT, *adj.* [*abstinens*, Lat.] That uses abstinence,

nence, in opposition to covetous, rapacious, or luxurious. It is used chiefly of persons.

ABSTINENTS, or **ABSTINENTES**, a sect of heretics that appeared in France and Spain about the end of the third century. They are supposed to have borrowed part of their opinions from the Gnostics and Manicheans, because they opposed marriage; condemned the use of flesh meat, and placed the Holy Ghost in the class of created beings.

ABSTORTED, *adj.* [*abstortus*, Lat.] Forced away, wrung from another by violence.

To ABSTRACT, *v. a.* [*abstraho*, Lat.] To take one thing from another. To separate by distillation. To separate ideas. To reduce to an epitome.—If we would fix in the memory the discourses we hear, or what we design to speak, let us *abstract* them into brief compends, and review them often. *Watts.*

ABSTRACT, *adj.* [*abstractus*, Lat.] Separated from something else; generally used with relation to mental perceptions; as, *abstract* mathematics, *abstract* terms, in opposition to concrete.

ABSTRACT, *f.* A smaller quantity, containing the virtue or power of a greater. An epitome made by taking out the principal parts. The state of being abstracted or disjoined. In literature, a compendious view of any large work; shorter and more superficial than an abridgment.

ABSTRACT IDEA, *adj.* in metaphysics, is a partial idea of a complex object, limited to one or more of the component parts or properties, laying aside or abstracting from the rest. Thus, in viewing an object with the eye, or recollecting it in the mind, we can easily abstract from some of its parts and properties, and attach ourselves to others: we can attend to the redness of a cherry, without regard to its figure, taste, or consistence.

ABSTRACT TERMS, words that are used to express abstract ideas. Thus beauty, ugliness, whiteness, roundness, life, death, are abstract terms.

ABSTRACT NUMBERS, are assemblages of units, considered in themselves without denoting any particular and determined particulars. Thus 6 is an abstract number, when not applied to any thing; but, if we say 6 feet, 6 becomes a concrete number. See the article **NUMBER**.

ABSTRACT MATHEMATICS, otherwise called *Pure Mathematics*, is that which treats of magnitude or quantity, absolutely and generally considered, without restriction to any species of particular magnitude; such are Arithmetic and Geometry. In this sense, abstract mathematics is opposed to mixed mathematics; wherein simple and abstract properties, and the relations of quantities primitively considered in pure mathematics, are applied to sensible objects, and by that means become intermixed with physical considerations; such are Hydrostatics, Optics, Navigation, &c.

ABSTRACTED, *part. adj.* Separated; disjoined. Refined, purified. Abstruse; difficult. Absent of mind, inattentive to present objects; as, an *abstracted* scholar.

ABSTRACTEDLY, *adv.* With abstraction, simply, separately from all contingent circumstances.

ABSTRACTION, *f.* [*abstractio*, Lat.] The act of abstracting. The state of being abstracted. Absence of mind; inattention. Disregard to worldly objects.

ABSTRACTION, in metaphysics, the operation of the mind when occupied by abstract ideas. A large oak fixes our attention, and abstracts us from the shrubs that surround it. In the same manner a beautiful woman in a crowd, abstracts our thoughts, and engrosses our attention solely to herself. These are examples of real abstraction: when these, or any others of a similar kind, are recalled to the mind after the objects themselves are removed from our sight, they form what are called *abstract ideas*.

Abstraction is chiefly employed these three ways. First, When the mind considers any one part of a thing, in some respect distinct from the whole; as a man's arm without the consideration of the rest of the body. Secondly, When we consider the *mode* of any substance, omitting the sub-

stance itself; or when we separately consider several modes which subsist together in one subject. This abstraction the geometricians make use of when they consider the length of a body separately, which they call a *line*, omitting the consideration of its breadth and thickness. Thirdly, It is by abstraction that the mind forms general or universal ideas; omitting the modes and relations of the particular objects whence they are formed. Thus, when we would understand a thinking being in general, we gather from our self-consciousness what it is to think; and, omitting those things which have a particular relation to our own minds, or to the human mind, we conceive a thinking being in general. Ideas formed in this manner, which are what we properly call *abstract ideas*, become general representatives of all objects of the same kind; and their names applicable to whatever exists conformable to such ideas. Thus the idea of colour that we receive from chalk, snow, milk, &c. is a representative of all of that kind; and has a name given it, *whiteness*, which signifies the same quality wherever found or imagined.

ABSTRACTIVE, *adj.* Having the power or quality of abstracting.

ABSTRACTLY, *adv.* In an abstract manner, absolutely, without reference to any thing else.

ABSTRACTNESS, *f.* Subtlety; separation from all matter or common notion.—I have taken some pains to make plain and familiar to your thoughts, truths, which established prejudice, or the *abstractness* of the ideas themselves, might render difficult. *Locke.*

ABSTRACTED, *part. adj.* [*abstractus*, Lat.] Unbound.

To ABSTRINGE, *v. a.* To unbind.

To ABSTRUDE, *v. a.* [*abstrudo*, Lat.] To thrust off, or pull away.

ABTRUSE, *adj.* [*abstrusus*, Lat. thrust out of sight.] Hidden. Difficult; remote from conception or apprehension. It is opposed to *obvious* and *easy*:

Th' eternal eye, whose sight discerns
Abstrusely thoughts, from forth his holy mount,
And from within the golden lamps that burn
Nightly before him, saw, without their light,
Rebellion rising.

Milton.

ABSTRUSELY, *adv.* In an abstruse manner; obscurely, not plainly, or obviously.

ABTRUSENESS, *f.* The quality of being abstruse; difficulty, obscurity.—It is not oftentimes so much what the scripture says, as what some men persuade others it says, that makes it seem obscure, and that as to some other passages which are so indeed, since it is the *abtruseness* of what is taught in them, that makes them almost inevitably so; it is little less saucy, upon such a score, to find fault with the style of the scripture, than to do so with the Author for making us but men. *Boyle.*

ABTRUSITY, *f.* Abtruseness. That which is abstruse. A word seldom used.

To ABSUME, *v. a.* [*absumo*, Lat.] To bring to an end by a gradual waste; to eat up. An uncommon word.

ABSURD, *adj.* [*absurdus*, Lat.] Unreasonable; without judgment, as used of men. Inconsistent, contrary to reason, used of sentiments or practices.—Thus, it would be absurd to say that 6 and 6 make only 10, or to deny that twice 6 make 12. When the term *absurd* is applied to actions, it has the same import as *ridiculous*.

ABSURDITY, *f.* The quality of being absurd; want of judgment, applied to men; want of propriety, applied to things. That which is absurd; as, His travels were full of *absurdities*. In which sense it has a plural.—The satisfaction we receive from the opinion of some pre-eminence in ourselves, when we see the absurdities of another, or when we reflect on any past *absurdities* of our own. *Addison.*

ABSURDLY, *adv.* After an absurd manner; improperly; unreasonably.—We may proceed yet further with the atheist, and convince him, that not only his principle is absurd, but his consequences also as *absurdly* deduced from it. *Bentley.*

ABSURDNESS,

ABSURDNESS, *f.* The quality of being absurd; injudiciousness; impropriety. Absurdity is more frequently used.

ABSUS, *f.* in botany. See **CASSIA**.

ABSYRTUS, in the heathen mythology, the son of Æta and Hypsæa, and the brother of Medea. The latter running away with Jason, after her having assisted him in carrying off the golden fleece, was pursued by her father; when, to stop his progress, she tore Absyrtus in pieces, and scattered his limbs in his way.

ABTHANES, a title of honour used by the ancient inhabitants of Scotland, who called their nobles *thanes*, which in the old Saxon signifies *king's ministers*; and of these the higher rank were styled *abthanes*, and those of the lower *under thanes*.

ABUCCO, **ABOCCO**, or **ABOCCHI**, a weight used in the kingdom of Pegu. One abucco contains $12\frac{1}{2}$ teccalis; two abuccos make a giro or agire; two giro, half a piza; and a piza weighs an hundred teccalis; that is, two pounds five ounces the heavy weight, or three pounds nine ounces the light weight of Venice.

ABUKESO, in commerce, the same with **ASLAN**.

ABULFARAGIUS (Gregory,) son to Aaron a physician, born in 1226, in the city of Malatia, near the source of the Euphrates in Armenia. He followed the profession of his father; and practised with great success, numbers of people coming from the most remote parts to ask his advice. However, he would hardly have been known at this time, had his knowledge been confined to physic: but he applied himself to the study of the Greek, Syriac, and Arabic languages, as well as philosophy and divinity; and he wrote a history which does honour to his memory. It is written in Arabic, and divided into dynasties. It consists of ten parts, being an epitome of universal history from the creation of the world to his own time. Dr. Pocock published it with a Latin translation in 1663; and added, by way of supplement, a short continuation relating to the history of the eastern princes.

ABUNA, the title given to the archbishop or metropolitan of Abyssinia.

ABUNDANCE, *f.* [*abondance*, Fr.] Plenty; a sense chiefly poetical. Great numbers. A great quantity. Exuberance, more than enough.

ABUNDANT, *adj.* [*abundans*, Lat.] Plentiful. Exuberant. Fully stored. It is followed sometimes by *in*, commonly by *with*.—The world began but some ages before these were found out, and was *abundant with* all things at first; and men not very numerous; and therefore were not put so much to the use of their wits, to find out ways for living commodiously. *Burnet*.—It is applied generally to things, sometimes to persons.—The Lord, the Lord God, merciful and gracious, long-suffering and *abundant in goodness and truth*. *Exod.* xxxiv. 6.

ABUNDANT NUMBER, in arithmetic, is a number, the sum of whose aliquot parts is greater than the number itself. Thus the aliquot parts of 12, being 1, 2, 3, 4, and 6, they make, when added together, 16. An abundant number is opposed to a *deficient* number, or that which is greater than all its aliquot parts taken together; as 14, whose aliquot parts are, 1, 2, and 7, which make no more than 10: and to a *perfect* number, or one to which its aliquot parts are equal; as 6, whose aliquot parts are 1, 2, and 3.

ABUNDANTLY, *adv.* In plenty.—Let the waters bring forth *abundantly* the moving creature that hath life. *Gen.* i. 20.—Amplly, liberally, more than sufficiently.—Heroic poetry has ever been esteemed the greatest work of human nature. In that rank has Aristotle placed it; and Longinus is so full of the like expressions, that he *abundantly* confirms the other's testimony. *Dryden*.

ABUNDANTIA, a heathen divinity, represented in ancient monuments under the figure of a woman with a pleasing aspect, crowned with garlands of flowers, pouring all sorts of fruit out of a horn which she holds in her right hand, and scattering grain with her left, taken pro-

miscuously from a sheaf of corn. On a medal of Trajan, she is represented with two cornucopieæ.

ABURY, or **AUBERY**, Wilts, near Marlborough-downs, noted for the stupendous remains of a Druidical temple, like Stonehenge, on Salisbury plain.

ABU SAID (Ebn Aljaptu), sultan of the Moguls, succeeded his father anno 717 of the hegira. He was the last monarch of the race of Jenghizkhan; and after his death, which happened the same year that Tamerlane was born, the empire was made a scene of blood and desolation.

ABUS, in ancient geography, a river of Britain, formed by the confluence of the Ure, the Derwent, Trent, &c. falling into the German Sea between Yorkshire and Lincolnshire, and forming the mouth of the Humber.

TO ABUSE, *v. a.* [*abutor*, *abusus*, Lat.] In abuse the verb, *s* has the sound of *z*; in the noun, the common sound. To make an ill use of. To violate; to defile. To deceive; to impose on. To treat with rudeness; to reproach.

Some praise at morning what they blame at night.

But always think the last opinion right.

A muse by these is like a mistress us'd,

This hour she's idoliz'd, the next *abus'd*.

Pope.

ABUSE, *f.* The ill use of any thing. A corrupt practice, bad custom. Seducement. Unjust censure, rude reproach, contumely:

I dark in light expos'd

To daily fraud, contempt, *abuse*, and wrong. *Milton.*

ABUSER, *f.* He that makes an ill use. He that deceives.—Next thou, the *abuser* of thy prince's ear. *Denham*. He that reproaches with rudeness. A ravisher, a violater.

ABUSIVE, *adj.* Practising abuse. Containing abuse; as an abusive lampoon. Deceitful; a sense little used, yet not improper.—It is verified by a number of examples, that whatsoever is gained by an *abusive* treaty, ought to be restored *in integrum*. *Bacon*.

ABUSIVELY, *adv.* Improperly, by a wrong use. Reproachfully.

ABUSIVENESS, *f.* The quality of being abusive; foulness of language.—Pick out of mirth, like stones out of thy ground, profaneness, filthiness, *abusiveness*. *Herbert*.

TO ABUT, *v. n.* obsolete. [*aboutir*, to touch at the end, Fr.] To end at, to border upon; to meet, or approach to, with the particle *upon*.—The Loos are two several corporations, distinguished by the addition of east and west, *abutting upon* a navigable creek, and joined by a fair bridge of many arches. *Carew*.

ABUTILON, in botany. See **HIBISCUS**, **MELOCHIA**, **MALVA**, **NAPÆA**, **SIDA**.

ABUTMENT, *f.* That which abuts, or borders upon another.

ABUTTAL, *f.* The butting or boundaries of any land. A writing declaring on what lands, highways, or other places, it does abut.

ABYDOS, anciently a town built by the Milesians in Asia, on the Hellespont, where it is scarce a mile over, opposite to Sestos on the European side. Now both called the *Dardanelles*. Abydos lay midway between Lampacus and Ilium, famous for Xerxes's bridge; and for the loves of Leander and Hero; celebrated also for its oysters.

ABYDOS was likewise anciently an inland town of Egypt, between Ptolemais and Diospolis Parva, towards Syrene; famous for the palace of Memnon and the temple of Osiris. A colony of Milesians: and the only one in the country into which the singers and dancers were forbid to enter.

This city, reduced to a village under the empire of Augustus, now presents to our view only an heap of ruins without inhabitants; but to the west of these ruins is still found the celebrated tomb of Ismandes. The entrance is under a portico sixty feet high, and supported by two rows of massy columns. The immovable solidity of the edifice, the huge masses which compose it, the hieroglyphics it is loaded with, stamp it a work of the ancient Egyptians. Beyond it is a temple 300 feet long and 145 wide. Upon entering

entering the monument we meet with an immense hall, the roof of which is supported by twenty-eight columns sixty-feet high and nineteen in circumference at the base. They are 12 feet distant from each other. The enormous stones that form the ceiling, perfectly joined and incruited, as it were, one in the other, offer to the eye nothing but one solid platform of marble 126 feet long and twenty-six wide. The walls are covered with hieroglyphics. One sees there a multitude of animals, birds, and human figures with pointed caps on their heads, and a piece of stuff hanging down behind, dressed in loose robes that come down only to the waist. Amongst these we may distinguish some women suckling their children, and men presenting offerings to them. Here also we meet with the divinities of India. Monsieur Chevalier, formerly governor of Chandernagore, who resided twenty years in that country, carefully visited this monument on his return from Bengal. He remarked here the gods *Jagrenet*, *Gonez*, and *Vechnou*, or *Wistnou*, such as they are represented in the temples of Indostan. A great gate opens at the bottom of the first hall, which leads to an apartment forty-six feet long by twenty-two wide. Six square pillars support the roof of it; and at the angles are the doors of four other chambers, but so choked up with rubbish that they cannot now be entered. The last hall, sixty-four feet long by twenty-four wide, has stairs by which one descends into the subterraneous apartments of this grand edifice. The Arabs, in searching after treasure, have piled up heaps of earth and rubbish. In the part we are able to penetrate, sculpture and hieroglyphics are discoverable as in the upper story. The natives say that they correspond exactly with those above ground, and that the columns are as deep in the earth as they are lofty above ground. It would be dangerous to go far into those vaults; for the air of them is so loaded with a mephitic vapour, that a candle can scarce be kept burning in them. Six lions' heads, placed on the two sides of the temple, serve as spouts to carry off the water. You mount to the top by a staircase of a very singular structure. It is built with stones incruited in the wall, and projecting six feet out; so that being supported only at one end, they appear to be suspended in the air. The walls, the roof, and the columns of this edifice, have suffered nothing from the injuries of time; and did not the hieroglyphics, by being corroded in some places, mark its antiquity, it would appear to have been newly built. The solidity is such, that unless people make a point of destroying it, the building must last a great number of ages. To the left of this great building we meet with another much smaller, at the bottom of which is a fort of altar. This was probably the sanctuary of the temple of Osiris.

ABYLA (Ptolemy, Mela), one of Hercules's pillars on the African side, called by the Spaniards *Sierra de las Monas*, over against Calpe in Spain, the other pillar; supposed to have been formerly joined, but separated by Hercules, and thus to have given entrance to the sea now called the Mediterranean: the limits of the labours of Hercules. *Pliny*.

ABYSM, *f.* [*abyssme*, old Fr. now written contractedly *abime*.] A gulf; the same with *abyss*.

My good stars that were my former guides,
Have empty left their orbs, and shot their fires
Into the *abyss* of hell. *Shakespeare*.

ABYSS, *f.* [*abyssus*, Lat. *αβυσσος*, bottomless, Gr.] A depth without bottom.

Thy throne is darkness in th' *abyss* of light,
A blaze of glory that forbids the sight;
O teach me to believe thee thus conceal'd,
And search no farther than thyself reveal'd. *Dryden*.

A great depth, a gulf; hyperbolically.—The yawning earth disclosed the *abyss* of hell. *Dryden*.—In a figurative sense, that in which any thing is lost.—If, discovering how far we have clear and distinct ideas, we confine our thoughts within the contemplation of those things that are within the

reach of our understandings, and launch not out into that *abyss* of darkness, out of a presumption that nothing is beyond our comprehension. *Locke*.—The body of waters supposed at the center of the earth.—We are here to consider what is generally understood by the great *abyss*, in the common explication of the deluge; and it is commonly interpreted either to be the sea, or subterraneous waters hid in the bowels of the earth. *Burnet*.—In the language of divines, hell:

That insatiable *abyss*,
Where flames devour, and serpents hiss. *Roscommon*.

Dr. Woodward, in his Natural History of the Earth, asserts, That there is a mighty collection of waters inclosed in the bowels of the earth, constituting a huge orb in the interior or central parts of it; and over the surface of this water he supposes the terrestrial strata to be expanded. This, according to him, is what Moses calls the great deep, and what most authors render the great *abyss*. The water of this vast *abyss*, he alleges, does communicate with that of the ocean, by means of certain hiatuses or chafins passing betwixt it and the bottom of the ocean: and this and the *abyss* he supposes to have one common centre, around which the water of both is placed; but so, that the ordinary surface of the *abyss* is not level with that of the ocean, nor at so great a distance from the centre as the other, it being for the most part restrained and depressed by the strata of earth lying upon it: but wherever those strata are broken, or so lax and porous that water can pervade them, there the water of the *abyss* ascends; fills up all the clefts and fissures into which it can get admittance; and saturates all the interstices and pores of the earth, stone, or other matter, all around the globe, quite up to the level of the ocean.

The existence of an *abyss*, or receptacle of subterraneous waters, is controverted by Camerarius; and defended by Dr. Woodward chiefly by two arguments: the first drawn from the vast quantity of water which covered the earth in the time of the deluge; the second, from the consideration of earthquakes, which he endeavours to show are occasioned by the violence of the waters in this *abyss*. A great part of the terrestrial globe has been frequently shaken at the same moment; which argues, according to him, that the waters, which were the occasion thereof, were co-extended with that part of the globe. There are even instances of universal earthquakes; which show, that the whole *abyss* must have been agitated; for so general an effect must have been produced by as general a cause, and that cause can be nothing but the subterraneous *abyss*.

To this *abyss* also has been attributed the origin of springs and rivers; the level maintained in the surfaces of different seas; and their not overflowing their banks. To the effluvia emitted from it, some even attribute all the diversities of weather and change in our atmosphere. Ray, and other authors, ancient as well as modern, suppose a communication between the Caspian Sea and the ocean by means of a subterranean *abyss*: and to this they attribute it that the Caspian does not overflow, notwithstanding the great number of large rivers it receives, of which Keimper reckons above fifty in the compass of sixty miles; though, as to this, others suppose that the daily evaporation may suffice to keep the level.

The different arguments concerning this subject may be seen collected and amplified in Cockburn's Inquiry into the Truth and Certainty of the Mosaic Deluge, p. 271, &c. After all, however, this amazing theory of a central *abyss* is far from being demonstrated: it will perhaps in several respects appear inconsistent with sound philosophy, as well as repugnant to the phenomena of nature. In particular, if we believe any thing like elective attraction to have prevailed in the formation of the earth, we must believe that the separation of the chaos proceeded from the union of similar particles. It is certain that rest is favourable to such operations of nature. As, therefore, the central parts of the earth were more immediately quiescent than those remote

remote from the centre, it seems absurd to suppose that the heavier and denser bodies gave place to the more light and fluid; that the central part should consist of water only, and the more superficial part of a crust or shell. Vid. Whitehurst's Inquiry into the original Formation of the Strata, &c. See DELUGE.

ABYSS is more particularly used in antiquity, to denote the temple of Proserpine. It was thus called on account of the immense fund of gold and riches deposited there; some say, hid under ground.

ABYSS is also used in heraldry to denote the centre of an escutcheon. In which sense, a thing is said to be bore in abyfs, *en abyfme*, when placed in the middle of the shield, clear from any other bearing: He bears azure, a fleur-de-lis, in abyfs.

ABYSSINIA, or *Modern Ethiopia*, is a very extensive empire in Africa, called by the Arabians *Al Habash*.—Into this part of the globe the admission of travellers has been supposed extremely difficult, and their return from thence almost impracticable. James Bruce, Esq. of Kinnaird, in Scotland, has, however, lately made the tour of those remote regions: from whence he has returned home in safety, and has since favoured the world with a very interesting and curious description of Abyssinia and the other parts of Ethiopia, through which he travelled to discover the source of the Nile. According to a map of the country published by this gentleman, Abyssinia is bounded on the south by a vast chain of mountains, extending with very little interruption from 34° to 44° E. lon. and between 80° and 90° N. lat. On the east and north-east it has the Red Sea, and on the south-east the kingdom of Adel. On the west and north its boundaries are less distinctly marked; having on both these quarters the barbarous kingdom of Sennaar, whose limits frequently vary according to the fortune of war. From Arkeeko, situated near the foot of the Bafaltes mountains, in about 15° 30' N. lat. it extends to near 7° N. lat. where the mountains of Caffa, the most southerly province of Abyssinia, terminate. Along the coast of the Red Sea lie the territories inhabited by the Hazorta-Shiho, the district of Engana-Shiho, and the kingdom of Dancali, including the territory of Azab. To the westward of these are the province or kingdom of Tigré, including the country of the Dobas, part of the kingdom of Bali, and that of Dawaro. Still farther west are those of Siré, Lafta, Amhara, the greatest part of Bali, and part of Fatigar, which last reaches beyond the mountains. Proceeding still in the same direction, we come to Teherkin, Tchelga, Abargale, Salao, Begemder, Shoa, and Ifat; reckoning always from north to south; Teherkin, for instance, being to the northward of Tchelga, &c. Shoa extends a considerable way to the westward; so that, besides Ifat, it has to the south of it also the kingdoms of Hade and Cambut; the latter extending beyond the southern ridge of mountains. To the westward are Ras-el-Feel, Dembea, Gojam, and Damot; and beyond these are the kingdoms of Dembea, Bizamo, Gooderoo, and Guraque; those of Nare or Enarea and Caffa occupying the south-west corner of the empire.

The principal river is the Nile, which has its source in this country; and the most considerable lake is that of Dembea, which discharges itself into the Nile; it is about 700 miles in length, and ninety in breadth. The air is pretty temperate in the mountains, and therefore their towns and strong holds are generally placed on them; but in the valleys it is hot and suffocating. The torrents in the rainy season wash a great deal of gold from the mountains. This season begins in May, when the sun is vertical, or directly over their heads, and ends in September.—These rains produce the inundation of the NILE; for the particulars of which see that Article.

The Abyssines in general are of an olive complexion, tall, graceful, and well featured. Those who are neither mechanics nor tradesmen (which few of them are), nor tillers of the ground, are enured to bear arms, which are a head-piece, a buckler, a coat of mail, bows and arrows,

darts, pikes capped with iron at both ends, a sling, and a sword: they have very few fire-arms, and those were introduced by the Portuguese. The habit of persons of quality is a fine silken vest, or fine cotton, with a kind of scarf. The citizens have the same habit, only coarser. The common people have nothing but a pair of cotton drawers, and a scarf which covers the rest of their body. The women are of a healthy constitution, active, and moderately handsome, having neither flat noses nor thick lips like the negroes; and nature is so friendly, that they stand in little need of midwives, which is indeed the case of most countries in the torrid zone. They appear in public as in Europe, without being forbid the conversation of the men as among the Mahometans. Princesses of the royal blood are not permitted to marry foreigners: and when they take the air, they go in great state, with 400 or 500 women attendants. Their language bears a great affinity with the Arabic; but particular provinces have a different dialect.

Gold, silver, copper, and iron, are the principal ores with which their mines abound in this extensive part of Africa: but not above one third part is made use of by way of merchandize, or converted into money; of which they have little or no use in Abyssinia. They cut their gold indeed into small pieces for the pay of their troops, and for expences of the court, which is but a modern custom among them; the king's gold, before the end of the 17th century, being laid up in his treasury in ingots, with intent to be never carried out, or never used in any thing but vessels and trinkets for the service of the palace. In the lieu of small money, they make use of rock salt as white as snow and as hard as stone. This is taken out of the mountain of Lafta, and put into the king's warehouses; where it is reduced into tablets of a foot long, and three inches broad, ten of which are worth about a French crown. When they are circulated in trade, they are reduced into still smaller pieces, as occasion requires. This salt is also applied to the same purpose as common sea-salt. With this mineral salt, they purchase pepper, spices, and silk stuffs, which are brought to them by the Indians, in their ports in the Red Sea. Cardamums, ginger, aloes, myrrh, cassia, civet, ebony-wood, ivory, wax, honey, and cotton, are merchandises which may be had from Abyssinia; to which may be added sugar, hemp, flax, &c. It is affirmed there are in this country the finest emeralds that are any where to be found; and, though they are found but in one place, they are there in great quantities, and some so large and so perfect as to be of almost ineffinable value. The greatest part of the merchandises above mentioned, are more for foreign than inland trade. The domestic commerce consists chiefly in salt, honey, buck-wheat, grey peas, citrons, oranges, lemons, and other provisions, with fruits and herbage necessary for the support of life. Those places that the Abyssinian merchants frequent the most, who dare venture to carry their commodities by sea themselves, are Arabia Felix, and the Indies; particularly Goa, Cambaye, Bengal, and Sumatra. With regard to their ports on the Red Sea, to which foreign merchants commonly resort, the most considerable are those of Mette, Azum, Zanjalla, Maga, Dazo, Patea, and Brava. The trade of the Abyssinians by land is inconsiderable. There are, however, bands of them who arrive yearly at Egypt, particularly at Cairo, laden with gold dust, which they bring to barter for the merchandises of that country, or of Europe, for which they have occasion. These caravans or caravans, if we may be allowed thus to call a body of forty or fifty poor wretches who unite together for their mutual assistance in their journey, are commonly three or four months in their route, traversing forests and mountains almost impassable in order to exchange their gold for necessaries for their families, and return immediately with the greatest part of the merchandise on their backs. Frequently the Jews or Egyptians give them large credit; which may seem surprising, as they are beyond recourse if they should fail of payment. But experience has shewn, that they have

never abused the confidence reposed in them; and even in the event of death, their fellow-travellers take care of the effects of the deceased for the benefit of their families, but in the first place for the discharge of those debts contracted at Cairo.—It remains only to be observed, that one of the principal branches of trade of the Abyssines is that of slaves; who are greatly esteemed in the Indies and Arabia for the best, and most faithful, of all that the other kingdoms of Africa furnish. The Indian and Arabian merchants frequently substitute them as their factors; and, on account of their good services and integrity, not only often give them their liberty, but liberally reward them.

There is a great difference of climate in this country, owing to the vast extent and variety of elevation in different parts of the empire, which is very perceptible in its soil and productions. The mountains in many places are not only barren, but altogether inaccessible, except by those who make it their constant practice to climb amongst them; and even by them they cannot be ascended without great difficulty and danger. The shapes of these mountains are very strange and tremendous; exceedingly different from those of Europe; some resembling towers and steeples, while others are like a board or slate set up on end; the base being so narrow, and the whole mountain so high and thin, that it seems wonderful how it can stand. In the valleys, however, and flat parts of the country, the soil is excessively fruitful, though in the warmest places grain cannot be brought to perfection. Wine is also made only in one or two places; but the greatest profusion of fruits of all kinds is to be met with every where, as well as many vegetables not to be found in other countries. There is a vast variety of flowers, which adorn the banks of the rivers in such a manner as to make them resemble fine gardens. Among these a species of roses is met with, which grows upon trees, and is much superior in fragrance to those which grow on bushes. Among the variety of rare plants to be met with in Abyssinia, Mr. Bruce particularly describes the following.

1. The papyrus, the ancient material for paper; which our author supposes to have been a native of Ethiopia, and not of Egypt as has been supposed. 2. Balestan, balm, or balsam plant; a tree growing to the height of fourteen or fifteen feet, and used for fuel along with other trees in the country. It grows on the coast of the Red Sea, among the myrrh trees behind Azab, all the way to Babelmandel. This is the tree producing the balm of Gilead mentioned in Scripture. 3. The fassa, myrrh, and opocalpasum trees. These grow likewise along the coast of the Red Sea. The fassa or opocalpasum is used in manufactures; and, according to our author, resembles gum *adragant*, probably tragacanth. The tree which produces it grows to a great size, and has a beautiful flower, scarce admitting of description without a drawing. 4. The ergett, a species of the mimosa, is of two kinds; one called *ergette y'dimmo*, or the bloody ergett, from the pink colour of its filaments; the other *ergett el krone*, or the horned ergett, with a flower resembling the acacia vera or Egyptian thorn. These were both found on the banks of a river named *Amo*, near the great lake Dambea. 5. Enfete, an herbacious plant, growing in Narea, in swampy places; but it is supposed to grow equally as well in any other part of the empire where there is heat and moisture sufficient. It forms a great part of the vegetable food of the Abyssinians. It produces a kind of figs, but these are not eatable. When used for food, it is to be cut immediately above the small detached roots, or perhaps a foot or two higher, according to the age of the plant. The green is to be stripped from the upper part till it becomes white; and, when soft, it affords an excellent food when eaten with milk or butter. 6. Kolquall, a kind of tree, only the lower part of which is woody, the upper part being herbaceous and succulent. The flowers are of a beautiful golden colour, and the fruit turns to a deep crimson; so that the trees make a very beautiful appearance. The whole plant is full of a very acrid and caustic milk. 7. Rack is a large tree, growing not only in

Abyssinia, but in many places of Arabia Felix. Its wood is so hard and bitter, that no worm will touch it; for which reason it is used by the Arabs for constructing their boats. It grows, like the mangrove, among the salt-water of the sea, or about salt-springs. 8. Gir-gir, or geshe-el-aube; a kind of grafs found about Ras-el-Feel, growing to the height of about three feet four inches. 9. The kantuffa, a very noxious species of thorn, much more troublesome than any with which we are acquainted, and growing to the height of eight or more feet. The flowers have a strong smell like the flower mignonet. 10. The gagnedi, is a short tree only about nine feet high, a native of Lamalmon. The flowers, which are yellow and very beautiful, turn towards the sun like those of the helianthus. 11. The wansey, a tree common throughout all Abyssinia; flowers exactly on the first day the rains cease. It grows to the height of eighteen or twenty feet; having a thick bark and close heavy wood; the first part of which is white, but the rest of a dark colour. The flowers are of a beautiful white colour; but it does not appear to possess any other remarkable property, though it is held in great estimation by the Abyssinians, and is even worshipped by the Galla. 12. The farek, or *Bauhinia acuminata*, grows in the country immediately adjacent to the sources of the Nile: being found by Mr. Bruce scarce 400 yards distant from the fountain. 13. Kuara, is a beautiful tree, growing in the south and south-west parts of Abyssinia. It has a fruit like a bean, of a red colour, which in the early ages was made use of as a weight for gold and diamonds; and hence Mr. Bruce is of opinion that the name of the imaginary weight *carat* is derived. 14. The walkuffa, grows in the hottest parts of Ethiopia. It is a flowering tree, with beautiful white blossoms, which do not appear till towards the middle of January. The flowers have no smell, and are accounted pernicious to bees. The wood is very heavy. 15. The wooginoos, or *Brucea antidyfenterica*, is common throughout the whole empire, but principally on the sides of the valleys. It is a sovereign remedy against the dysentery, a very common and fatal disease in hot countries. Mr. Bruce had experimental proof of its antidyfenteric virtues. 16. Cusso, or *Bankfia anthelmintica*, is a very beautiful and useful tree, being a strong anthelmintic, and used as such by the Abyssinians. Every person there, whether male or female, is troubled with that kind of worm called *ascarides*; a great number of which are evacuated every month, and the evacuation is promoted by an infusion of this plant. While taking this medicine, the patients sequester themselves from all their acquaintance, and keep close at home. It is said, that the want of this medicine in other countries is the reason why the Abyssinians do not go out of their own country; or, if they do, that they are short-lived. 17. Tef, is a kind of grain sown generally throughout Abyssinia; and constituting the bread commonly made use of by the inhabitants. They have indeed plenty of wheat, and are as skilful in forming it into bread as the Europeans; but this is only made use of by people of the first rank: however, the tef is sometimes of such an excellent quality, that the bread made from it is held in equal estimation with the finest wheat. From the bread made of this grain a fourth liquor called *bouza* is prepared, which is used for common drink like our small beer. A liquor of the same kind, but of inferior quality, is made from barley cakes. Some have been of opinion, that the use of tef occasions the worms above mentioned; but this is controverted by Mr. Bruce. Nook, a plant not to be distinguished from our marigold either in shape, size, or foliage, is also sown very generally over the country, and furnishes all Abyssinia with oil for the kitchen and other uses.

Abyssinia abounds with a vast variety of quadrupeds, both wild and tame. Immense numbers of cattle every where present themselves, some of them the most beautiful in the world. Buffaloes are here met with in great numbers, and are very fierce and untractable; but there are no such animals as carnivorous bulls, which have been said to exist in this and other internal parts of Africa. Antelopes

telopes and other wild animals are met with in great numbers in the uncultivated parts; feeding chiefly on the leaves of trees. They abound most of all, however, in those parts which have been once cultivated, but since desolated by the calamities of war; and where wild oats abound in such quantities as to hide them from pursuit. Hyenas, lions, foxes, jackals, wild boars, &c. are also found, as well as the elephant, rhinoceros, caméléopard, and others of the larger and more uncommon kinds. Great havoc is made in the cultivated fields by multitudes of baboons, apes, rats, and mice. There is plenty of hares; but these being reckoned unclean, as well as wild boars, are not used as food. The rivers abound with crocodiles and hippopotami, at least the Nile, and those large streams which flow into it: but a great number have water in them only during the rainy season, and these have neither fish nor any animal that feeds upon them.

The number of birds in this country is immense; nor are those of the carnivorous kind at all deficient. Great numbers of eagles, vultures, hawks, and others of that kind, are met with, and come punctually every year after the tropical rains have ceased. They feed at first upon the shell-fish which are met with in great quantities on the edges of the deserts, where they had lived in the salt springs; but, being forced from their natural habitations when these springs were swelled by the rains, are afterwards left to perish on dry land. When these fail, their next resource is from the carcases of the large animals, such as the elephant and rhinoceros, which are killed in the flat country by the hunters. Their next supply is the multitude of rats and field-mice which infest the country after harvest. The vast slaughter of cattle made by the Abyssinian armies, the multitude of persons killed whose bodies are allowed to rot on the field of battle, &c. furnish them also with another resource. These supplies, however, all fail at the beginning of the rainy season, when the hunters and armies return home, and the vast quantity of water which continually overflows the ground renders it impossible for them to find any other food.

There are other birds, which feed upon insects, and multitudes which live on grain or seeds of various kinds; all of which are amply supplied by the immense quantity of fruits and berries which grow in Abyssinia, and are ripe at all seasons of the year. A very remarkable particular concerning this is, that the trees which bear fruit all the year round do not carry it always in the same place. The west side is that which blossoms first, and where of consequence the fruit first comes to perfection; the south side succeeds, and goes through the same process; after which, the north blossoms in like manner; and last of all is the east side, which produces flowers and fruit towards the beginning of the rainy season. All the trees of Abyssinia are ever-green; and their leaves are of a thick leathery consistence, and highly varnished to enable them to resist the violent rains which fall during a certain season. The granivorous birds have likewise this advantage, that the rains do not fall at the same time all over the country. It is intersected by a chain of mountains that divide the seasons also; so that they have but a short way to fly in order to become birds of passage, and supply themselves with such food as is necessary for them beyond the mountains. All the pigeons, of which there are many species, are birds of passage excepting one kind. The owls are extremely large and beautiful, but few in number. There is a great variety of swallows, several kinds of which are unknown in Europe; but, says Mr. Bruce, "those that are common in Europe appear in passage at the very season when they take their flight from thence. We saw the greatest part of them in the island of Masuah, where they lighted and tarried two days, and then proceeded with moon-light nights to the south-west." The large birds which reside constantly among the mountains of Samen and Taranta have all their feathers tubular, the hollow part being filled with a kind of yellow dust which issues out in great abundance on hunting them. This was par-

ticularly observed by Mr. Bruce in a species of eagle which he calls the golden eagle; and the dust being viewed through a microscope with a very strong magnifying power, appeared like fine feathers. The crows are spotted white and black, almost in equal proportions. The raven has his feathers intermixed with brown; the tip of his beak white, and a figure like a cup or chalice of white feathers upon his head. Mr. Bruce saw no sparrows, magpies, nor bats; neither are there many water-fowl, especially of the web-footed kind; but there are vast numbers of storks, which cover the plains in May, when the rains become constant. There are no geese, excepting one species called the golden goose or goose of the Nile, which is common all over Africa; but there are snipes in all the marshes.

Our author describes very few fishes; though he says that an account of these, and other marine productions of the Red Sea, which he collected, would occupy many large volumes. He mentions a fish named binny, which is good food, and grows to a large size; its whole body is covered with beautiful scales resembling silver spangles.

Of the reptiles in Abyssinia, Mr. Bruce describes a kind of lizard, and of the cerastes, or horned serpent; but denies that serpents are numerous in Abyssinia, as almost all authors have supposed, and as we should be led naturally to suspect. He vouches also for the power that some persons have of enchanting serpents and scorpions, which in some is natural, in others communicated artificially by certain medicines. He prevailed upon those who knew the secret to prepare him by these means as they had done others; but, notwithstanding this assistance, he acknowledges, that when it came to the trial his heart always failed him.

Mr. Bruce gives an ample description of the manners of the Abyssinians, who in some respects are barbarous beyond measure. The continual state of warfare in which they are engaged, no doubt contributes to confirm them in their barbarity. This arises from an error in the regulations concerning the succession. The crown is indeed hereditary, but it depends on the minister to choose the particular person who is to enjoy it; and as it is always his inclination to have the government in his own hands, he never fails to choose an infant, who is seldom suffered to live after he comes to the years of maturity. Thus perpetual wars and commotions take place, inasmuch that the ravenous birds, as has been observed, find one great supply of food in the slaughters made by the Abyssinians of one another. All authors agree, that the devastations committed by their armies are excessive; inasmuch, that after a long encampment is removed, nothing is to be seen all around the place where it was but bare earth. When an army there marches through the country, an inconceivable number of birds and beasts of prey, especially the former, follow it from the first day of its march to its return; increasing always in proportion the more it advances into the country. An army there leaves nothing living behind, nor the vestige of an habitation; but the fire and the sword reduce every thing to a wilderness and solitude. The beasts and birds unmolested have the country to themselves, and increase beyond all possible conception. The slovenly manner of this savage people, who, after a battle, bury neither friends nor enemies; the quantity of beasts of burthen that die perpetually under the load of baggage, and variety of mismanagement; the quantity of offal, and half-eaten carcases of cows, goats, and sheep, which they consume in their march for sustenance; all furnish a stock of carrion sufficient to occasion contagious distempers, were there not such a prodigious number of voracious attendants who consume them almost before putrefaction. There is no giving the reader any idea of their number, unless by comparing them to the sand of the sea. While the army is in motion, they are a black canopy which extends over it for leagues. When encamped, the ground is discoloured with them beyond the sight of the eye; and all the trees are loaded with them.

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The prodigious number of criminals executed for high treason, whose bodies are cut in pieces and thrown about the streets, invite the hyænas to the capital, in the same manner that the carrion of the camp invites the birds of prey to follow it. The method of keeping off these voracious animals is certainly very curious. "An officer (says Mr. Bruce) called *Serack Maffery*, with a long whip, begins cracking and making a noise worse than twenty French postillions, at the door of the palace before the dawn of day. This chafes away the hyænas and other wild beasts; this too is the signal for the king's rising, who sits in judgment every morning fasting; and after that, about eight o'clock, he goes to breakfast."

With regard to the ferocious manners of the Abyssinians, they are accounted for by Mr. Bruce very naturally. Their continual warfare inures them to blood from their infancy; so that even children would not have the least scruple at killing one another, or grown up persons, if they were able. Many shocking instances of hardness of heart are related of them. Their cruelty displays itself abundantly in the punishments inflicted upon criminals, one of which is fleeing alive. Cutting in pieces with a sabre is another; and this is performed, not by executioners, whose employment is reckoned disgraceful as in this country, but by officers and people of quality. So little is this thought of in Gondar, the capital of Abyssinia, that Mr. Bruce happening to pass by an officer employed in this work, who had three men to dispatch, the officer called to him to stop till he had killed them all, as he wanted to speak to him upon a matter of consequence. Stoning to death is a capital punishment likewise common in this country; and usually inflicted on Roman Catholics if they happen to be found, or upon other heretics in religion as they term them.

It is not to be supposed that people who regard the lives of one another so little, will show much compassion to the brute creation. In this respect however, the Abyssinians are cruel and savage beyond all people on the face of the earth. There are many instances of savages eating raw flesh, and we call them barbarous that do so; but what name shall we give to those who cut off pieces of flesh from animals while still living, and eat it not only raw but still quivering with life! Mr. Bruce also says, that this way of eating not raw, but living, flesh, was customary among the nations of antiquity; and, in Picard, we find a people called Antis, that inhabited the mountains of Peru, who after they had taken an enemy, tied him alive to a tree, and cut off and ate the flesh from his bones, in which state he was left to languish and expire. Mr. Bruce informs us, that when he was at no great distance from Axum, the capital of Tigré, he fell in with three of the natives driving a cow. They halted at a brook, threw down the beast, and one of them cut a pretty large collop of flesh from its buttock; after eating which, they drove the cow gently on as before. In his description of their feasts he says the animal is tied, so that it cannot move: after stripping off the skin, the flesh of the buttocks is cut off in solid square pieces, without bones or much effusion of blood; and the prodigious noise the animal makes is a signal for the company to sit down to table. Every man sits between two women, having a long knife in his hand. With this he cuts the flesh, while the motion of its fibres is yet visible, into pieces like dice. These are laid upon pieces of bread made of the grain called *teff*, being strongly powdered with Cayenne pepper, and fossil salt. They are then rolled up like so many cartridges; the men open their mouths, stooping and gaping like idiots, while the women cram them so full of these cartridges, that they seem every moment in danger of being choked; and in proportion to the quantity their mouths can hold, and the noise they make in chewing, they are held in estimation by the company. All this time the animal bleeds but little: but when the large arteries are cut and it expires, the flesh becomes tough; and the wretches who have the rest to eat, gnaw it from the bones like dogs!

This circumstance, mentioned by Mr. Bruce, of the Abyssinians eating raw flesh from the ox, appears at first view so unnatural and disgusting, that it has induced many persons to doubt his veracity, and even to question whether he had ever really visited the source of the Nile. Yet, we find every nation has its peculiarities with respect to food, many of which would appear inhuman, did not our familiarity with the custom take off the impression. Do not we eat raw oysters within a second of their being separated from the shell? And do we not both roast them and lobsters whilst alive; the barbarity of which practice seems almost to equal that of the Abyssinians? Do not cooks skin eels whilst alive? And do not epicures crimp fish for the gratification of their appetites?

That the Abyssinians eat beef in a raw state, is agreed both by Lobo and Poncet; and the former says, reeking from the beast. Mr. Antes, moreover, was told by a Franciscan monk, who went with the caravan from Abyssinia to Cairo, that he was witness to an ox being killed, and immediately devoured by a band of travellers. For the civil, religious, and political, history of this people, see ETHIOPIA.

ACA, ACE, or ACON, a town of Phœnicia, on the Mediterranean; afterwards called Ptolemais; now Acre. See ACRE.

ACACALOTL, *f.* the Braslian name of a bird called by some *corvus aquaticus*, or water raven: properly, the pelicus carbo, or corvorant. See PELICANUS.

ACACIA, *f.* in botany. See GUILANDINA, GUAIA-CUM, MIMOSA, POINCIANA, SPARTIUM.

The flowers of a species of the acacia are used by the Chinese in making that yellow which we see bears washing in their silks and stuffs, and appears with so much elegance in their painting on paper. The method is this:—They gather the flowers before they are fully open; these they put into a clean earthen vessel over a gentle heat, and stir them continually about, as they do the tea leaves, till they become dryish and of a yellow colour; then to half a pound of the flowers they add three spoonfuls of fair water, and after that a little more, till there is just enough to hold the flowers incorporated together: they boil this for some time, and the juice of the flowers mixing with the water, it becomes thick and yellow; they then take it from the fire, and strain it through a piece of coarse silk. To the liquor they add half an ounce of common alum, and an ounce of calcined oyster-shells reduced to a fine powder. All is then well mixed together; and this is the fine lasting yellow they have so long used.

Mr. Geoffroy attributes the origin of bezoar to the seeds of this plant; which being broused by certain animals, and vellicating the stomach by their great sourness and astringency, cause a condensation of the juices till at length they become coated over with a stony matter, which we call BEZOAR.

ACACIA FALSE, in botany. See ROBINIA.

ACACIA THREE-THORNED, in botany. See GLEDITSIA.

ACACIA, *f.* in the materia medica, the inspissated juice of the unripe fruit of the MIMOSA NILOTICA. This juice is brought to us from Egypt, in roundish masses, wrapt up in thin bladders. It is outwardly of a deep-brown colour, inclining to black; inwardly of a reddish or yellowish brown; of a firm consistence, but not very dry. It soon softens in the mouth, and discovers a rough, but not disagreeable, taste, which is followed by a sweetish relish. This inspissated juice entirely dissolves in watery liquors; but is scarce sensibly acted on by rectified spirit. Acacia is a mild astringent medicine. The Egyptians give it in spitting of blood, in the quantity of a drachm, dissolved in any convenient liquor; they likewise employ it in collyria for strengthening the eyes, and in gargarisms for quinsseys. Among us, it is little otherwise used than as an ingredient in mithridate and theriaca, and is rarely met with in the shops. What is usually sold for the Egyptian acacia, is the inspissated juice of unripe sloes: this is hard-

er, heavier, of a darker colour, and somewhat sharper in taste, than the true fort.

ACACIA GERMAN, the juice of unripe sloes inspissated nearly to driness over a gentle fire, care being taken to prevent its burning. It is moderately astringent, similar to the Egyptian acacia, for which it has been commonly substituted in the shops. It is given in fluxes, and other disorders where styptic medicines are indicated, from a scruple to a drachm.

ACACIA, among antiquaries, something resembling a roll or bag, seen on medals, in the hands of several consuls and emperors. Some take it to represent a handkerchief rolled up, wherewith they made signals at the games; others, a roll of petitions or memorials; and some, a purple bag full of earth, to remind them of their mortality.

ACACIANS, in ecclesiastical history, the name of several sects of heretics; some of which maintained, that the Son was only a similar, not the same, substance with the Father; and others, that he was not only a distinct, but a dissimilar, substance. Two of these sects had their denomination from Acacius bishop of Cæsarea, who lived in the fourth century, and changed his opinions, so as, at different times, to be head of both. Another was named from Acacius patriarch of Constantinople, who lived in the close of the fifth century.

ACACIUS, surnamed **LUSCUS**, because he was blind of one eye, was bishop of Cæsarea in Palestine, and succeeded the famous Eusebius: he had a great share in the banishment of Pope Liberius, and bringing Felix to the see of Rome. He gave name to the above sect, and died about the year 365. He wrote the life of Eusebius, and several other works.

ACACIUS (St.) bishop of Amida, in Mesopotamia, in 420, was distinguished by his piety and charity. He sold the plate belonging to his church, to redeem seven thousand Persian slaves who were ready to die with want and misery; and, giving each of them some money, sent them home. Veranius their king was so affected with this noble instance of benevolence, that he desired to see the bishop; and this interview procured a peace between that prince and Theodosius I.

ACAD, or **ACHAD**, a town in which Nimrod reigned, called Archad by the Seventy; situated in Babylonia to the eastward of the Tigris.

ACADEMIAL, *adj.* Relating to an academy, belonging to an academy.

ACADEMIAN, *f.* A scholar of an academy or university; a member of an university. *Wood*, in his *Athenæ Oxonienses*, mentions a great feast made for the *academians*.

ACADEMICAL, *adj.* [*academicus*, Lat.] Belonging to an university.

ACADEMICIAN, *f.* [*académicien*, Fr.] The member of an academy. It is generally used in speaking of the professors in the academies of France.

ACADEMIC, *f.* A student of an university.

ACADEMIC, *adj.* [*academicus*, Lat.] Relating to an university:

While through poetic scenes the genius roves,
Or wanders wild in *academic* groves.

Pope.

ACADEMICS, or **ACADEMISTS**, a denomination given to the cultivators of a species of philosophy originally derived from Socrates, and afterwards illustrated and enforced by Plato, who taught in a grove near Athens, consecrated to the memory of Academus, an Athenian hero; from which circumstance this philosophy received the name of *academic*. Before the days of Plato, philosophy had in a great measure fallen into contempt. The contradictory systems and hypotheses which had successfully been urged upon the world were become so numerous, that, from a view of this inconsistency and uncertainty of human opinions, many were led to conclude, that truth lay beyond the reach of our comprehension. Absolute and universal scepticism was the natural consequence of this conclusion. In order to remedy this abuse of philosophy and

of the human faculties, Plato laid hold of the principles of the academical philosophy; and, in his *Phædo*, reasons in the following manner:—"If we are unable to discover truth (says he), it must be owing to two circumstances: either there is no truth in the nature of things; or the mind, from a defect in its powers, is not able to apprehend it. Upon the latter supposition, all the uncertainty and fluctuation in the opinions and judgments of mankind admit of an easy solution. Let us therefore be modest, and ascribe our errors to the real weakness of our own minds, and not to the nature of things themselves. Truth is often difficult of access: in order to come at it, we must proceed with caution and diffidence, carefully examining every step; and, after all our labour, we shall frequently find our greatest efforts disappointed, and be obliged to confess our ignorance and weakness."

Labour and caution in their researches, in opposition to rash and hasty decisions, were the distinguishing characteristics of the disciples of the ancient academy. A philosopher, possessed of these principles, will be slow in his progress; but will seldom fall into errors, or have occasion to alter his opinion after it is once formed. Vanity and precipitance are the great sources of scepticism: hurried on by these, instead of attending to the cool and deliberate principles recommended by the academy, several of our modern philosophers have plunged themselves into an absurd and ridiculous kind of scepticism. They pretend to discredit subjects that are plain, simple, and easily comprehended; but give peremptory and decisive judgments upon things that evidently exceed the limits of our capacity. Of these, Berkeley and Hume are the most considerable. Berkeley denied the existence of every thing, excepting his own ideas. Mr. Hume has gone a step further, and questioned even the existence of ideas; but at the same time has not hesitated to give determined opinions with regard to eternity, providence, and a future state, miraculous interpositions of the Deity, &c. subjects far above the reach of our faculties. In his essay on the academical or sceptical philosophy, he has confounded two very opposite species of philosophy. After the days of Plato, indeed, the principles of the first academy were grossly corrupted by Arcesilas, Carneades, &c. This might lead Mr. Hume into the notion that the *academical* and *sceptical* philosophy were synonymous terms. But no principles can be of a more opposite nature than those which were inculcated by the old academy of Socrates and Plato, and the sceptical notions which were propagated by Arcesilas, Carneades, and the other disciples of the succeeding academies.

ACADEMIST, *f.* The member of an academy. This is not often used.—It is observed by the Parisian *academists*, that some amphibious quadrupeds, particularly the sea-calf or seal, hath his epiglottis extraordinary large. *Ray.*

ACADEMY, *f.* [anciently, and properly, with the accent on the first syllable, now frequently on the second. *Academia*, Lat.] An assembly or society of men, uniting for the promotion of some art. The place where sciences are taught. An university. A place of education, in contradistinction to the universities or public schools. The thing, and therefore the name, is modern.

The first academy was a fine villa or pleasure house, in one of the suburbs of Athens, about a mile from the city; where Plato, and the wise men who followed him, held assemblies for disputes and philosophical conference; which gave the name to the sect of academics. The house took its name, *Academy*, from one Academus, or Eademus, a citizen of Athens, to whom it originally belonged: he lived in the time of Theseus; and here he used to have gymnastic sports or exercises.

This academy was farther improved by Cimon, and adorned with fountains, trees, shady walks, &c. for the convenience of the philosophers and men of learning, who here met to confer and dispute for their mutual improvement. It was surrounded with a wall by Hipparchus, the son of Pisistratus; and it was also used as the burying-place for illustrious persons, who had deserved well of the republic.

republic. It was here that Plato taught his philosophy; and hence it was that all public places, destined for the assemblies of the learned and ingenious, have been since called academies. Sylla sacrificed the delicious walks and groves of the academy, which had been planted by Cimon, to the ravages of war; and employed those very trees in constructing machines to batter the walls of the city which they had adorned.—Cicero too had a villa or country retirement, near Puzzuoli, which he called by the same name, *Academia*. Here he used to entertain his philosophical friends; and here it was that he composed his Academical Questions, and his books *De Naturâ Deorum*.

ACADEMY, among the moderns, denotes a regular society or company of learned persons, instituted under the protection of some prince, or other public authority, for the cultivation and improvement of arts or sciences. Some authors confound academy with university; but, though much the same in Latin, they are very different things in English. An university is properly a body composed of graduates in the several faculties; of professors, who teach in the public schools; of regents or tutors, and students who learn under them, and aspire likewise to degrees. Whereas an academy is not intended to teach, or profess any art or science, but to improve it: it is not for novices to be instructed in, but for those that are more knowing; for persons of learning to confer in, and communicate their lights and discoveries to each other, for their mutual benefit and improvement.

The first modern academy we read of, was established by Charlemagne, by the advice of Alcuin, an English monk: it was composed of the chief geniuses of the court, the emperor himself being a member. In their academical conferences, every person was to give some account of the ancient authors he had read; and each one assumed the name of some ancient author, that pleased him most, or some celebrated person of antiquity. Alcuin, from whose letters we learn these particulars, took that of Placcus, the surname of Horace; a young lord named Augilbert, took that of Homer; Adelard bishop of Corbie, was called Augustin; Recluse bishop of Mentz, was Dametas; and the king himself David.

Since the revival of learning in Europe, academies have multiplied greatly, most nations being furnished with several, and from their communications the chief improvements have been made in the arts and sciences, and in cultivating natural knowledge. There are now academies for almost every art, or species of knowledge; in giving an account of which, it seems most proper to arrange them according to their subjects.

I. MEDICAL ACADEMIES, as that of the *Naturæ Curiosos* in Germany; that founded at Palermo in 1645; another at Venice in 1701, which meets weekly in a hall near the grand hospital; another at Geneva in 1715, in the house of M. le Clerc. The colleges of physicians at London and Edinburgh are also, by some, ranked in the number of Academies.

The *Academy of Naturæ Curiosos*, called also the Leopoldine Academy, was founded in 1652 by Jo. Laur. Bauschius, a physician; who, in imitation of the English, published an invitation to all physicians to communicate their extraordinary cases; and, meeting with success, was elected president. Their works were at first published separately; but in 1670 a new scheme was laid for publishing a volume of observations every year. The first volume appeared in 1684, under the title of *Ephemerides*, and the work has been continued with some interruptions and variations of the title, &c. In 1687, the emperor Leopold took the society under his protection, granting the members several privileges, particularly that their presidents should be counts palatine of the holy Roman empire. This academy has no fixed residence, nor regular assemblies: instead of these, there is a kind of bureau, or office, first established at Breslau, and afterwards removed to Nuremberg, where letters, observations, &c. from correspondents or members are taken in. The academy consists of a

president, two adjuncts or secretaries, and colleagues or members without restriction. The colleagues, at their admission, oblige themselves to two things: first, to choose some subject out of the animal, vegetable, or mineral, kingdom, to handle, provided it had not been treated of by any colleague before; the second, to apply themselves to furnish materials for the Annual *Ephemerides*. Each member to bear a symbol of the academy, viz. a gold ring; whereon, instead of a stone, is a book open, and on the face thereof, an eye; on the other side the motto of the academy, *Nunquam otiosus*.

II. CHIRURGICAL ACADEMIES; as that instituted some years ago, by public authority, at Paris: the members of which were not only to publish their own and correspondents observations and improvements; but to give an account of all that is published on surgery, and to compose a complete history of the art, by their extracts from all the authors ancient and modern who have wrote on it. A question in surgery is annually proposed by the academy, and a gold medal of 200 livres value given to him who furnishes the most satisfactory answer.

Academy of Surgery at Vienna, was instituted some years ago, by order of the emperor, under the direction of the celebrated Brambilla. In this there were at first only two professors; and to their charge the instruction of 130 young men was committed, 30 of whom had formerly been surgeons in the army. But of late the number both of the teachers and pupils has been considerably increased. Gabrieli was appointed to teach pathology and practice; Boecking, anatomy, physiology, and physics; Streitz, medical and pharmaceutical surgery; Hunczowsky, surgical operations, midwifery, and the *chirurgia forensis*; and Plenk, chemistry and botany. To these also was added, Beindl, as professor and extraordinary professor of surgery and anatomy. A large and splendid edifice is erected in Vienna for this society, which affords habitation both for the teachers, the students, pregnant women, patients for clinical lectures, and servants. The emperor also purchased, for the use of this academy a medical library; a complete set of surgical instruments; an apparatus for experiments in natural philosophy; a collection of natural history; a number of anatomical and pathological preparations; a collection of preparations in wax brought from Florence; and a variety of other useful articles. Adjoining to the building also there is a good botanical garden.

III. ECCLESIASTICAL ACADEMIES; as that of Bologna in Italy, instituted in 1687, employed in the examination of the doctrine, discipline, and history, of each age of the church.

IV. COSMOGRAPHICAL ACADEMIES; as that at Venice, called the *Argonauts*. This was instituted at the solicitation of F. Coronelli, for the improvement of geographical knowledge. Its design was to publish exact maps, both celestial and terrestrial, as well particular as general, together with geographical, historical, and astronomical, descriptions. Each member, in order to defray the expence of such a publication, was to subscribe a proportional sum, for which they were to receive one or more copies of each piece published. For this end three societies are settled; one under F. Moro, provincial of the Minorities in Hungary; another under the Abbot Laurance au Ruy Payenne au Marais; the third under F. Baldigiani, Jesuit, professor of mathematics in the Roman college. The device of this academy is the terraqueous globe, with the motto *Plus ultra*; and at its expence all the globes, maps, and geographical writings, of F. Coronelli have been published.

V. ACADEMIES OF SCIENCES. These comprehend such as are erected for improving natural and mathematical knowledge. They are otherwise called *Philosophical* and *Physical* academies. The first of these was instituted at Naples about the year 1560, in the house of Baptista Porta. It was called the *Academy Secretorum Naturæ*; and was succeeded by the *Academy of Lyncei*, founded at Rome by Prince Frederic Cesi, towards the end of that century. Several

Several of the members of this academy rendered it famous by their discoveries; among these was the celebrated Galileo. Several other academies were instituted about that time, which contributed greatly to the advancement of the sciences; but none of them comparable to that of the Lyncei.

Some years after the death of Toricelli, the *Academy del Cimento* made its appearance, under the protection of Prince Leopold, afterwards Cardinal de Medicis. Redi was one of its chief members; and the studies pursued by the rest may be collected from those curious experiments published in 1667, by their secretary Count Laurence Magulotti, under the title of *Saggi di Naturali Esperienze*; a copy of which was presented to the Royal Society, translated into English by Mr. Waller, and published at London in 4to.

The *Academy degli Inquieti*, afterwards incorporated into that of Della Tracia in the same city, followed the example of that of Del Cimento. Some excellent discourses on physical and mathematical subjects, by Geminiano Montanari, one of the chief members, were published in 1667, under the title of *Perfieri Fisco Matematici*.

The *Academy of Rossano*, in the kingdom of Naples, was originally an academy of Belles Lettres, founded in 1540, and transformed into an Academy of Sciences in 1695 at the solicitation of the learned abbot Don Giacinto Gimma; who, being made president, under the title of promoter general thereof, gave them a new set of regulations. He divided the academists into the following classes:—Grammarians, Rhetoricians, Poets, Historians, Philosophers, Physicians, Mathematicians, Lawyers, and Divines, with a class apart for cardinals, and persons of quality. To be admitted a member, a man must have some degrees in the faculty. The members are not allowed to take the title of academists in the beginning of their books, without a written permission from their president, which is not granted till the work has been examined by the censors of the academy; and the permission is the greatest honour the academy can confer, as they thereby adopt the work, and are answerable for it against all criticisms that may be made upon it. To this law the president or promoter himself is subject; and no academist is allowed to publish any thing against the writings of another without leave from the society.

Several other Academies of Sciences have been founded in Italy; but, for want of being patronized, did not continue long. The loss of them, however, was abundantly repaired by the institution of others still subsisting; such as, the *Academy of Filarmonici* at Verona; of *Ricovatri* at Padua, where a learned discourse on the origin of springs was delivered by Sig. Vallisnieri, first professor of physic in the university of that city, and which was afterwards printed. To the *Academy of the Mute of Reggio*, at Modena, the same Sig. Vallisnieri presented an excellent discourse on the scale of created beings, since inserted in his History of the Generation of Man and Animals, printed at Venice in the year 1721.

F. Merfenne is said to have given the first idea of a philosophical academy in France, towards the beginning of the 17th century, by the conferences of naturalists and mathematicians occasionally held at his lodgings; at which Gassendi, Des Cartes, Hobbes, Roberval, Pascal, Blondel, and others, assisted. F. Merfenne proposed to each certain problems to examine, or certain experiments to be made. These private assemblies were succeeded by more public ones, formed by Mr. Montmort and Mr. Thevenot, the celebrated traveller. The French example animated several Englishmen of distinction and learning to erect a kind of philosophical academy at Oxford, towards the close of Oliver Cromwell's administration; which, after the restoration, was erected into a Royal Society. See SOCIETY. The English example, in its turn, animated the French. Louis XIV. in 1666, assisted by the counsels of M. Colbert, founded an academy of sciences at Paris, with a sufficient revenue to defray the charge of experiments, and salaries to the members.

Royal Academy of Sciences. After the peace of the Pyrenees, Louis XIV. being desirous of establishing the ARTS, SCIENCES, and LITERATURE, upon a solid foundation, directed M. Colbert to form a society of men of known abilities and experience in the different branches, who should meet together under the king's protection, and communicate their respective discoveries. Accordingly M. Colbert formed a society of such persons as were conversant in natural philosophy and mathematics, joined to them other persons skilled in history, and other branches of erudition, with those who were entirely engaged in what are called the *Belles Lettres*, grammar, eloquence, and poetry. All the different classes were ordered to meet together upon the first Thursday of every month; and, by their respective secretaries, make a report of the proceedings of the foregoing month. In a short time, however, the classes of history, belles lettres, &c. were united to the French Academy, which was originally instituted for the improvement and refining the French language; so that the Royal Academy contained only two classes, viz. that of natural philosophy and mathematics.

In the year 1696, the king, by a proclamation dated the 26th of January, gave this academy a new form, and put it upon a more respectable footing.—It was now to be composed of four kinds of members, viz. *honorary, pensionary, associates, and elves*. These last were a kind of pupils, or scholars, each of whom was attached to one of the pensionaries. The first class to contain ten persons, and each of the rest twenty. The honorary academists to be all inhabitants of France; the pensionaries all to reside at Paris; eight of the associates allowed to be foreigners; and the elves all to live at Paris. The officers to be, a president named by the king, out of the class of honorary academists; and a secretary and treasurer to be perpetual. Of the pensionaries, three to be geometers, three astronomers, three mechanics, three anatomists, three chemists, three botanists, and the remaining two to be secretary and treasurer. Of the twelve associates, two to apply themselves to geometry, two to botany, and two to chemistry. The elves to apply themselves to the same kind of science with the pensionaries they were attached to; and not to speak, except when called by the president. No regular or religious to be admitted, except into the class of honorary academists; nor any person to be admitted either for associate or pensionary, unless known by some considerable printed work, some machine, or other discovery. To encourage the members to pursue their labours, the king engaged not only to pay the ordinary pensions, but even to give extraordinary gratifications, according to the merit of their respective performances; furnishing withal the expence of the experiments and other inquiries necessary to be made. If any member gave in a bill of charges of experiments he had made, the money was immediately paid by the king, upon the president's allowing and signing the said bill. So, if an anatomist, for instance, required live tortoises, for making experiments on the heart, &c. as many as he pleased were brought him at the king's charge.

Finally in the year 1783 the king confirmed, by letters patent, dated April 23, the establishment of the academy of sciences, making the following alterations, and adding classes of agriculture, natural history, mineralogy, and physics; incorporating the associates and adjuncts, and limiting to six the members of each class, namely, three pensioners and three associates; by which the former receive an increase of salary, and the latter approach nearer to becoming pensioners.

By the articles of this instrument it is ordained, that the academy shall consist of eight classes, namely, that of geometry, 2d astronomy, 3d mechanics, 4th general physics, 5th anatomy, 6th chemistry and metallurgy, 7th botany and agriculture, 8th natural history and mineralogy. That each class shall remain irrevocably fixed at six members; namely, three pensioners and three associates, independent however of a perpetual secretary and treasurer, of twelve free associates, and of eight associate strangers or foreigners,

ers, the same as before, except that the adjunct-geographer for the future be called the associate-geographer.

The late M. Rouille de Meslay, counsellor of the parliament of Paris, founded two prizes, the one of 2500 livres, the other of 2000 livres, which the academy distributed alternately every year: the subjects of the former prize respecting physical astronomy, and of the latter, navigation and commerce. And the world is highly indebted to this academy for the many valuable works they have executed, or published, both individually and as a body collectively, especially by their memoirs, making upwards of a hundred volumes in 4to, with the machines, indexes, &c. in which may be found most excellent compositions in every branch of science.

The French have also considerable academies in most of their great cities; as, at Montpellier, a Royal Academy of Sciences on the like footing as that at Paris, being as it were a counter part thereof; at Thoulouse, an academy under the denomination of Lanternists; others at Nîmes, Arles, Lyons, Dijon, Bourdeaux, &c. And we have the best authority for asserting, that, notwithstanding the late unparalleled acts of violence, which shook the Gallic empire to its very foundations, the progress of literature was but for a short time impeded, and the public academies are now encouraged and protected.

The Royal Academy of Sciences at Berlin, was founded in 1700, by Frederic I. king of Prussia, on the model of that of England; excepting that, besides natural knowledge, it likewise comprehends the Belles Lettres. In 1718, it was ordained that the president shall be one of the counsellors of state, and nominated by the king. The members were divided into four classes; the first for prosecuting physics, medicine, and chemistry; the second for mathematics, astronomy, and mechanics; the third for the German language, and the history of the country; the fourth for oriental learning, particularly as it may concern the propagation of the gospel among infidels. The great promoter of this institution was the celebrated M. Leibnitz, who was made director. The first volume of their transactions was published in 1710, under the title of *Miscellanea Berolinensia*; and, though they received but few marks of the royal favour for some time, they continued to publish new volumes in 1723, 1727, 1734, and 1740. At last, Frederic II. the renowned king of Prussia, gave new vigour to this academy, by inviting to Berlin such foreigners as were most distinguished for their merit in literature, and encouraged his subjects to prosecute the study and cultivation of the liberal sciences by giving ample rewards; and thinking that the academy, instead of having some opulent nobleman for its president, would find an advantage in having a man of letters at its head, he conferred that honour on M. Maupertuis. At the same time he gave a new regulation to the academy, and took upon himself the title of its protector. The academists hold two public assemblies annually, at the last of which is given a gold medal of 50 ducats value: the subject for this prize is successively, natural philosophy, mathematics, metaphysics, and erudition.

The Imperial Academy of Sciences at Petersburg, was projected by Czar Peter the Great. That monarch having, during his travels, observed the advantage of public societies for the encouragement and promotion of literature, formed the design of founding an academy of sciences at Petersburg. By the advice of Wolf and Leibnitz, whom he consulted on this occasion, the society was regulated, and several learned foreigners were invited to become members. The emperor himself drew the plan, and signed it on the 10th of February, 1724; but was prevented by the suddenness of his death, from carrying it into execution. His decease, however, did not prevent its completion: for, on the 21st of December, 1725, the empress Catharine I. established it on the original plan; and on the 27th of the same month the society was first assembled. The empress settled a fund of 4982l. per annum for the support of the academy; and fifteen members, all emi-

nent for their learning and talents, were admitted and pensioned, under the title of professors in the various branches of literature and science. The most distinguished of these professors were Nicholas and Daniel Bernoulli, the two De Lîles, Bulfinger, and Wolf.

During the short reign of Peter II. the salaries of the members were discontinued, and the academy was utterly neglected by the court; but it was again patronized by the empress Anne, who even added a seminary for the education of youth, under the superintendence of the professors. Both institutions flourished for some time under the direction of baron Korf; but upon his death, towards the latter end of Anne's reign, an ignorant person being appointed president, many of the most able members quitted Russia. At the accession of Elizabeth; new life and vigour were again restored to the academy: the original plan was enlarged and improved; some of the most learned foreigners were again drawn to Petersburg; and, what was considered as a good omen for the literature of Russia, two natives, Lomonosof and Rumovsky, men of genius and abilities, who had prosecuted their studies in foreign universities, were enrolled among its members. The annual income was now increased to 10,659l. and soon afterwards the new institution took place.

The present empress Catharine II. with her usual zeal for promoting the diffusion of knowledge, has taken this useful society under her more immediate protection. She has altered the court of directors greatly to the advantage of the whole body; she has corrected many abuses, and has infused a new spirit into their researches. By her majesty's particular recommendation, the most ingenious professors have visited the various provinces of her vast dominions; and, as the fund of the academy was not sufficient to supply the whole expence of these several expeditions, the empress bestowed a largess of 2000l. which she still renews as often as occasion requires. In these travels, they were ordered to pursue their inquiries upon the different sorts of earths and waters; upon the best methods of cultivating the barren and desert spots; upon the local disorders incident to men and animals, and the most efficacious means of relieving them; upon the breeding of cattle, and particularly of sheep; on the rearing of bees and silk-worms; on the different places and objects for fishing and hunting; on minerals; on the arts and trades; and on forming a Flora Russica, or collection of indigenous plants: they were particularly instructed to rectify the longitude and latitude of the principal towns: to make astronomical, geographical, and meteorological, observations; to trace the course of the rivers; to take the most exact charts; and to be very distinct and accurate in remarking and describing the manners and customs of the different people, their dresses, languages, antiquities, traditions, history, religion; and, in a word, to gain every information which might tend to illustrate the real state of the whole Russian empire. In consequence of these expeditions, perhaps no country can boast, within the space of so few years, such a number of excellent publications on its internal state, on its natural productions, on its topography, geography, and history; on the manners, customs, and languages, of the different people, as have issued from the press of this academy.

The first transactions of this society were published in 1728, and intitled, *Commentarii Academiae Scientiarum Imperialis Petropolitanae ad anno 1726*, with a dedication to Peter II. The publication was continued under this form until the year 1747, when its transactions were called *Novi Commentarii Academiae*, &c. In 1777 the academy again changed the title into *Acta Academiae Scientiarum Imperialis Petropolitanae*, and likewise made some alteration in the arrangement and plan of the work. Under the new title of *Acta Academiae*, several volumes have been given to the public, and two are printed every year. These transactions abound with ingenious and elaborate disquisitions upon various parts of science and natural history, and which reflect the greatest honour upon their authors; and

it may not be an exaggeration to assert, that no society in Europe has more distinguished itself for the excellence of its publications, and particularly in the more abstruse parts of the pure and mixed mathematics.

The academy is still composed, as at first, of fifteen professors, besides the president and director. Each of these professors has a house and an annual stipend from 200l. to 600l. Beside the professors, there are four adjuncts, who are pensioned, and who are present at the sittings of the society, and succeed to the first vacancies.

The building and apparatus of this academy are extraordinary. There is a fine library, consisting of 40,000 curious books and manuscripts.—There is an extensive museum, in which the various branches of natural history, &c. are distributed in different apartments: it is extremely rich in native productions, having been considerably augmented with a variety of specimens collected by Pallas, Gmelin, Guldenstaedt, and other learned professors, during their late expeditions through the Russian empire. The stuffed animals and birds occupy one apartment. The chamber of rarities, the cabinet of coins, &c. contain innumerable articles of the highest curiosity and value, not to mention Cox's Museum and other valuable curiosities purchased from this country. The society has this modest motto, *Paulatim*.

The Academy of Sciences at Bologna, called the *Institute of Bologna*, was founded by Count Marigli in 1712, for the cultivating of physics, mathematics, medicine, chemistry, and natural history. Its history is written by M. de Limiers, from memoirs furnished by the founder himself.

The Academy of Sciences at Stockholm, or *Royal Swedish Academy*, owes its institution to six persons of distinguished learning, amongst whom was the celebrated Linnæus; they originally met on the 2d of June, 1739, formed a private society, in which some dissertations were read; and in the latter end of the same year their first publication made its appearance. As the meetings continued and the members increased, the society attracted the notice of the king, and was, on the 31st of March, 1741, incorporated under the name of the Royal Swedish Academy. Not receiving any pension from the crown, it is only under the protection of the king, being directed, like our Royal Society, by its own members. It has now a large fund, which has chiefly arisen from legacies and other donations; but a professor of experimental philosophy, and two secretaries, are still the only persons who receive any salaries. The dissertations read at each meeting are collected and published four times in the year; they are written in the Swedish language, and printed in octavo, and the annual publications make a volume. The first forty volumes, which were finished in 1779, are called the *Old Transactions*; for in the following year the title was changed into that of *New Transactions*. The king is sometimes present at the ordinary meetings, and particularly at the annual assembly in April for the election of members. Any person who sends a treatise which is thought worthy of being printed, receives the transactions for that quarter *gratis*, and a silver medal, which is not esteemed for its value, being worth only three shillings, but for its rarity and the honour conveyed by it. All the papers relating to agriculture are put forth separately under the title of *Oeconomica acta*. Annual premiums, in money and gold medals, principally for the encouragement of agriculture and inland trade, are also distributed by the academy.

The Royal Academy of Sciences at Copenhagen, owes its institution to the zeal of six literati, whom Christian VI. in 1742, ordered to arrange his cabinet of medals. The count of Holstein was the first president; and the six persons who first formed the design, were John Gram, Joachim Frederic Ramus, Christian Louis Scheid, Mark Woldickey, Eric Pontopidan, and Bernard Moelman. These persons, occasionally meeting for that purpose, extended their designs; associated with them others who were eminent in several branches of science; and forming a kind of literary society, employed themselves in searching into, and explain-

ing the history and antiquities of their country. The count of Holstein warmly patronized this society, and recommended it so strongly to Christian VI. that, in 1743, his Danish majesty took it under his protection, called it the Royal Academy of Sciences, endowed it with a fund, and ordered the members to join to their former pursuits, natural history, physics, and mathematics. In consequence of the royal favour, the members engaged with fresh zeal in their pursuits; and the academy has published twenty volumes in the Danish language, some whereof have been translated into Latin.

The American Academy of Sciences, was established in 1780 by the council and house of representatives in the province of Massachusetts Bay, for promoting the knowledge of the antiquities of America, and of the natural history of the country; for determining the uses to which its various natural productions might be applied; for encouraging medicinal discoveries, mathematical disquisitions, philosophical inquiries and experiments, astronomical, meteorological, and geographical, observations, and improvements in agriculture, manufactures, and commerce; and, in short, for cultivating every art and science which may tend to advance the interest, honour, dignity, and happiness, of a free, independent, and virtuous, people. The members of this academy are never to be more than 200, nor less than 40.

VI. ACADEMIES OR SCHOOLS OF ARTS; as that at Petersburg, which was established by the empress Elizabeth, at the suggestion of count Shuvalof, and annexed to the academy of sciences: the fund was 4000l. per annum, and the foundation for 40 scholars. The present empress has formed it into a separate institution, enlarged the annual revenue to 12,000l. and augmented the number of scholars to 300; she has also constructed, for the use and accommodation of the members, a large circular building, which fronts the Neva. The scholars are admitted at the age of six, and continue until they have attained that of 18: they are clothed, fed, and lodged, at the expence of the crown. They are all instructed in reading and writing, arithmetic, the French and German languages, and drawing. At the age of 14 they are at liberty to choose any of the following arts, divided into four classes. 1. Painting in all its branches of history, portraits, battles, and landscapes; architecture; mosaic; enamelling, &c. 2. Engraving on copper-plates, seal-cutting, &c. 3. Carving in wood, ivory, and amber. 4. Watch-making, turning, instrument-making, casting statues in bronze and other metals, imitating gems and medals in paste and other compositions, gilding, and varnishing. Prizes are annually distributed to those who excel in any particular art; and from those who have obtained four prizes, twelve are selected, who are sent abroad at the charge of the empress. A certain sum is paid to defray their travelling expences; and when they are settled in any town, they receive an annual salary of 60l. which is continued during four years. There is a small assortment of paintings for the use of the scholars; and those who have made great progress are permitted to copy the pictures in the empress's collection. For the purpose of design, there are models in plaster of the best antique statues in Italy, all done at Rome, of the same size with the originals, which the artists of the academy were employed to cast in bronze.

The Royal Academy of Arts in London, was instituted for the encouragement of *Designing, Painting, Sculpture*, &c. &c. in the year 1768. This academy is provided with a noble set of apartments in the front of Somerset-place, under the immediate patronage of the king, and under the direction of forty artists of the first rank in their several professions. It furnishes, in winter, living models of different characters to draw after; and in summer, models of the same kind to paint after. Nine of the ablest academicians are annually elected out of the forty, whose business is to attend by rotation, to set the figures, to examine the performance of the students, and to give them necessary instructions. There are likewise four professors, of *Paint-*
ing,

ing, of *Architecture*, of *Anatomy*, and of *Perspective*, who annually read public lectures on the subjects of their several departments; besides a president, a council, and other officers. The admission to this academy is free to all students properly qualified to reap advantage from the studies cultivated in it; and there is an annual exhibition of paintings, sculptures, and designs, open to all artists of distinguished merit, the elegance and utility of which does infinite honour to the kingdom.

The Academy of Painting and Sculpture at Paris. This took its rise from the disputes that happened between the master painters and sculptors in that capital; in consequence of which, M. Le Brun, Sarazin, Corneille, and others of the king's painters, formed a design of instituting a particular academy; and, having presented a petition to the king, obtained an arret dated Jan. 20, 1648. In the beginning of 1655, they obtained from cardinal Mazarin a brevet, and letters patent, which were registered in parliament; in gratitude for which favour, they chose the cardinal for their protector, and the chancellor for their vice-protector. In 1663, by means of M. Colbert, they obtained a pension of 4000 livres. The academy consists of a protector; a vice-protector; a director; a chancellor; four rectors; adjuncts to the rectors; a treasurer; four professors, one of which is professor of anatomy, and another of geometry; several adjuncts and counsellors, an historiographer, a secretary, and two ushers.

There is also an Academy of Painting, Sculpture, &c. at Rome, established by Lewis XIV. wherein those who have gained the annual prize at Paris are intitled to be three years entertained at the king's expence, for their further improvement.

The Academy of Architecture, established by M. Colbert in 1671, consisting of a company of skilful architects, under the direction of the superintendant of the buildings.

VII. ACADEMIES OF LAW; as that famous one at Beryta, and that of the Sitientes at Bologna.

VIII. ACADEMIES OF HISTORY; as the *Royal Academy of Portuguese History at Lisbon*. This academy was instituted by king John V. in 1720. It consists of a director, four censors, a secretary, and fifty members; to each of whom is assigned some part of the ecclesiastical or civil history of the nation, which he is to treat either in Latin or Portuguese. In the church history of each diocese, the prelates, synods, councils, churches, monasteries, academies, persons illustrious for sanctity or learning, places famous for miracles or relics, must be distinctly related in twelve chapters. The civil history comprises the transactions of the kingdom from the government of the Romans down to the present time. The members who reside in the country are obliged to make collections and extracts out of all the registers, &c. where they live. A medal was struck by this academy in honour of their prince; the front of which was his effigy, with the inscription *Johannes V. Lusitanorum Rex*; and, on the reverse, the same prince is represented standing, and raising History almost prostrate before him, with the legend *Historia Resurgens*.

Academy of Suabian History at Tubingen, was lately established by some learned men, for publishing the best historical writings, the lives of the chief historians, and compiling new memoirs, on the several points and periods thereof.

IX. ACADEMIES OF ANTIQUITIES; as that at Cortona in Italy, and at Upsal in Sweden. The first is designed for the study of Etrurian antiquities: the other for illustrating the northern languages, and the antiquities of Sweden, in which notable discoveries have been made by it. The head of the Etrurian academy is called *Lucomon*, by which the ancient governors of the country were distinguished. One of their laws is to give audience to poets only one day in the year; another is to fix their sessions, and impose a tax of a dissertation on each member in his turn.

The Academy of Medals and Inscriptions at Paris was set on foot by M. Colbert, under the patronage of Lewis XIV.

in 1663, for the study and explanation of ancient monuments, and perpetuating great and memorable events, by coins, relievos, inscriptions, &c.—One of the first undertakings of this academy, was to compose, by means of medals, a connected history of the principal events of Lewis XIV's reign; but in this design they met with great difficulties, and of consequence it was interrupted for many years; but at length it was completed down to the advancement of the duke of Anjou to the crown of Spain.—In this celebrated work, the establishment of the academy itself was not forgot. The medal on this subject represents Mercury sitting, and writing with an antique stylus on a table of brass; he leans with his left hand upon an urn full of medals, and at his feet are several others placed upon a card: the legend, *Rerum gestarum fides*; and on the exergue, *Academia regia inscriptionum et numismatum, instituta M.DC.LXIII.* signifying that the Royal Academy of Medals and Inscriptions, founded in 1663, ought to give to future ages a faithful testimony of all great actions. Besides this work, we have several volumes of their memoirs; and their history, written and continued by their secretaries.

X. ACADEMIES OF BELLES LETTRES, are those wherein eloquence and poetry are chiefly cultivated. These are very numerous in Italy, and not uncommon in France.

The Academy of Umidi at Florence has contributed greatly to the progress of the sciences by the excellent Italian translations given, by some of its members, of the ancient Greek and Latin historians. Their chief attention is to the Italian poetry, at the same time that they have applied themselves to the polishing of their language, which produced the *Academy della Crusca*.

The Academy of Humorists, Umoristi, had its origin at Rome from the marriage of Lorenzo Marcini, a Roman gentleman; at which several persons of rank were guests; and, it being carnival time, to give the ladies some diversion, they took themselves to the reciting of verses, sonnets, speeches, first extempore, and afterwards premeditatedly; which gave them the denomination of *Belli Humori*. After some experience, coming more and more into the taste of these exercises, they resolved to form an Academy of Belles Lettres; and changed the title of *Belli Humori* for that of *Humoristi*: choosing for their device a cloud, which, after being formed of exhalations from the salt waters of the ocean, returns in a gentle sweet shower; with this motto from Lucretius, *Redit agmine dulci*.

In 1690, the *Academy of Arcadi* was established at Rome, for reviving the study of Poetry and of the Belles Lettres. Besides most of the politer wits of both sexes in Italy, this academy comprehends many princes, cardinals, and other ecclesiastics; and, to avoid disputes about pre-eminence, all appear masked after the manner of Arcadian shepherds. Within ten years from its first establishment, the number of *academists* amounted to six hundred. They hold assemblies seven times a year in a mead or grove, or in the gardens of some nobleman of distinction. Six of these meetings are employed in the recitation of poems and verses of the Arcadi residing at Rome; who read their own compositions; except ladies and cardinals, who are allowed to employ others. The seventh meeting is set apart for the compositions of foreign or absent members. This academy is governed by a custos, who represents the whole society, and is chosen every four years, with a power of electing twelve others yearly for his assistance. Under these are two sub-custodes, one vicar, or pro-custos, and four deputies or superintendants, annually chosen. The laws of the society are immutable, and bear a near resemblance to the ancient model.

XI. ACADEMIES OF LANGUAGES; called, by some, *Grammatical Academies*: as,

The Academy della Crusca at Florence, famous for its vocabulary of the Italian tongue, was formed in 1582, but scarce heard of before the year 1584, when it became noted for a dispute between Tasso and several of its members. Many authors confound this with the Florentine academy. The

discourses

discourses which Toricelli, the celebrated disciple of Galileo, delivered in the assemblies, concerning levity, and the wind, the power of percussion, mathematics, and military architecture, are a proof that these academists applied themselves to things as well as words.

The *Academy of Fruits* had its rise in 1617, at an assembly of several princes and nobility of the country, who met with a design to refine and perfect the German tongue. It flourished long under the direction of princes of the empire, who were always chosen presidents. In 1668, the number of members arose to upwards of 900. It was prior in time to the French Academy, which only appeared in 1629, and was not established into an academy before the year 1635. Its history is written in the German tongue by George Neumark.

The *French Academy*, which had its rise from a meeting of men of letters in the house of M. Conrat, in 1629. In 1635, it was erected into an academy, by Cardinal Richelieu, for refining and ascertaining the French language and style.—The number of its members are limited to forty; out of whom a director, chancellor, and secretary, are to be chosen: the two former hold their posts for two months, the latter is perpetual. They meet three times a week in the Louvre; and, at breaking up, forty silver medals are distributed among them. By this distribution, the attendance of the academists is secured, those who are present receiving the surplus otherwise intended for the absent. To elect or expel a member, at least eighteen are required; nor can any be chosen unless he petition for it: by this expedient, the affront of refusals from persons elected is avoided. Religious are not admitted; nor can any person be admitted on another footing than as a man of letters. The design of this academy was to give not only rules, but examples, of good writing. They began with making speeches on subjects taken at pleasure, about twenty of which were printed. They have been severely satirized, and their style has been ridiculed as enervating instead of refining the French language. The most remarkable work of this academy is a dictionary of the French tongue; which, after fifty years spent in settling the words and phrases to be used in writing, was at last published in the year 1694.

An *Academy* similar to the above has been set on foot at Petersburg, by the learned princefs Dashkof: it consists of sixty members. The plan has also been approved by the empress, who has given a fund for its support and establishment.

The *Royal Spanish Academy at Madrid*, held its first meeting in July 1713, in the palace of its founder, the Duke d'Escalona. It consisted at first of eight academists, including the duke; to which number fourteen others were afterwards added, the founder being chosen president or director. In 1714, the king granted them his confirmation and protection. Their device is a crucible in the middle of the fire, with this motto, *Lympha, fya, y da esplendor*; "It purifies, fixes, and gives brightness." The number of members is limited to twenty-four; the Duke d'Escalona to be director for life, but his successors chosen yearly, and the secretary to be perpetual. Their object, as marked out by the royal declaration, was to cultivate and improve the national language: they were to begin with choosing carefully such words and phrases as have been used by the best Spanish writers; noting the low, barbarous, or obsolete, ones; and composing a dictionary wherein these may be distinguished from the former.—For a further account of similar establishments, see the article SOCIETY.

ACADEMY is also a term for schools and other seminaries of learning among the Jews, where their rabbins and doctors instructed their youth in the Hebrew language, and explained to them the Talmud and the secrets of the Cabbala. Those of Tiberias and Babylon have been most noted.

The Romans had a kind of military academies, established in all the cities of Italy, under the name of *Campi*

Martis. Here the youth were admitted to be trained for war at the public expence. The Greeks, besides academies of this kind, had military professors called *Tactici*, who taught all the higher offices of war, &c. &c.

We have two royal academies of this kind in England, the expences of which are defrayed by the government; the one at Woolwich, for the artillery and military engineers; and the other at Portsmouth, for the navy. The former was established by his late majesty king George II. in 1741, for instructing persons belonging to the military part of the ordnance, in the several branches of the mathematics, fortification, &c. proper to qualify them for the service of artillery, and the office of engineers. This institution is under the direction of the master-general and board of ordnance for the time being; and at first the lectures of the masters in the academy were attended by the practitioner-engineers, with the officers, serjeants, corporals, and private men of the artillery, besides the cadets. At present, however, none are educated there but the gentlemen cadets, to the number of 90 or 100, where they receive an education perhaps not to be obtained or purchased for money in any part of the world. The master-general of the ordnance is always captain of the cadets' company, and governor of the academy; under him are a lieutenant-governor, and an inspector of studies. The masters have been gradually increased, from two or three at first, now to the number of twelve, namely, a professor of mathematics, and two other mathematical masters, a professor of fortification and an assistant, two drawing-masters, two French masters, with masters for fencing, dancing, and chemistry. This institution is of the greatest consequence to the state, and it is hardly credible that so important an object should be accomplished at so trifling an expence. It is to be lamented, however, that the academy is fixed in so unhealthy a situation; that the lecture-rooms and cadets' barracks are so small as to be insufficient for the purposes of the institution; and that the salaries of the professors and masters should be so inadequate to their labours, and the benefit of their services.

The Royal Naval Academy at Portsmouth was founded by George I. in 1722, for instructing young gentlemen in the sciences useful for navigation, to breed officers for the royal navy. The establishment is under the direction of the board of admiralty, who give salaries to two masters, by one of whom the students are boarded and lodged, the expence of which is defrayed by their own friends, nothing being supplied by the government but their education.

ACADEMY is likewise a name given to a riding-school, where young gentlemen are taught to ride the great horse, &c. and the ground allotted is usually called the *Manege*.

ACADEMY FIGURE, a drawing of a naked man or woman, taken from the life; which is usually done on paper with red or black chalk, and sometimes with pastils or CRAYONS.

ACADIE, or ACADY, in geography, a name formerly given to Nova Scotia, or New Scotland, in America. See NOVA SCOTIA.

ACÆNA, *f.* in antiquity, a Grecian measure of length, being a ten-feet rod, used in measuring their lands.

ACÆNA, *f.* [*axana*, Gr. a thorn.] In botany, a plant of the tetrandria monogynia class. The generic characters are.—Calyx: perianthium four-leaved; leaflets ovate, concave, equal, permanent. Corolla: none, unless the calyx be termed as such. Stamina: filaments equal, of middle length, opposite to the calyx. Antheræ quadrangular, twin, erect. Pistillum: germ inferior, obovate, hispid. Style very small, bent in on one side. Stigma a small, many-cleft, thickish, coloured, membrane. Pericarpium: a dry, obovate, one-celled, berry, beset with spines bent backwards. Seed: single.—*Essential Character*. Calyx: four-leaved. Corolla: four-petalled. Berry dry, inferior, one-seeded, with spines bent backwards.—This is a Mexican plant. Perennial, woody, very-branched; the branches very long. Stems many, shrubby, rather erect,

two feet high. Leaves pinnate, scattered, sheathing; leaflets sessile, approximating, pubescent underneath: the first pairs very small, linear, acute, quite entire; from four to eight large pairs, oblong, serrate; the serratures bearded at the end. Spikes axillary, ancipital, erect, a little rigid, six or seven inches long. Bractes ovate-oblong, concave, so near the calyx as easily to be taken for a part of it. Flowers subsessile, alternate.

ACAJOU, and ACAJUBA, *f.* in botany. See ANACARDIUM.

ACALANDRUS, a river falling into the bay of Tarentum, not far from the Metapontum (Pliny, Strabo); now Fiume de Rosetto.

ACALEPTIC, *f.* in ancient prosody, a complete verse.

ACALYPHA, *f.* [ακαληφη, παρα το μη εχειν καλην αφην, Gr. not being pleasant to handle.] In botany, a genus of the monoeia monadelphia class, ranking in the natural order of tricoceæ. The generic characters are—(male flowers crowded above the females) Calyx: perianthium three or four leaved; leaflets roundish, concave, equal. Corolla: none. Stamina: filaments eight to sixteen, short, crowded, connected at the base. Antheræ roundish.—Female flowers fewer, below the others, received into a large divided involucre. Calyx: perianthium three leaved; leaflets subovate, concave, converging, small, permanent. Corolla: none. Pistillum: germ roundish. Styles three; branching, usually three-parted, long. Stigmas simple. Pericarpium: capsule roundish, three-furrowed, three-celled; the valves gaping two ways. Seeds: solitary, roundish, very large.—*Essential Character.* Male. Calyx, three or four leaved. Corolla, none. Stamina, eight to sixteen.—Female. Calyx, three-leaved. Corolla, none. Styles, three. Capsule three-grained, three-celled. Seed, one.

Species. 1. *Acalypha Virginica*, or Virginian acalypha. Female involucre heart-shaped gashed: leaves ovate-lanceolate longer than the petiole. This sort grows naturally in Virginia, and several other parts of North America; also in Ceylon. It is an annual plant, seldom more than a foot high, sending out several side-branches towards the bottom: the leaves are very like those of broad-leaved pellitory of the wall: the flowers are produced in small clusters in July and August: these make but a poor appearance, and resemble those of pellitory so much, that they may easily be mistaken for them at a little distance.

2. *Acalypha virgata*, or Jamaica acalypha. Female spikes with involucre heart-shaped, serrate; male ones distinct, naked; leaves lanceolate-ovate. This is a native of the warmest countries, and grows plentifully in Jamaica. This is also an annual plant, which in England seldom exceeds the former in stature. The leaves greatly resemble those of the annual nettle, and sting full as much when touched.

3. *Acalypha Indica*, or Indian acalypha. Female involucre heart-shaped slightly notched: leaves ovate shorter than the petiole. This species was discovered in great plenty by Dr. Housloun, at La Vera Cruz. It is an inhabitant of marshy places, and grows about three feet high, with an herbaceous stalk: leaves alternate, differing much in their figure; some plants having them long and narrow, others broad like those of the chestnut-tree, and deeply veined. These varieties arise from the seed of the same plant. It is found also in the East Indies upon dunghills, whence it has the name of *Kupamenija*, i. e. dung-loving. It is annual, and flowers in July. The stems are round, striated, branching, a foot high: at the joints are roundish smooth leaves, which are slightly notched, and resemble those of mercury; whence, and from the tricocous capsule, these plants are called by some *Three-seeded Mercury*. A spike comes out from the axils with six, seven, or eight, female flowers. The involucre is stem-clasping, each having one female flower, with male flowers terminating the spike.

4. *Acalypha villosa*, or villous acalypha. Female involucre very small, toothed, and extremely villous; spikes

elongate; leaves ovate pointed serrate, longer than the petiole.—It was found by Mutis in the woods about Carthage, where it flowers from May to August. It is an erect branching shrub, often fifteen feet high. The flowers are very small, in axillary spikes, those of different sexes on distinct branches: the male spike close, cylindric, erect: the female very loose; calyx five-leaved; three styles, each bifid to the base.

5. *Acalypha Australis*, or South American acalypha. Female involucre quite entire; leaves lanceolate obtuse.—Is a native of South America.

6. *Acalypha hernandifolia*. Female spikes very long, involucre cordate serrate; males distinct naked; leaves subcordate serrate, on very long petioles. 7. *Acalypha corensis*. Female flowers terminating distinct, involucre three-leaved; male spikes axillary involucre; leaves ovate serrate. 8. *Acalypha levigata*. Female spikes with many-parted involucre; male spikes lax naked; leaves wedge-ovate acuminate serrulate very smooth. 9. *Acalypha elliptica*. Female spikes with involucre shorter than the germs, ovate toothed hirsute; males naked lax; leaves elliptic acuminate toothed. 10. *Acalypha reptans*. Spikes terminating erect, flowers mixed, females lower; involucre cordate serrate; males leafless; leaves ovate serrate; stem creeping. 11. *Acalypha tomentosa*. Female spikes terminating solitary, involucre many-parted; males erect; leaves ovate-lanceolate serrate scabrous villous-tomentose underneath. 12. *Acalypha angustifolia*. Female flowers subsessile terminating, involucre serrate; males in spikes; leaves linear serrate. 13. *Acalypha scabrofolia*. Female spikes with cordate gashed involucre; leaves oblong-lanceolate serrate scabrous.—These are all natives of the West Indies. The seventh is a shrub six feet in height, upright, smooth, and having runners; and is a native of Domingo and Martinico, but most frequent on the confines of woods in Venezuela. The eleventh and twelfth are found in Hispaniola. The tenth is found both there and in Jamaica. The rest are inhabitants of the island of Jamaica.

14. *Acalypha betulæfolia*. Female flowers axillary sessile, involucre cordate crenate; males in spikes; leaves roundish crenate smooth.—This is a shrub that has very much the appearance of *Betula mana*. The leaves are about half an inch in length, and some of them almost as broad.

Propagation and Culture. These plants have no beauty to recommend them, and are preserved only in some botanic gardens for the sake of variety. If the seeds of the first sort are permitted to scatter, the plants will come up in the spring, better than if sown by hand; and, if they are not put into the ground in autumn, they rarely grow the first year. All the culture this plant requires, is to keep it clear from weeds, and to let it remain where it was sown, for it does not bear removing well. It flowers in August, and the seeds ripen in October. The second sort is too tender to thrive in the open air in England, therefore the seeds should be sown in pots, plunged into a hot-bed; and, if the plants do not come up the first year, which often happens, the pots should be put under shelter in winter, and the following spring plunged again into a hot-bed, which will bring up the plants: these must be transplanted into other pots, and brought forward in hot-beds, otherwise they will not produce ripe seeds at all. The third species may be treated like the second: in a stove it will flower, and in September perfect the seeds. The other sorts have not yet been introduced, but will require the same treatment with the second and third.

ACAMANTIS, the ancient name of the island of Cyprus, taken from one of its promontories situated to the west, and called Acamas. Teos in Ionia was also called thus from Acamus the founder.

ACAMAS, or ACAMANTIS, the west promontory of the island of Cyprus, from whence it took this ancient name; now Cape Pifanio, or Epifanio, where formerly was a town of the same name, now a village called Crufocco.

ACAMAS,

ACAMAS, son of Theseus, followed the rest of the Grecian princes to the siege of Troy; and was deputed with Diomedes, to the Trojans, in order to get Helen restored. Laodice, Priam's daughter, falling in love with this prince, stole a night with him, and had a son by him called Munitus. He was one of the heroes who concealed themselves in the wooden horse. One of the tribes of Athens was called *Acamantides* from him, by the appointment of the oracle; and he founded a city in Phrygia Major, called *Acamantium*. Homer mentions two other heroes of this name; one a Thracian prince who came to succour Priam, another a son of Antenor.

ACANACEOUS PLANTS, *f.* such as are armed with prickles.

ACANGA, *f.* in botany. See **BROMELIA**.

ACANGIS, that is, *Ravagers* or *Adventurers*; a name which the Turks give their hussars or light-troops, who are generally sent out in detachments to procure intelligence, harrafs the enemy, or ravage the country.

ACANNY, a country of Guinea, long famous for producing and trading in very fine gold; also a town or village of Guinea. Lat. 8. 30. N. lon. 0. 30. E.

ACANOS, or **ACANTHIUM**, *f.* in botany. See **ONOPORDUM**.

ACANTHA, *f.* in botany, the prickle of any plant; in zoology, a term for the spine or prickly fins of fishes.

ACANTHABOLUS, *f.* in surgery, an instrument for pulling thorns, or the like, out of the skin.

ACANTHINE, *f.* any thing resembling or belonging to the herb acanthus. Acanthine garments, among the ancients, are said to be made of the down of thistles; others think they were garments embroidered in imitation of the acanthus.

ACANTHOIDES, *f.* in botany. See **CARLINA**.

ACANTHOPTERYGIUS FISHES, *f.* a term used by Linnæus and others for those fishes whose back-fins are hard, ossæous, and prickly.

ACANTHOS, a town of Egypt, near Memphis, now Bifalta. Also a maritime town of Macedonia, to the west of mount Athos, a colony of Andrians, now Erisso; near which was shown Xerxes' ditch, of seven stadia, in order to separate mount Athos from the continent, and convey his ships, without doubling Athos, into the Singitic bay. Acanthos is also a town of Epirus.

ACANTHUS, *f.* [*ἄκανθα*, Gr. a thorn.] In botany, a genus of the didynamia angiospermia class, ranking in the natural order of perfonate. The generic characters are—Calyx: perianthium with leaflets in three alternate pairs, unequal, permanent. Corolla: one-petalled unequal; tube very short, closed with a beard; upper lip none; under lip very large, flat, straight, very broad, three-lobed, obtuse, the length of the upper lip of the calyx. Stamina: filaments four, subulate, shorter than the corolla, the two upper rather longer, recurved, incurved at the top. Antheræ oblong, compressed, obtuse, the lateral ones parallel, villous before. Pistillum: germ conical. Style filiform, length of the stamens. Stigmas two, acute, lateral. Pericarpium: capsulæ subovate with a point, two-celled, two-valved, with a contrary partition; claws alternate, curved, fastened to the partition. Seed: ovate, gibbous, single; sometimes two.—*Essential Character*. Calyx: two-leaved, bifid. Corolla: one-lipped, bent down, trifid. Capsule two-celled.

Description. The plants of this genus are generally large, with a single herbaceous stalk, and great pinnatifid leaves. The flowers are produced in terminating spikes. Some of the species are shrubby and thorny; with undivided leaves, toothed, and having a thorn at the end of the teeth.

Species. 1. *Acanthus mollis*, or smooth acanthus; the leaves sinuate unarmed.—This has a stem from two to three feet in height. The leaves oblong, smooth on both sides, and shining; from a span to a foot in length, divided deeply into opposite ovate lobes, which are bluntly toothed and finely ciliate about the edges: they are placed on roundish

petioles, with a flat channel running along the upper surface. Though the leaves are said to be smooth, yet they are not without white bristles on both sides, especially along the nerves. The flowers are white, and come out from about the middle to the top of the stalk. This is the species which is used in medicine, under the name of *branca urfina*. The roots and leaves abound with a mucilage, which is readily extracted by boiling or infusion. The roots are the most mucilaginous. Where this plant is common, they employ it for the same purposes to which the *althæa* or marsh-mallow, and other vegetables possessing similar qualities, are applied among us.

2. *Acanthus cardusfolius*, or thistle-leaved acanthus. The leaves sinuous-toothed thorny, spike of flowers radical.—The stem is extremely short. Many leaves proceed almost immediately from the root, resembling those of the thistle; whence it derives the trivial name: the divisions terminate in a tomentose or naked spine. The spike of flowers is oblong, of the same length with the leaves, or longer; and furnished with imbricate, nerved, stiff, six-spined, bractes. The calyxes are thornless and membranaceous. Sparrmann found this plant at the Cape of Good Hope.

3. *Acanthus spinosus*, or prickly acanthus, the leaves pinnatifid thorny, deeply jagged in very regular order, and each segment is terminated with a sharp spine; as are also the petioles, and the calyx of the flowers; so that this plant is troublesome to handle. It grows wild in Italy and Provence; and flowers from July to September. In 1629 it was cultivated in England. These plants were formerly called *brank-urfine*, and also by the vulgar appellation of *beard's-breech*, from the roughness of this species. But these have now become obsolete; and the softer, more classical, name of *acanthus* is generally adopted in English.

4. *Acanthus Dioscoridis*, or acanthus of Dioscorides; the leaves lanceolate quite entire and thorny on the margin.—This, which Linnæus supposes to be the genuine species of Dioscorides, grows naturally in the east, on Lebanon, &c.

5. *Acanthus ilicifolius*, or holly-leaved acanthus; the leaves repand tooth-thorny, stem shrubby prickly; it is an ever-green shrub, rising about four feet high, and dividing into many branches; with leaves very like those of the common holly, both in size and shape; and armed with spines in the same manner. The flowers come out singly in an upright raceme at the end of the stalk; they are white, and shaped like those of the common acanthus, but smaller. The calyx consists of six imbricate leaflets, according to Linnæus. Loureiro describes it as having an upright border, divided into four parts; the segments acute, and the two outer ones larger than the others. The corolla has the tube truncate in front, and extending backwards into an ovate, upright, segment, which is slightly trifid. The stigma is simple, and there are two seeds. He observed it near Canton in China, differing from that of Cochinchina, in having two small concave leaflets at the base of the calyx; and the truncate part of the corolla emarginate. Native of the East and West Indies, and some of the islands in the South Seas.

6. *Acanthus integrifolius*, or entire-leaved acanthus; the leaves oblong entire, stem herbaceous procumbent. 7. *Acanthus procumbens*, or procumbent acanthus. Leaves oblong serrate and ciliate, stem procumbent shrubby. 8. *Acanthus furcatus*, or forked acanthus; the leaves oblong tooth-thorny, stem shrubby, bractes terminated by a three-forked thorn. 9. *Acanthus Capensis*, or Cape acanthus; the leaves oblong toothed thorny, stem shrubby erect, bractes terminated by a simple thorn.—These species are natives of the Cape of Good Hope. The last has round, opposite, ash-coloured, branches; opposite, subanceolate, sessile, stiff, leaves, with two spines on each side, and one at the end; the axillary leaves are petioled, longer, softer, but thorny as well as the others. Spikes of flowers terminal, solitary, and sessile: the bractes resemble the leaves, but are mostly without spines. The calyx is bivalve and

smooth, the upper valve longest: the corolla has one trifid lip.

10. *Acanthus Maderaspatensis*, or *Madras acanthus*; the leaves fourfold, flowers axillary, calyxes ciliate, with an herbaceous dichotomous stem: elliptic thornless leaves: the outer calyx imbricated, with four pairs of obovate leaflets inclining to wedge-shaped, and ciliate: the inner four-leaved, the two outer leaflets of which are lanceolate and longer than the others; the two inner less and linear. Capsule red. It is a native of the East Indies.

Propagation and Culture. The smooth and prickly acanthus are lasting plants, which may be propagated either by seeds, or parting of their roots; if by the former method, the seeds should be sown in a light dry soil, towards the end of March: when the season proves favourable, the plants will appear in May, and all the culture they require is to keep them clean from weeds, and, where the plants are too close to thin them, so as to leave them about six inches asunder, which will be room enough for them to grow till autumn, when they should be transplanted where they are designed to remain. The first sort, and especially the Portuguese variety, being more tender, ought to be planted in a warm border near a wall; and, as these do not multiply so fast by their roots, they do not require more room than three feet; but the third spreads its roots to a great distance, therefore must have more than twice that room. This, being hardy, may be planted between shrubs, to fill up vacant spaces, where it will thrive fast enough, provided the ground be light, and not over wet; and, when it is in flower, will make an agreeable variety. If this sort be propagated by its roots, the operation may be performed either in spring or autumn; but the others must only be removed in the spring; for, if they are transplanted in the autumn, and the following winter should prove cold, they will run the hazard of being lost. These plants take root very deep, so that when they are planted in wet grounds, their roots will rot in winter. When they are once established in a garden, they are with difficulty eradicated.

The holly-leaved and *Madras acanthus* are too tender to thrive out of a stove in England, and can only be propagated by seeds, which do not ripen in Europe.—The other sorts must be placed among Cape plants, and treated in the same manner as they are.

ACANTHUS, *f.* in architecture, an ornament representing the leaves of the acanthus, used in the capitals of the Corinthian and Composite orders.

ACAPULCO, a considerable town and port in Mexico, in the South Sea. It has a fine harbour, from whence a ship annually sails to Manilla in the Philippine islands, near the coast of China in Asia; and another returns annually from thence with all the treasures of the East Indies, such as diamonds, rubies, sapphires, and other precious stones; the rich carpets of Persia; the camphire of Borneo; the benjamin and ivory of Pegu and Cambodia; the silks, muslins, and calicoes, of the Mogul's country; the gold-dust, tea, china-ware, silk, and cabinets, of China and Japan; inasmuch that this single ship contains more riches than many whole fleets.

It was one of these Acapulco ships or galleons, that commodore Anson captured in 1743, which retrieved all the misfortunes of that celebrated voyage, for which see *ANSON*; and the *St. Jago* register-ship was also one of this description, which in 1793 was taken by the French privateer *le Dumouris*, and afterwards captured by Sir Andrew Snape Douglas in the *Phaeton* frigate, detached from admiral Gell's squadron, and brought into Portsmouth. The rich cargo of this ship, consisting of 33 chests of gold, jewels, and plate, 680 chests of dollars, and a prodigious quantity of the choicest merchandize, loaded twenty-one waggons, which conveyed the property in cavalcade, under a strong detachment of dragoons, from Portsmouth to the Tower of London, where it was safely deposited. The ship and cargo, after being two years in

litigation, produced, it is said, upwards of 900,000*l.* which was divided amongst the captors in 1795.

The goods brought by these ships to Acapulco are carried to the city of Mexico by mules and pack-horses; and from thence to Vera Cruz on the North Sea, in order to be shipped for Europe. Acapulco itself is a small place, consisting only of about 200 or 300 thatched houses. Ships arrive at the port by two inlets, separated from each other by a small island; the entrance into them in the day-time is by means of a sea-breeze, as the sailing out in the night-time is effected by a land-breeze. A wretched fort, 42 pieces of cannon, and a garrison of 60 men, defend it. It is equally extensive, safe, and commodious. The basin which constitutes this harbour is surrounded by lofty mountains, which are so dry, that they are even destitute of water. The air here is hot, heavy, and unwholesome; to which none can habituate themselves, except certain negroes that are born under a similar climate, or some mulattoes. This feeble and miserable colony is crowded with a vast accession to its numbers upon the arrival of the galleons, and the Spanish register-ships; when a fair is held, which continues about 30 days, to which traders flock from all the provinces of Mexico, who come to exchange European toys, their own cochineal, and about ten millions of silver (437,500*l.* sterling), for spices, muslins, printed linens, silk, perfumes, and the gold works of Asia. N. Lat. 17. 30. W. lon. 102. 29.

ACARADY, a country on the south coast of Guinea, remarkable for fine pure gold.

ACARAI, a town of Paraguay, in South America, built by the Jesuits in 1624. S. Lat. 26. 0. lon. 51. 5. W.

ACARAUNA, *f.* a small American fish, called by our sailors the *old wife*. See *LABRUS*.

ACARNA, *f.* in botany.—See *ATRACTYLIS*, *CARDUUS*, *CARLINA*, *CNICUS*.

ACARNANIA, the first county of Free Greece, or Greece Proper, bounded on the west by the Sinus Ambracius, and separated from Ætolia by the river Achelous on the east, and by the Sinus Ambracius from Epirus. The people were called *Acarnanes*, denoting persons unshorn; other Ætolians, to the east of the Achelous, being called *Curetes*, from being shorn. According to Lucian, they were noted for effeminacy and incontinence; hence the proverb, *Porcellus Acarnanius*. This country was famous for an excellent breed of horses; so that *Ἀκαρννός κτην* is a proverbial saying for a thing excellent in its kind. It is now called *la Carnia* and *il Despotato*.

ACARON, or **ACCARON**, a town of Palestine, called *Echron* in Scripture. It was the boundary of the Philistines to the north; stood at some distance from the sea, near Bethshemesh, and was famous for the idol Baalzebub.

ACARUS, *f.* the *TICK* or *MITE*, a genus of insects belonging to the order of aptera, or such as have no wings. The acarus has eight legs; two eyes, one on each side of the head; and two jointed tentacula. The female is oviparous. Linnaeus enumerates thirty-five species; of which some are inhabitants of the earth, some of waters; some live on trees, others among stones, and others on the bodies of other animals, and even under the skin. We shall give a description of a few of the most remarkable.

1. The fire, or cheese-mite, is a very minute species. To the naked eye, these mites appear like moving particles of dust; but the microscope discovers them to be perfect animals, having as regular a figure, and performing all the functions of life as perfectly, as creatures that exceed them many times in bulk. The head is small in proportion to the body; and has a sharp snout, and a mouth that opens and shuts like a mole's. They have two small eyes, and are extremely quicksighted; and when they have been once touched with a pin, you will easily perceive how cunningly they avoid a second touch. Their legs are each furnished at the extremity with two little claws, with which the animal very nicely takes hold of anything. The hinder part of the body is plump and bulky; and ends in

1. The Achras Sapota Plant. 2. The Cheese mite. 3. The Harvest Tick. 4. The Tick Insect.
5. The longicornis, or, horned Tick; all greatly Magnified.

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an oval form, from which there issue out a few exceeding long hairs. Other parts of the body are also beset with thin and long hairs. The males and females are easily distinguished in these little animals. The females are oviparous, as the louse and spider; and from their eggs the young ones are hatched in their proper form, without having any change to undergo afterwards. They are, however, when first hatched, extremely minute; and, in their growing to their full size, they cast their skins several times. These little creatures may be kept alive many months between two concave glasses, and applied to the microscope at pleasure. They are thus often seen *in coitu*, conjoined tail to tail; and this is performed by an incredibly swift motion. Their eggs, in warm weather, hatch in twelve or fourteen days; but in winter they are much longer. Their eggs are so small, that a regular computation shows, that ninety millions of them are not so large as a common pigeon's egg. They are very voracious animals, and have often been seen to eat one another. Their manner of eating is by thrusting alternately one jaw forward and the other backward, and in this manner grinding their food; and after they have done feeding, they seem to chew the cud.—There are several varieties of this species found in different substances besides cheese; as in malt-dust, flour, oatmeal, &c. Those in malt-dust and oatmeal are much nimbler than the cheese-mites, and have more and longer hairs. There are also a sort of wandering mites, which range wherever there is any thing they can feed on: they are often seen in the form of a white dust, and are not suspected to be living creatures.—The mite is called by authors simply, *acarus*. It is an animal very tenacious of life, and will live months without food. Mr. Lewenhock had one which lived eleven weeks on the point of a pin, on which he had fixed it for examining by his microscope.

2. The *fanguifugus*. The hinder part of the abdomen is crenated, the scutellum is oval and yellowish, and the beak trifid. It is a native of America, and sticks so fast on the legs of travellers, sucking their blood, that they can hardly be extracted.

3. The *telarius* is of a greenish yellow colour. It has a small sting or weapon, with which it wounds the leaves of plants, and occasions them to fold backward. They are very frequently to be met with in the autumn, inclosed in the folded leaves of the lime-tree.

4. The *exulcerans*, or itch-*acarus*, is a very small species: its body is of a figure approaching to oval, and lobated; the head is small and pointed; its colour is whitish, but it has two dusky semicircular lines on the back. It has long setaceous legs, but the two first are short. It is found in pustules of the itch: authors in general have supposed that it causes that disease: but others observe, that if this were so, it would be found more universally in those pustules. It is more probable that these only make a proper nidus for it. See the article *ITCH*.

5. The *batatas* is of a blood-colour, and a little rough; the fore pair of legs are as long as the body. It inhabits the potatoes of Surinam.

6. The *ovinus*, or sheep-tick, has a flat body of a roundish figure, but somewhat approaching to oval, and of a yellowish white colour, and has a single large round spot on the back: the anus is visible in the lower part of the body; the thorax is scarcely conspicuous; the head is very small and black; the mouth is bifid: the antennæ are of a clavated figure, and of the length of the snout; the legs are short and black. It is common on sheep, and its excrements stain the wool green: it will live in the wool many months after it is shorn from the animal.

7. The *coleopratorum*, or *acarus* of insects, is extremely minute: its body is round, reddish, and covered with a firm and hard skin; the head is very small, the neck scarcely visible; the legs are moderately long, the anterior pair longer than the others; it has a whiteness about the anus. It is frequent on the bodies of many insects, which it infests, as the louse does others; it runs very

swiftly: the humble-bee and many other of the larger insects, are continually infested with it; but none so much as the common black beetle, which has thence been called the lousy beetle.

8. The *baccarum*, or scarlet tree-mite, is a small species: its body is roundish, and the back not at all flattened, as it is in many others; the skin is smooth, shining, and glossy; and the whole animal seems distended, and ready to burst; the colour is a bright red, but a little dusky on the sides than elsewhere: the head is very small, and the legs short; there is on each side a small dusky spot near the thorax, and a few hairs grow from different parts of the body. It is very common on trees, particularly on the currant, on the fruit of which we frequently see it running.

ACASTUS, in classic history, the son of Pelias king of Thessaly, and one of the most famous hunters of his time, married Hippolyta, who falling desperately in love with Peleus her son-in-law, and he refusing to gratify her wishes, she accused him to her husband of a rape; on which he slew them both.

ACATALECTIC, *f.* [ἀκαταληκτικός, Gr.] A verse which has the complete number of syllables, without defect or superfluity.

ACATERY, or **ACATRY**, *f.* anciently an officer of the king's household, designed for a check betwixt the clerks of the kitchen and the purveyors.

ACATHARSIA, *f.* in medicine, an impurity of the blood or humours.

ACATHISTUS, *f.* the name of a solemn hymn anciently sung in the Greek church on the Saturday of the fifth week in Lent, in honour of the Virgin, for having thrice delivered Constantinople from the invasions of the barbarous nations.

ACATIUM, *f.* in the ancient navigation, a kind of boat or pinnace used for military purposes. Strabo describes it as a privateer or pirate sloop.

ACAULIS, *f.* in botany, a term applied to certain plants, the flowers of which have no pedicle or stalk to support them, but rest immediately on the ground, such as the carline thistle, &c.

ACCA (St.) bishop of Hagustaldt, or Hexam, in Northumberland, succeeded Wilfrid in that see in 709. He ornamented his cathedral in a most magnificent manner: he furnished it also with plate and holy vestments; and erected a noble library, consisting chiefly of ecclesiastical learning, and a large collection of the lives of the saints, which he was at great pains to procure. He was accounted a very able divine, and was famous for his skill in church-music. He died in 740, having enjoyed the see of Hexam thirty-one years, under Egbert king of the Northumbrians.

ACCALIA, *f.* in Roman antiquity, solemn festivals held in honour of Acca Laurentia, Romulus's nurse: they were otherwise called **LAURENTALIA**.

ACCANY. See **ACANNY**.

ACCAPITARE, *v. n.* in law, the act of becoming vassal of a lord, or of yielding him homage and obedience. Hence,

ACCAPITUM, *f.* signifies the money paid by a vassal upon his admission to a feud. It likewise, in our ancient law, was used to express the relief due to the chief lord.

ACCEDAS AD CURIAM, *f.* in the English law, a writ lying, where a man has received, or fears, false judgment in an inferior court. It lies also for justice delayed, and is a species of the writ **RECORDARE**.

To **ACCEDE**, *v. n.* [*accedo*, Lat.] To be added to, to come to; generally used in political accounts; as, another power has *acceded* to the treaty; that is, has become a party.

To **ACCELERATE**, *v. a.* [*accelero*, Lat.] To make quick, to hasten, to quicken motion; to give a continual impulse to motion, so as perpetually to increase:

Lo! from the dread immensity of space
Returning, with *accelerated* course,
The rushing comet to the sun descends.

Thomson.

Spices

Spices quicken the pulse, and *accelerate* the motion of the blood, and dissipate the fluids; from whence leanness, pains in the stomach, loathings, and fevers. *Arbuthnot*.—It is generally applied to matter, and used chiefly in philosophical language; but it is sometimes used on other occasions.—It may point out to a student now and then, what may employ the most useful labours of his thoughts, and *accelerate* his diligence in the most momentous enquiries. *Watts*.

ACCELERATION, *f.* [*acceleratio*, Lat.] The act of quickening motion. The state of the body accelerated or quickened in its motion. The act of hastening.—Considering the languor ensuing that action in some, and the visible *acceleration* it maketh of age in most, we cannot but think venery very much abridgeth our days. *Brown*.

ACCELERATION, in mechanics, the increase of velocity in a moving body. Accelerated motion is that which continually receives fresh accessions of velocity. Acceleration stands directly opposed to *retardation*, which denotes a diminution of velocity. It is chiefly used in physics, in respect of falling bodies, i. e. of heavy bodies tending towards the centre of the earth by the force of gravity. That natural bodies are accelerated in their descent, is evident from various considerations, both *a priori* and *posteriori*. Thus, we actually find, that the greater height a body falls from, the greater impression it makes, and the more vehemently does it strike the subject plane, or other obstacle.

Various were the systems and opinions which philosophers produced to account for this acceleration. But the immediate cause of acceleration is now sufficiently obvious; the principle of gravitation, which determines the body to descend, determining it to be accelerated by a necessary consequence.

Suppose a body let fall from on high: the primary cause of its beginning to descend is doubtless the power of gravity; but when once the descent is commenced, that state becomes in some measure natural to the body; so that, if left to itself, it would persevere in it for ever, even though the first cause should cease: as we see in a stone cast with the hand, which continues to move after it is left by the cause that gave it motion. But, beside the propensity to descend impressed by the first cause, and which of itself were sufficient to continue the same degree of motion, once begun, *in infinitum*; there is a constant accession of subsequent efforts of the same principle, gravity, which continues to act on the body already in motion, in the same manner as if it were at rest. Here, then, being a double cause of motion; and both acting in the same direction, viz. directly towards the centre of the earth; the motion they jointly produce must necessarily be greater than that of any one of them.—And the velocity thus increased having the same cause of increase still persisting, the descent must necessarily be continually accelerated.

ACCELERATION of BODIES on inclined Planes. The same general law obtains here as in bodies falling perpendicularly: the effect of the plane is to make the motion slower; but the inclination being every where equal, the retardation arising therefrom will proceed equally in all parts, at the beginning and the ending of the motion. See **MECHANICS**.

ACCELERATION of the MOTION of PENDULUMS. The motion of pendulous bodies is accelerated in their descent; but in a less ratio than that of bodies falling perpendicularly. See **MECHANICS** and **PENDULUM**.

ACCELERATION of the MOTION of PROJECTILES. See **PROJECTILE**.

ACCELERATION is also applied in the ancient astronomy, in respect of the fixed stars. This acceleration was the difference between the revolution of the *primum mobile* and the solar revolution; which was computed at three minutes and fifty-six seconds.

ACCELERATION of a PLANET. A planet is said to be accelerated in its motion, when its real diurnal motion exceeds its mean diurnal motion. And, on the other hand,

the planet is said to be retarded in its motion, when the mean exceeds the real diurnal motion. This inequality arises from the change in the distance of the planet from the sun, which is continually varying; the planet moving always quicker in its orbit when nearer the sun, and slower when farther off.

ACCELERATION of the MOON, a term used to express the increase of the moon's mean motion from the sun, compared with the diurnal motion of the earth; so that it is now a little swifter than it was formerly. Dr. Halley was the first who made this discovery: and he was led to it by comparing the ancient eclipses observed at Babylon with those observed by Albatennius in the ninth century, and some of his own time. He was not able to ascertain the quantity of this acceleration, because the longitudes of Bagdad, Alexandria, and Aleppo, where the observations were made, had not been accurately determined. But since his time the longitude of Alexandria has been ascertained by Chazelles; and Babylon, according to Ptolemy's account, lies 50' east from Alexandria. From these data, Mr. Dunthorne compared several ancient and modern eclipses, with the calculations of them, by his own tables, and hereby verified Dr. Halley's opinion; for he found that the same tables represent the moon's place more backward than her true place in ancient eclipses, and more forward than her true place in later eclipses; and thence justly inferred, that her motion in ancient times was slower; in later times quicker, than the tables give it. But he did not content himself with merely ascertaining the fact; he proceeded to determine the quantity of the acceleration; and by means of the most ancient eclipse of which any authentic account remains, observed at Babylon in the year before Christ 721, he concluded, that the observed beginning of this eclipse was not above an hour and three-quarters before the beginning by the tables; and therefore the moon's true place could precede her place by computation but little more than 50' of a degree at that time. Admitting the acceleration to be uniform, and the aggregate of it as the square of the time, it will be at the rate of about 10" in 100 years.

Dr. Long attributes the acceleration above described to one or more of these causes:—either, 1. The annual and diurnal motion of the earth continuing the same, the moon is really carried round the earth with a greater velocity than heretofore: or, 2. The diurnal motion of the earth, and the periodical revolution of the moon, continuing the same, the annual motion of the earth round the sun is a little retarded; which makes the sun's apparent motion in the ecliptic a little slower than formerly; and, consequently, the moon, in passing from any conjunction with the sun, spends less time before she again overtakes the sun, and forms a subsequent conjunction: in both these cases, the motion of the moon from the sun is really accelerated, and the synodical month actually shortened. Or, 3. The annual motion of the earth, and the periodical revolution of the moon continuing the same, the rotation of the earth round its axis is a little retarded: in this case, days, hours, minutes, seconds, &c. by which all periods of time must be measured, are of a longer duration; and consequently the synodical month will appear to be shortened, though it really contains the same quantity of absolute time as it always did. If the quantity of matter in the body of the sun be lessened by the particles of light continually streaming from it, the motion of the earth round the sun may become slower: if the earth encreases in bulk, the motion of the moon round the earth may be quickened thereby. See **ASTRONOMY**.

ACCELERATOR, *f.* in anatomy, the name of two muscles of the penis, which serve for ejecting the urine or semen. See **ANATOMY**.

To ACCEND, *v. a.* [*accendo*, Lat.] To kindle, to set on fire; a word very rarely used.

ACCENDENTES, a lower order of ministers in the Romish church, whose office is to light and trim the candles.

ACCENDONES,

ACCENDONES, in Roman antiquity, a kind of gladiators, whose office was to excite and animate the combatants during the engagement. The orthography of the word is contested: the first edition of Tertullian, by Rhemanus, has it *accedones*; an ancient manuscript, *accendones*. Aquinas adheres to the former, Pitiscus to the latter. The origin of the word, supposing it *accendones*, is from *accendo*, I kindle; supposing it *accedones*, from *accedo*, I accede, am added to. The former places their distinguishing character in enlivening the combat by their exhortations and suggestions; the latter thinks them to be much the same with what among us are called *seconds*, among the Italians *patroni*; excepting that these latter only stand by to see the laws of the sword duly observed, without intermeddling to give advice or instruction.

ACCENSI, in the Roman armies, certain supernumerary soldiers, designed to supply the places of those who should be killed or disabled. The *accensi*, Livy observes, were placed at the rear of the army, because no great exertions were expected from them: they were taken out of the fifth class of citizens.

ACCENSI, in antiquity, denotes an inferior order of officers, appointed to attend the Roman magistrates, somewhat in the manner of ushers, serjeants, or tipstaves, among us. They were thus called from *accire*, to send for; one part of their office being to call assemblies of the people, summon parties to appear and answer before the judges, &c.

ACCENSI was also an appellation given to a kind of adjutants, appointed by the tribune to assist each centurion and decurion. In which sense, *accensus* is synonymous with *optio*. In an ancient inscription, given by a Torre, we meet **ACCENSUS EQUITUM ROMANORUM**; an office no where else heard of. That author suspects it to be a corruption; and instead thereof reads, *A censibus*.

ACCENSION, *f.* [*accensio*, Lat.] The act of kindling, or the state of being kindled.—The fulminating damp will take fire at a candle, or other flame, and, upon its *accension*, gives a report like the discharge of a gun, and makes an explosion so forcible as sometimes to kill the miners, shake the earth, and force bodies of great weight and bulk from the bottom of the pit or mine. *Woodward.*

ACCENT, *f.* [*accentus*, Lat.] The manner of speaking or pronouncing, with regard either to force or elegance. The sound given to the syllable pronounced. In grammar, the marks made upon syllables, to regulate their pronunciation. Poetically, language or words. A modification of the voice, expressive of the passions or sentiments.

The tender *accent* of a woman's cry
Will pass unheard, will unregarded die;
When the rough seaman's louder shouts prevail,
When fair occasion shews the springing gale. *Prior.*

To **ACCENT**, *v. a.* [*accentus*, Lat.] formerly elevated at the second syllable, now at the first. To pronounce, to speak words with particular regard to the grammatical marks or rules. In poetry; to pronounce or utter in general. To write or note the accents. We generally reckon three grammatical accents in ordinary use, all borrowed from the Greeks, viz. the *acute accent* (´), which shews when the tone of the voice is to be raised. The *grave accent* (`), when the note or tone of the voice is to be depressed. The *circumflex accent* (^ or ˆ), is composed of both the acute and the grave, and points out a kind of undulation of the voice. The Latins have made the same use of these three accents.

The Hebrews have a grammatical, a rhetorical, and musical, accent; though the first and last seem, in effect, to be the same; both being comprised under the general name of *tonic accents*, because they give the proper tone to syllables; as the rhetorical accents are said to be euphonic, because they tend to make the pronunciation more sweet and agreeable. There are four euphonic accents, and twenty-five tonic: of which some are placed above,

and others below, the syllables; the Hebrew accents serving not only to regulate the risings and fallings of the voice, but also to distinguish the sections, periods, and numbers of periods, in a discourse; and to answer the same purposes with the points in other languages. Their accents are divided into *emperors*, *kings*, *dukes*, &c. each bearing a title answerable to the importance of the distinction it makes. Their emperor rules over a whole phrase, and terminates the sense completely; answering to our full-point. Their king answers to our colon; and their duke to our comma. The king, however, occasionally becomes a duke, and the duke a king, as the phrases are more or less short.

As to the Greek accents, now seen both in manuscripts and printed books, there has been no less dispute about their antiquity and use than about those of the Hebrews. Isaac Vossius endeavours to prove them of modern invention; asserting, that anciently they had nothing of this kind, but only a few notes in their poetry, which were invented by Aristophanes the grammarian, about the time of Ptolemy Philopater; and that these were of musical, rather than grammatical, use, serving as aids in the singing of their poems, and very different from those introduced afterwards. He also shews from several ancient grammarians, that the manner of writing the Greek accents in these days was quite different from that which appears in our books.

The use of accents, to prevent ambiguities, is most remarkably perceived in some eastern languages, particularly the Siamese and Chinese. Among the people of China, every word, or (which is the same thing) syllable, admits of five accents, as spoken more acutely or remissly; and thus stands for many different things. The same sound *ya*, according to the accent affixed to it, signifies *God*, a *wall*, *excellent*, *stupidity*, and a *goose*. The Chinese have but 330 spoken words in their language; but these being multiplied by the different accents or tones, which affect the vowels, furnish a language tolerably copious. By means hereof, their 330 simple sounds come to denote 1650 things; but, this being hardly sufficient, they are increased further by aspirates added to each word to double the number. The Chinese only reckon four accents; for which the missionaries use the following marks, *aa*, *à*, *á*, *ä*; to which they have added a fifth, thus, *z*. They make a kind of modulation; wherein, prolonging the duration of the sound of the vowel, they vary the tone, raising and sinking it by a certain pitch of voice: so that their talking is a sort of music or singing. Attempts have been made to determine the quantity of the rise or fall in each accent by means of musical notes; but this is hard to effect, as being different in different persons. Hence the great difficulty of the language to foreigners; they are forced to sing most scrupulously: if they deviate ever so little from the accent, they say quite a different thing from what was intended. Thus, meaning to compliment the person you are speaking to with the title *Sir*, you call him a beast with the same word, only a little varied in the tone.

ACCENT, in music, is a certain enforcement of particular sounds, whether by the voice or instruments, generally used at the beginning of bars.

To **ACCENTUATE**, *v. a.* [*accentuer*, Fr.] To place the proper accents over the vowels.

ACCENTUATION, *f.* The act of placing the accent in pronunciation. Marking the accent in writing.

To **ACCEPT**, *v. a.* [*accipio*, Lat. *accepter*, Fr.] To take with pleasure; to receive kindly; to admit with approbation. It is distinguished from *receive*, as *specific* from *general*; noting a particular manner of receiving.—God is no respecter of persons: but, in every nation, he that feareth him, and worketh righteousness, is *accepted* with him. *Acts*, x. 34.—It is used in a kind of juridical sense; as, to *accept terms*, *accept a treaty*. In the language of the Bible, to *accept persons*, is to act with personal and partial regard. It is sometimes used with the particle *of*—I will

appease him with the present that goeth before me, and afterwards I will see his face; peradventure he will *accept* of me. *Gen.* xxxii. 20.

ACCEPTABILITY, *f.* The quality of being acceptable.—He hath given us his natural blood to be shed for the remission of our sins, and for the obtaining the grace and *acceptability* of repentance. *Taylor*.

ACCEPTABLE, *adj.* [*acceptable*, Fr. from the Latin.] It is pronounced by some with the accent on the first syllable, as by Milton; by others, with the accent on the second, which is more analogical. That which is likely to be accepted; grateful; pleasing. It is used with the particle *to* before the person *accepting*—I do not see any other method left for men of that function to take, in order to reform the world, than by using all honest arts to make themselves *acceptable* to the laity. *Swift*.

ACCEPTABLENESS, *f.* The quality of being acceptable.

ACCEPTABLY, *adv.* In an acceptable manner; so as to please; with the particle *to*.—If you can teach them to love and respect other people, they will, as your age requires it, find ways to express it *acceptably* to every one. *Locke*.

ACCEPTANCE, *f.* [*acceptance*, Fr.] Reception with approbation. The meaning of a word as it is received or understood; *acceptation* is the word now commonly used.

ACCEPTANCE, in law, is as it were a kind of tacit agreement to a preceding act, which might have been defeated and avoided, were it not for such acceptance had. For example: If a bishop before the statute of 1 *Eliz.* leased part of his bishopric for a term of years, reserving rent, and then died; and afterwards another is made bishop, who accepts and receives the rent when due, by this acceptance the lease is made good, which otherwise the new bishop might have avoided. So if *husband and wife*, seised of lands in right of the wife, join and make a lease, reserving rent, and the husband dies, after whose death the wife receives or accepts the rent; by this the lease is confirmed, and it shall bind her. So if *tenant in dower* leases for years, and dies, and the heir accepts the rent. But if a *parson* makes a lease for years not warranted by the statute 32 Hen. VIII. and which consequently is void by his death, acceptance of rent by a new parson or successor will not make it good. 1 *Saund.* 241. And if a *tenant for life* makes a lease for years, there no acceptance will make the lease good, because the lease is void by his death. *Dyer*, 46. 239. But if *tenant in tail* makes a lease for years, rendering rent, and then dies, and the issue accepts the rent, it shall bind him. But if such tenant in tail makes a lease for years to commence after his death, rendering rent; in such case, acceptance of rent by the issue will not make the lease good to bar him, because the lease did not take effect in the life of his ancestor. *Plowd.* 418. If an *infant* accepts of rent at his full age, it makes the lease good, and shall bind him. If a lease is made on condition that the lessee shall do no *waste*, and he commits waste, and afterwards the lessor accepts the rent, he cannot enter for the condition broken; because he thereby affirms the lease to have continuance. 1 *Inst.* 211. If the lessor accepts from his tenant the last rent due to him, and gives the lessee a release for it; all rent in arrear is by law presumed to be satisfied. 1 *Inst.* 373.

Acceptance of a bill of exchange by the person on whom it is drawn (so as to charge the drawer with costs) must be in writing, under or on the back of the bill. But if he accepts it, either verbally or in writing, he thereby makes himself liable to pay it. If he refuses to accept it, and it is of the value of 20l. or upwards, and expressed to be for value received, the person to whom it is made payable, or to whom it is indorsed, may protest it for *non-acceptance*; which protest must be made in writing, under a copy of such bill of exchange, by a notary public; or, if no notary public be resident in the place, then by any other substantial inhabitant in the presence of two witnesses: and notice of such protest must, within fourteen days after, be

given to the drawer. But if the bill be accepted, and afterwards the acceptor fails or refuses to pay it within three days after it becomes due (which three days are called days of grace), the same must for non-payment be protested and notified, in like manner as for non-acceptance. And, on producing the protest, either of non-acceptance or non-payment, the drawer is bound to make good to the payee or indorsee, not only the amount of the bill (which he is bound to do within a reasonable time after non-payment, without any protest, by the rules of the common law), but also interest and all charges, to be computed from the time of making the protest. 2 *Blackst.* 469.

ACCEPTANCE, in the church of Rome, is put for receiving the pope's constitutions.

ACCEPTATION, *f.* Reception, whether good or bad. This large sense now seems wholly out of use.—What is new finds better *acceptation*, than what is good or great. *Denham*.—Good reception, acceptance.—Cain, envious of the *acceptation* of his brother's prayer and sacrifice, slew him; making himself the first manslayer, and his brother the first martyr. *Raleigh*.—The state of being acceptable; regard. Acceptance in the juridical sense: this sense occurs rarely. The meaning of a word, as it is commonly received.

ACCEPTER, *f.* The person that accepts.

ACCEPTILATION, *f.* [*acceptilatio*, Lat.] A term of the civil law, importing the remission of a debt by an acquittance from the creditor, testifying the receipt of money which has never been paid.

ACCEPTION, *f.* [*acceptio*, Fr. from *acceptio*, Lat.] The received sense of a word; the meaning. Not in use.

ACCESS, *f.* [In some of its senses, it seems derived from *accessus*; in others, from *accessio*, Lat. *accès*, Fr.] The way by which any thing may be approached. The means, or liberty, of approaching either to things or men. Encrease, enlargement, addition. It is sometimes used, after the French, to signify the returns or fits of a distemper; but this sense seems yet scarcely received into our language.

ACCESSARINESS, *f.* The state of being accessory.

ACCESSARY, *adj.* [A corruption, as it seems, of the word *accessory*, which see; but now more commonly used than the proper word.] That which, without being the chief constituent of a crime, contributes to it. But it had formerly a good and general sense.

ACCESSIBLE, *adj.* [*accessibilis*, Lat. *accessible*, Fr.] That which may be approached; that which we may reach or arrive at. It is applied both to persons and things, with the particle *to*.—As an island, we are *accessible* on every side, and exposed to perpetual invasions; against which it is impossible to fortify ourselves sufficiently, without a power at sea. *Addison*.

ACCESSION, *f.* [*accessio*, Lat. *accession*, Fr.] Increase by something added, enlargement, augmentation. The act of coming to, or joining one's self to; as, *accession* to a confederacy. The act of arriving at; as, the king's *accession* to the throne.

ACCESSION, in law, is a method of acquiring property, by which, in things that have a close connection or dependence upon one another, the property of the principal thing draws after it the property of the accessory. Thus, the owner of a cow becomes likewise the owner of the calf. It sometimes likewise signifies consent or acquiescence. **ACCESSION**, among physicians, is used for a paroxysm of a disease.

ACCESSORILY, *adv.* In the manner of an accessory.

ACCESSORY, *adj.* Joined to another thing so as to encrease it; additional.

ACCESSORY, *f.* [*accessorius*, Lat. *accessoire*, Fr.] This word, which had anciently a general signification, is now almost confined to forms of law.] Applied to persons:

Now were all transform'd

Alike, to serpents all, as *accessories*
To his bold riot.

Milton.

Applied to things.—An *accessory* is said to be that which does

does accede unto some principal fact or thing in law; and, as such, generally speaking, follows the reason and nature of its principal. *Ayliffe*.

ACCESSORY, in law, is of four kinds. 1. Accessory (quasi accedens ad culpam) is he that is not the chief actor, but one that is concerned in the felony by commandment, aid, or receipt. In the highest capital offence, namely, high-treason, there are no accessories, neither before nor after; for the consenters, aiders, abettors, and knowing receivers and comforters, of traitors, are all principals. 1 *Hale's Hist.* 613.

Also in cases that are criminal, but not capital, as in petit larceny and trespass, there are no accessories; for the accessories before are in the same degree as principals; and accessories after, by receiving the offenders, cannot be in law under any penalties as accessories, unless the acts of parliament that induce those penalties do expressly extend to receivers or comforters, as some do. Accessories therefore relate only to capital felonies; in which cases there may be accessories, either by common law, or by act of parliament.

2. Accessory before the fact committed, is he that, being absent at the time of the felony committed, doth yet procure, counsel, command, or abet, another to commit a felony. For if he is present, although another actually commits the felony, he is a principal offender; as if one present moves another to strike, or if one present did nothing, but yet came to assist the party if needful; or if one hold the party while the felon strikes him; or if one present delivers his weapon to the other that strikes. *Hale's Pleas*, 216.

So if several persons set out together, or in small parties, upon one common design, be it murder or other felony, or for any other purpose unlawful in itself, and each takes the part assigned him, some to commit the fact, others to watch at proper distances and stations to prevent a surprise, or to favour (if need be) the escape of those who are more immediately engaged: they are all, provided the fact be committed, in the eye of the law present at it. For it was made a common cause with them; each man operated in his station at one and the same instant towards the same common end; and the part each man took tended to give countenance, encouragement, and protection, to the whole gang, and to insure the success of their common enterprise. *Foss. Cr. Law*, 350.

3. Accessory after the fact, is, where a person knowing the felony to be committed, relieves, comforts, or assists, the felon. Generally, any assistance whatever given to a felon, to hinder his being apprehended or punished, makes the assister an accessory: as furnishing him with a horse to escape his pursuers, money or victuals to support him, a house or other shelter to conceal him, or open force and violence to rescue or protect him. So likewise to convey instruments to a felon to enable him to break gaol, or to bribe the gaoler to let him escape, makes a man accessory to the felony. 4 *Blackst.* 37.

To buy or receive stolen goods, knowing them to be stolen, falls under none of these descriptions: it was therefore at common law a mere misdemeanor, and made not the receiver accessory to the theft, because he received the goods only, and not the felon. But now, by the statutes 5 An. c. 31. and 4 Geo. c. 11. all such receivers are made accessories, and may be transported for fourteen years; and, in the case of receiving linen goods stolen from the bleaching grounds, are, by the statute 18 Geo. II. c. 27. declared felons without benefit of clergy. *Id.* 38.

4. If the principal and accessory appear together, and the principal pleads the general issue, the accessory shall be put to plead also; and, if he likewise plead the general issue, both may be tried by one inquest: but the principal must be first convicted, and the jury shall be charged, that, if they find the principal not guilty, they shall find the accessory not guilty. But if the principal plead a plea in bar, or abatement, or a former acquittal, the accessory shall not be forced to answer till that plea be determined; for, if it be

found for the principal, the accessory is discharged; if against the principal, yet he shall after plead over to the felony, and may be acquitted. 2 *Haw.* 323. 1 *Hale's Hist.* 624.

In the case of stolen goods, if the principal cannot be taken, the buyer or receiver may be prosecuted as for a misdemeanor, to be punished by fine and imprisonment, or other such corporal punishment as the court shall think fit, although the principal be not convicted; which shall exempt the offender from being punished as accessory, if the principal be afterwards taken and convicted. 1 An. st. 2. c. 9. 5 An. c. 31.

ACCESSORY, among painters, an epithet given to such parts of an history-piece as serve chiefly for ornament, and might have been wholly left out: such as vases, armour, &c.

ACCESSORY NERVES, in anatomy, a pair of nerves, which, arising from the medulla in the vertebrae of the neck, ascend, and enter the skull; and pass out of it again with the par vagum, wrapped up in the same common integument, and, after quitting them, are distributed into the muscles of the neck and shoulders. See ANATOMY.

ACCI, a town of Tarracoenfis, formerly called Acti; supposed to be Guadix, to the east of the city of Granada, at the foot of a mountain, near the source of the rivulet at Guadalantin; now greatly decayed.

ACCIAIOLI (Donata), a man famous for his learning and the honourable employments he possessed in Florence, his native country, in the 15th century. He wrote a Latin translation of some of Plutarch's Lives; Commentaries on Aristotle's Ethics and Politics; and the Life of Charlemagne. He was sent to France by the Florentines, to sue for succour from Louis XI. against Pope Sixtus IV. but on his journey died at Milan; his body was carried to Florence, and buried in the church of the Carthusians. The small fortune he left his children is a proof of his probity and disinterestedness. His daughters, like those of Aristides, were married at the public expence, as an acknowledgment of his services. His funeral eulogium was spoken by Christopher Landini; and an elegant epitaph, by Politian, was inscribed on his tomb.

ACCIDENCE, *f.* [a corruption of *accidents*, from *accidentia*, Lat.] The little book containing the first rudiments of grammar, and explaining the properties of the eight parts of speech.

ACCIDENT, *f.* [*accidens*, Lat.] The property or quality of any being, which may be separated from it, at least in thought. That which happens unforeseen; casualty, chance.—The reformation owed nothing to the good intentions of king Henry. He was only an instrument of it (as logicians speak) by accident. *Swift*.

ACCIDENT, among logicians, is used in a threefold sense. 1. Whatever does not essentially belong to a thing; as the clothes a man wears, or the money in his pocket. 2. Such properties in any subject as are not essential to it; thus whiteness in paper is an accidental quality. 3. In opposition to substance, all qualities whatever are called accidents; as sweetness, softness, &c.

ACCIDENT, in grammar, implies a property attached to a word, without entering into its essential definition; for every word, notwithstanding its signification, will be either primitive, derivative, simple, or compound, which are the accidents of words. A word is said to be primitive, when it is taken from no other word in the language in which it is used: thus *heaven*, *king*, *good*, are primitive words. It is said to be derivative, when it is taken from some other word: thus, *heavenly*, *kingdom*, *goodness*, &c. are derivatives. A simple word is easily distinguished from a compound: thus, *just*, *justice*, are simple words; *unjust*, *injustice*, are compound: *res* is a simple word, as well as *publica*; but *respublica* is a compound. Besides these accidents, which are common to all sorts of words, each particular species has its accidents: thus the accidents of the noun substantive are the gender, declension, and number; and the adjective has another accident, namely, the comparison. See the articles GRAMMAR and LANGUAGE.

ACCIDENT,

ACCIDENT, in heraldry, an additional point or mark in a coat of arms, which may be either omitted or retained without altering the essence of the armour; such as abatement, difference, and tincture.

ACCIDENTAL, *f.* [*accidental*, Fr.] A property non-essential.—Conceive, as much as you can, of the essentials of any subject, before you consider its *accidentals*. *Watts*.

ACCIDENTAL, *adj.* Having the quality of an accident, non-essential; used with the particle *to*, before that in which the accident inheres.—This is *accidental* to a state of religion, and therefore ought to be reckoned among the ordinary difficulties of it. *Tillotson*.—Casual, fortuitous, happening by chance.—Look upon things of the most *accidental* and mutable nature; *accidental* in their production, and mutable in their continuance; yet God's prescience of them is as certain in him, as the memory of them is, or can be, in us. *South*.—In the following passage it seems to signify *adventitious*:

Ay, such a minister as wind to fire,
That adds an *accidental* fierceness to
Its natural fury.

Denham.

ACCIDENTAL, in philosophy, is applied to that effect which flows from some cause intervening by accident, without being subject, or at least without any appearance of being subject, to general laws or regular returns. In this sense, *accident* is opposed to *constant* and *principal*. Thus the sun's place is, with respect to the earth, the constant and principal cause of the heat in summer and the cold in winter; whereas winds, snows, and rains, are the *accidental* causes which often alter and modify the action of the principal cause.

ACCIDENTAL COLOURS, are those which depend upon the affections of the eye, in contradistinction to those which belong to the light itself. The impressions made upon the eye by looking steadfastly at a particular colour are various, according to the single colour or combination of colours in the object; and they continue for some time after the eye is withdrawn, and give a false colouring to other objects. See **LIGHT** and **COLOURS**.

ACCIDENTAL POINT, in perspective, is that point in the horizontal line where the projections of two lines parallel to each other meet the perspective plane.

ACCIDENTALLY, *adv.* After an accidental manner; non-essentially. Casually, fortuitously.—Although virtuous men do sometimes *accidentally* make their way to preferment, yet the world is so corrupted, that no man can reasonably hope to be rewarded in it, merely upon account of his virtue. *Swift*.

ACCIDENTALNESS, *f.* The quality of being accidental.

ACCIDENTS, *f.* in law, are properly relievable in a court of equity. But there are many accidents which are also supplied in a court of law; as, loss of deeds, mistakes in receipts or accounts, wrong payments, deaths which make it impossible to perform a condition literally, and a multitude of other contingencies. And there are many which cannot be relieved even in a court of equity; as, if by accident a recovery is ill suffered, a devise ill executed, a contingent remainder destroyed, or a power of leasing omitted in a family settlement. 3 *Blackst.* 431.

ACCIDENTS, in astrology, denote the most extraordinary occurrences in the course of a person's life, either good or bad: such as a remarkable instance of good fortune, a signal deliverance, a great sickness, &c.

ACCIPENSER, *f.* in ichthyology, a genus of fishes belonging to the Amphibia Nantes of Linnæus. The accipenser has a single linear nostril: the mouth is in the under part of the head, and contains no teeth; the cirri are below the snout, and before the mouth. There are three species of this genus, viz.

1. The ruthenus has 4 cirri and 15 squamous protuberances. It is a native of Russia.

2. The huso has 4 cirri; the body is naked, i. e. has no prickles or protuberances. The skin of the huso is so

tough and strong, that it is employed for ropes in carts and other wheel-carriages; and the ichthyocollo, or isinglass of the shops, famous as an agglutinant, and used also for the fining of wines, is made from its found or scales. The huso is the largest of the genus, and grows to twenty-four feet in length. It inhabits the Danube and the rivers of Russia.

3. The sturio, or sturgeon, with 4 cirri, and 11 squamous protuberances on the back. This fish annually ascends our rivers, but in no great numbers, and is taken by accident in the salmon-nets. It seems a spiritless fish, making no manner of resistance when entangled, but is drawn out of the water like a lifeless lump. It is seldom taken far out at sea, but frequents such parts as are not remote from the estuaries of great rivers. It is admired for the delicacy and firmness of its flesh, which is white as veal, and extremely good when roasted. It is generally pickled. The most we receive comes either from the Baltic rivers or North America. Great numbers are taken during the summer in the lakes Frischehaff, and Curischhaff near Pillau, in large nets made of small cord. The adjacent shores are formed into districts, and farmed out to companies of fishermen, some of which are rented for 6000 guilders, or near 300l. per annum. They are found in vast abundance in the American rivers in May, June, and July; at which time they leap some yards out of the water, and, in falling, make a noise to be heard in still weather at some miles distant. Caviare is made of the roes of this, and also of all other sorts of sturgeons, dried, salted, and packed up close. Ichthyocollo, or isinglass, is likewise made of the sound of this fish, as well as that of the others; but in very small quantity. The sturgeon grows to a great size, to the length of eighteen feet, and to the weight of 500lb. but it is seldom taken in our rivers of that bulk. In the manner of breeding, this fish is an exception among the cartilaginous kind; being, like the bony fish, oviparous, spawning in water.

ACCIPIENT, *f.* [*accipiens*, Lat.] A receiver, perhaps sometimes used for *recipient*.

ACCIPITER, *f.* the name of Linnæus's first order of birds. See **ZOOLOGY**.—Among the Romans, the term *accipiter* signified a hawk; and which, from its being very carnivorous, they considered as a bird of bad omen.

ACCISMUS, *f.* denotes a feigned refusal of something which a person earnestly desires.

Accismus is sometimes considered as a virtue; sometimes as a vice, which Augustus and Tiberius practised with great success. Cromwell's refusal of the crown of England may be brought as an instance of an *accismus*. The word is more particularly used, in rhetoric, as a species of irony.

To ACCITE, *v. a.* [*accito*, Lat.] To call, to summons; a word not now in use.

ACCITUM, anciently a town of Hispania Batica, now Finiana, as appears from an ancient inscription; situate on an eminence of the mountain Alpuxaras in Granada.

ACCIIUS (Lucius), a Latin tragic poet, the son of a freedman, and, according to St. Jerom, born in the consulship of Hostilius Mancinus and Attilius Serranus, in the year of Rome 583. The titles of several of his tragedies are mentioned by various authors. He wrote on the most celebrated stories which had been represented on the Athenian stage; as Andromache, Andromeda, Atreus, Clytemnestra, Medea, Meleager, Philoctetes, the civil wars of Thebes, Tereus, the Troades, &c. He composed one dramatic piece wholly Roman: it was entitled *Brutus*, and related to the expulsion of the Tarquins. He was so much esteemed by the public, that a comedian was punished for only mentioning his name on the stage. Cicero speaks with great derision of one Accius who had written a history; and, as this author had written annals, some insist that he is the person censured: but as Cicero himself, Horace, Quintilian, Ovid, and Paternulus, have spoken of this author with so much applause, we cannot think it is him whom the Roman orator censures with so much severity.

Accius,

ACCIPENSER.

1. The Staric, or Sturgeon. 2. The Ruthens, or Sturgeon of Russia?

Accius, a poet of the 16th century, to whom is attributed "A Paraphrase of Æsop's Fables," on which Julius Scaliger bestows great encomiums.

ACCLAIM, *f.* [*acclamo*, Lat. from which probably first the verb *acclaim*, now lost, and then the noun.] A shout of praise, acclamation:

The herald ends; the vaulted firmament
With loud *acclaims*, and vast applause, is rent. *Dryden.*

ACCLAMATION, *f.* [*acclamatio*, Lat.] A confused noise or shout of joy, by which the public express their applause, esteem, or approbation.

ACCLAMATION, in a more proper sense, denotes a certain form of words, uttered with extraordinary vehemence, and in a peculiar tone somewhat resembling a song, frequent in the ancient assemblies. Acclamations were usually accompanied with applauses, with which they are sometimes confounded: though they ought to be distinguished; as acclamation was given by the voice, applause by the hands; add, that acclamation was also bestowed on persons absent, applause only on those present. Acclamation was also given by women, whereas applause seems to have been confined to men.

Acclamations are of various kinds; ecclesiastical, military, nuptial, senatorial, synodical, scholastic, theatrical, &c. We meet with loud acclamations, musical and rhythmical acclamations; acclamations of joy and respect, and even of reproach and contumely.

Acclamations were not unknown on the theatres in the earliest ages of the Roman commonwealth; but they were artless then, and little other than confused shouts. Afterwards they became a sort of regular concerts. That mentioned by Phædrus, *latere incolumis Roma salvo principe*, which was made for Augustus, and proved the occasion of a pleasant mistake of a flute-player called Princeps, shows that musical acclamations were in use in that emperor's reign. Nero, passionately fond of music, took special care to improve and perfect the music of acclamations. Charmed with the harmony wherewith the Alexandrians, who came to the games celebrated at Naples, had sung his praises, he brought several over to instruct a number of youth, chosen from among the knights and people, in the different kinds of acclamations practised at Alexandria. These continued in use as long as the reign of Theodoric. But the people did not always make a single chorus; sometimes there were two, who answered each other alternately: thus, when Nero played on the theatre, Burrhus and Seneca, who were on either hand, giving the signal by clapping, 5000 soldiers called Augustals, began to chant his praise, which the spectators were obliged to repeat. The whole was conducted by a music-master called *Mesochorus* or *Pausanius*.—To theatrical acclamations may be added those of the soldiery and the people in time of triumph. The victorious army accompanied their general to the capitol; and, among the verses they sung in his praises, frequently repeated "Io Triumphe," which the people answered in the same strain. It was also in the way of acclamation that the soldiers gave their general the title of *Imperator* after some notable victory; a title which he only kept till the time of his triumph.

The acclamations of the senate were somewhat more serious than the popular ones; but arose from the same principle, viz. a desire of pleasing the prince or his favourites; and aimed likewise at the same end, either to express the general approbation and zeal of the company, or to congratulate him on his victories, or to make him new protestations of fidelity. These acclamations were usually given after a report made by some senator, to which the rest all expressed their consent by crying "Omnes, Omnes;" or else, "Equum est, Justum est." Sometimes they began with acclamations, and sometimes ended with them without other debates. It was after this manner that all the elections and proclamations of emperors, made by the senate, were conducted; something of which practice is still retained at modern elections of kings and emperors,

where *Vivat Rex, Vive le Roi, and Long live the King*, are customary forms.

For the acclamations wherewith authors, poets, &c. were received, who recited their works in public; it is to be observed, the assemblies for this purpose were held with great parade in the most solemn places, as the capitol, temples, the Athenæum, and the houses of great men. Invitations were sent every where, in order to make the greater appearance. The chief care was, that the acclamations might be given with all the order and pomp possible. Men of fortune who pretended to wit, kept able applauders in their service, and lent them to their friends. Others endeavoured to gain them by presents and treats. Philostratus mentions a young man named Vavus, who lent money to the men of letters, and forgave the interest to such as applauded his exercises.

The acclamations wherewith the spectators honoured the victories of the athlete, were a natural consequence of the impetuous motions which attended the gymnastic games. The cries and acclamations of the people, sometimes expressing their compassion and joy, sometimes their horror and disgust, are strongly painted by different poets and orators.

Acclamations made also a part of the ceremony of marriage. They were used for the omen's sake; being the *Lata Omina*, sometimes spoken of before marriage in Roman writers.

Acclamations, at first practised in the theatre, and passing thence to the senate, &c. were in process of time received into the acts of councils, and the ordinary assemblies of the church. The people expressed their approbation of the preacher variously; the more usual forms were, "Orthodox! Third Apostle, &c." These acclamations being sometimes carried to excess, and often misplaced, were frequently prohibited by the ancient doctors, and at length abrogated; though they appear to have been in some use as low as the time of St. Bernard.

ACCLAMATION MEDALS, among antiquaries, such as represent the people expressing their joy in the posture of acclamation.

ACCLIVITY, *f.* [*acclivus*, Lat.] The steepness or slope of a line inclining to the horizon, reckoned upwards; as, the ascent of an hill is the *acclivity*, the descent is the declivity.

ACCLIVOUS, *adj.* [*acclivus*, Lat.] Rising with a slope.

To **ACCLOY**, *v. a.* To fill up, in an ill sense; to crowd, to stuff full; a word almost obsolete. To fill to satiety; in which sense *cloy* is still in use.—They that escape best in the temperate zone, would be *accloyed* with long nights, very tedious, no less than forty days. *Ray.*

To **ACCOIL**, *v. n.* To crowd, to keep a coil about, to bustle, to be in a hurry: a word now out of use.

ACCOLADE, *f.* a ceremony anciently used in the conferring of knighthood, and supposed to be the embrace or kiss, which princes anciently gave the new knight, as a token of their affection: whence the word *accolade*; *q. d.* a clapping, or taking round the neck. Others will rather have it to be a blow on the chine of the neck, given on the same occasion. Greg. de Tours writes, that the kings of France, even of the first race, in conferring the gilt shoulder-belt, kissed the knights on the left cheek. For the *accolée*, or blow, John of Salisbury assures us, was in use among the Normans: by this it was that William the Conqueror conferred the honour of knighthood on his son Henry. At first, it was given with the naked fist; but was afterwards changed into a blow with the flat of the sword on the shoulder of the knight.

ACCOLEE, *f.* sometimes synonymous with **ACCOLADE**. It is also used in various senses in heraldry: sometimes it is applied to two things joined; at other times, to animals with crowns, or collars, about their necks, as the lion in the Ogilvy's arms; and, lastly, to kews, battons, maces, swords, &c. placed saltierwise behind the shield.

ACCOLENT, *f.* [*accolens*, Lat.] He that inhabits near a place; a borderer.

ACCOLTI (Bernardo), secretary to the republic of Florence, was surnamed L'Unico, or the Nonsuch, probably from the great extent of his understanding, the variety of sciences he had acquired, and the excellency of his poetic vein; which not only gained him a seat among the academicians of the court of Urbino, but made that great Mecenas, Pope Leo X. in 1520, create him prince of the state of Nepi. He wrote many pieces; among others, a collection of beautiful poems, printed at Venice in 1519 and 1553.

ACCOMMODABLE, *adj.* [*accommodabilis*, Lat.] That which may be fitted; with the particle *to*.—As there is infinite variety in the circumstances of persons, things, actions, times, and places; so we must be furnished with such general rules as are *accommodable* to all this variety, by a wise judgment and discretion. *Watts.*

To ACCOMMODATE, *v. a.* [*accommodo*, Lat.] To supply with conveniences of any kind. It has *with* before the thing. With the particle *to*, to adapt, to fit, to make consistent with. To reconcile; to adjust what seems inconsistent, or at variance; to make consistency appear.

To ACCOMMODATE, *v. n.* To be conformable to.—They make the particular ensigns of the twelve tribes *accommodate* unto the twelve signs of the zodiac. *Brown.*

ACCOMMODATE, *adj.* [*accommodatus*, Lat.] Suitable, fit: used sometimes with the particle *for*, but more frequently with *to*.—They are so acted and directed by nature, as to cast their eggs in such places as are most *accommodate* for the exclusion of their young, and where there is food ready for them as soon as they be hatched. *Ray.*—In these cases we examine the why, the what, and the how, of things, and propose means *accommodate* to the end. *L'Esrange.*

ACCOMMODATELY, *adv.* Suitably, fitly.

ACCOMMODATION, *f.* Provision of conveniences. In the plural, conveniences, things requisite to ease or refreshment. Composition of a difference, reconciliation, adjustment: Adaptation, fitness; with the particle *to*.—The organization of the body, with *accommodation* to its functions, is fitted with the most curious mechanism. *Hale.*

ACCOMMODATION, in a scriptural sense, is the application of one thing, by analogy, to another; or the making two or more things agree with one another. To know a thing by *accommodation*, is to know it by the idea of a similar thing referred thereto. A prophecy of Scripture is said to be fulfilled various ways; properly, as when a thing foretold comes to pass; and improperly, or by way of *accommodation*, when an event happens to any place or people, like to what fell out some time before to another. Thus, the words of Isaiah, spoken to those of his own time, are said to be fulfilled in those who lived in our Saviour's; and are *accommodated* to them: "Ye hypocrites, well did Isaiah prophecy of you, &c." which same words St. Paul afterwards *accommodates* to the Jews of his time.

The primitive church *accommodated* multitudes of Jewish, and even heathen, ceremonies and practices, to Christian purposes; but the Jews had before done the same by the Gentiles: some will even have circumcision, the tabernacle, brazen serpent, &c. to have been originally of Egyptian use, and only *accommodated* by Moses to the purposes of Judaism.

ACCOMPANIER, *f.* The person that makes part of the company; companion.

To ACCOMPANY, *v. a.* [*accompagner*, Fr.] To be with another as a companion. It is used both of persons and things:

Go visit her, in her chaste bower of rest,
Accompany'd with angel-like delights.

Spenfer.

To ACCOMPANY, *v. n.* To associate with; to become a companion to.—No man in effect doth *accompany* with others, but he learneth, ere he is aware, some gesture, voice, or fashion. *Bacon.*

ACCOMPANIMENT, *f.* something attending or add-

ed as a circumstance to another, either by way of ornament, or for the sake of symmetry.

ACCOMPANIMENT, in music, denotes the instruments which accompany a voice, in order to sustain it, as well as to make the music more full. The accompaniment is used in recitative as well as in song; on the stage, as well as in the choir, &c. The ancients had likewise their accompaniments on the theatre; they had even different kinds of instruments to accompany the chorus, from those which accompanied the actors in the recitation.—The accompaniment among the moderns, is frequently a different part or melody from the song it accompanies. It is disputed whether it was so among the ancients. It is generally alleged, that their accompaniments went no farther than the playing in octave, or in antiphony to the voice.

ACCOMPANIMENT, in painting, denotes such objects as are added, either by way of ornament, or probability; as dogs, guns, game, &c. in a hunting-piece.

ACCOMPANIMENT, in heraldry, any thing added to a shield by way of ornament; as the belt, mantling, supporters, &c. It is also applied to several bearings about a principal one; as a saltier, bend, fess, chevron, &c.

ACCOMPLICE, *f.* [*complice*, Fr. from *complex*, a word in the barbarous Latin much in use.] An associate, a partner, usually in an ill sense. A partner, or co-operator; in a sense indifferent. It is used with the particle *to* before a thing, and *with* before a person:

Childless Arturius, vastly rich before,
Thus by his losses multiplies his store,
Suspected for *accomplice* to the fire,
That burnt his palace but to build it higher. *Dryden.*
Who, should they steal for want of his relief,
He judg'd himself *accomplice* with the thief. *Dryden.*

To ACCOMPLISH, *v. a.* [*accomplir*, Fr. from *compleo*, Lat.] To complete, to execute fully; as, to *accomplish* a design. To complete a period of time. To fulfil; as a prophecy. To gain, to obtain. To adorn, or furnish, either mind or body.

ACCOMPLISHED, *part. adj.* Complete in some qualification. Elegant; finished in respect of embellishments; used commonly of acquired qualifications, without including moral excellence.

ACCOMPLISHER, *f.* The person that accomplishes.

ACCOMPLISHMENT, *f.* [*accomplissement*, Fr.] Completion, full performance, perfection. Completion; as, of a prophecy. The act of obtaining or perfecting any thing; attainment; completion. Embellishment, elegance, ornament of mind or body.—Young heirs, and elder brothers, from their own reflecting upon the estates they are born to, and, therefore, thinking all other *accomplishments* unnecessary, are of no manner of use but to keep up their families. *Addison.*

ACCOMPLISHMENT, in a scriptural sense, is principally used in speaking of events foretold by the Jewish prophets in the Old Testament, and fulfilled under the New. We say a literal accomplishment, a mystical or spiritual accomplishment, a single accomplishment, a double accomplishment, a Jewish accomplishment, a Christian, a heathen, accomplishment. The same prophecy is sometimes accomplished in all, or in several of those different ways. Thus, of some of the prophecies of the Old Testament, the Jews find a literal accomplishment in their own history, about the time when the prophecy was given: the Christians find another in Christ, or the earliest days of the church; the heathens another, in some of their emperors; the Mahometans another, in their legislator, &c. There are two principal ways of accomplishing a prophecy; *directly*, and by *accommodation*. See **ACCOMMODATION** and **PROPHECY**.

ACCOMPT, *f.* [*Fr. compteur* and *compte*, anciently *acompter*.] An account, a reckoning. See **ACCOUNT**.

To ACCORD, *v. a.* [derived by some from *corda*, the string of a musical instrument, by others from *corda*, hearts; in the first implying *harmony*, in the other *unity*.] To make agree;

agree; to adjust one thing to another; with the particle *to*. To bring to agreement; to compose; to accommodate.

TO ACCORD, v. n. To agree, to suit one with another; with the particle *with*.—Several of the main parts of Moses's history, as concerning the flood, and the first fathers of the several nations of the world, do very well *accord with* the most ancient accounts of profane history. *Tillotson*.

ACCORD, f. [*accord*, Fr.] A compact; an agreement; adjustment of a difference. Concurrence, union of mind. Harmony, symmetry, just correspondence of one thing with another.—Beauty is nothing else but a just *accord* and mutual harmony of the members, animated by a healthful constitution. *Dryden*.—Own *accord*; voluntary motion: used both of persons and things. Action in speaking, correspondent to the words.

ACCORD, in law, is an agreement between the party injuring and the party injured, where one is injured by a trespass or offence done, or on a contract, to satisfy him with some recompence; which, if executed and performed, shall be a good bar in law, if the other party after the accord performed bring any action for the same. As if a man contract to build a house, or to deliver a horse, and fail in it; this is an injury, for which the sufferer may have his remedy by action: but, if the party injured accepts a sum of money or other thing as a satisfaction, this is a redress of that injury, and entirely takes away the action. 3 *Blackst* 15.

The accord must be executed before the action be commenced; and therefore an accord to do a thing at a day to come is not good. But, if it be executed before the action commenced, it is good, although it was executory only at the time of the accord. 1 *Roll's Rep.* 129.

If a man plead an accord, the safest way is to plead it as a satisfaction, and not by way of accord; and therefore he need say no more than that the defendant gave so much to the plaintiff in satisfaction, which the plaintiff received. 9 *Co.* 80.

The defendant must plead that the plaintiff accepted the thing agreed upon in full satisfaction; and, if it be on a bond, it must be in satisfaction of the money mentioned in the condition, and not of the bond itself, for that cannot be discharged but by writing under hand and seal. *Cro. Ja.* 254.

ACCORD, in painting, is the harmony that reigns among the lights and shades of a picture.

ACCORDANCE, f. Agreement with a person; with the particle *with*. Conformity to something.—The only way of defining of sin, is, by the contrariety to the will of God; as of good, by the *accordance with* that will. *Hammond*.

ACCORDANT, adj. [*accordant*, Fr.] Willing; in a good humour. Not in use.

ACCORDING, prep. [from *accord*, of which it is properly a participle, and is therefore never used but with *to*.] In a manner suitably to, agreeably to, in proportion.—Our zeal, then, should be *according to* the whole gospel: not only *according to* its truths, but precepts: not only *according to* its free grace, but necessary duties: not only *according to* its mysteries, but also its commandments. *Sprat*.—With regard to. In proportion. The following phrase is, I think, vicious:—A man may, with prudence and a good conscience, approve of the professed principles of one party more than the other, *according as* he thinks they best promise the good of church and state. *Swift*.

ACCORDINGLY, adv. Agreeably, suitably, conformably.—Mealy substances, fermented, turn sour. *Accordingly*, given to a weak child, they still retain their nature; for bread will give them the cholick. *Arbutnot*.

ACCORDS (Stephen Tabourot, Seigneur des), advocate in the parliament of Dijon in France, and king's advocate in the bailiwick and chancery of that city, born in the year 1549. He was a man of genius and learning. His work, intitled "Les Touches," was published at Paris in 1585; which is indeed a collection of witty poems,

but worked up rather in too loose a manner, according to the licentious taste of that age. His Bigarrures are written in the same strain. He was censured for this way of writing, which obliged him to publish an apology. The lordship of Accords is an imaginary fief or title from the device of his ancestors, which was a drum, with the motto, *à tous accords*, "chiming with all." He had sent a sonnet to a daughter of M. Begat, the great and learned president of Burgundy, "who (says he) did me the honour to love me:—And, inasmuch (continues he), as I had subscribed my sonnet with only my device, *à tous accords*, this lady first nicknamed me, in her answer, *Seigneur des Accords*; by which title her father also called me several times. For this reason I chose this surname, not only in all my writings composed at that time, but even in these books." He died July 24th, 1561, in the 46th year of his age.

TO ACCOST, v. a. [*accoster*, Fr.] To speak to first; to to address; to salute.—You mistake, knight: *accost* her, front her, board her, woo her, assail her. *Shakespeare*.

ACCONSTABLE, adj. Easy of access; familiar. Not in use.—They were both indubitable, strong, and high-minded, men, yet of sweet and *acconstable* nature, almost equally delighting in the press and affluence of dependents and suitors. *Wotton*.

ACCOUNT, f. [from the old French *acompt*, from *computus*, Lat. It was originally written *acompt*; but, by gradually softening the pronunciation, in time the orthography changed to *account*.] A computation of debts or expences; a register of facts relating to money. The state or result of a computation; as, the *account* stands thus between us. Such a state of persons or things, as may make them more or less worthy of being considered in the reckoning. Value, or estimation.—I should make more *account* of their judgment, who are men of sense, and yet have never touched a pencil, than of the opinion given by the greatest part of painters. *Dryden*.—Profit; advantage: to *turn to account*, is to produce advantage.—We would establish our souls in such a solid and substantial virtue, as will *turn to account* in that great day, when it must stand the test of infinite wisdom and justice. *Addison*.—Distinction, dignity, rank.—There is such a peculiarity in Homer's manner of apostrophizing Eumæus: it is generally applied, by that poet, only to men of *account* and distinction. *Pope*.—A reckoning verified by finding the value of a thing equal to what it was accounted.—Considering the usual motives of human actions, which are pleasure, profit, and ambition, I cannot yet comprehend how those persons find their *account* in any of the three. *Swift*.—A reckoning referred to, or sum charged upon, any particular person; and thence, figuratively, regard; consideration; sake.—This must be always remembered, that nothing can come into the *account* of recreation, that is not done with delight. *Locke*.—Nothing can recommend itself to our love, on any other *account*, but either as it promotes our present, or is a means to assure to us a future, happiness. *Rogers*.—A narrative, relation; in this use it may seem to derived from *conte*, Fr. a tale, a narration. The review or examination of an affair taken by authority; as, the magistrate took an *account* of the tumult. The relation and reasons of a transaction given to a person in authority.—The true ground of morality can only be the will and law of a God who sees men in the dark, has in his hands rewards and punishments, and power enough to call to *account* the proudest offender. *Locke*.—Explanation; assignment of causes.—It is easy to give *account*, how it came to pass, that, though all men desire happiness, yet their wills carry them contrarily. *Locke*.—An opinion previously established.—A prodigal young fellow, that had sold his clothes, upon the sight of a swallow, made *account* that summer was at hand, and away went his shirt too. *L'Estrange*.—The reasons of any thing collected.—Being convinced, upon all *accounts*, that they had the same reason to believe the history of our Saviour, as that of any other person to which they themselves were not actually eye-witnesses,

witnesses, they were bound, by all the rules of historical faith, and of right reason, to give credit to this history. *Addison.*

ACCOUNT, in law, is a writ or action, commanding the defendant to render a just account to the plaintiff, or shew to the court good cause to the contrary. In this action, if the plaintiff succeeds, there are two judgments; the first is, that the defendant do account (*quod computet*) before auditors appointed by the court; and, when such account is finished, then the second judgment is, that he pay to the plaintiff so much as he is found in arrear. This action, by the old common law, laid only against the parties themselves, and not their executors; because matters of account rested solely in their own knowledge. But this defect was remedied by statute 4 Anne, c. 16. which gives an action of account against the executors and administrators. But however it is found by experience, that the most ready and effectual way to settle these matters of account, is by bill in a court of equity, where a discovery may be had on the defendant's oath, without relying merely on the evidence which the plaintiff may be able to produce. Therefore actions of account, to compel a man to bring in and settle his accounts, are now very seldom used; though, when an account is once stated, nothing is more common than an action upon the implied *assumpsit* to pay the balance. *3 Blackst. 162.*

A plea of a stated account is bad, unless it shews the account was in writing, and what the balance was. *2 Atk. 399.*

A stated account is not an extinguishment of the original debt; therefore it cannot be pleaded in bar of an action for the debt. *Bur. Mansf. 9.*

ACCOUNT is taken sometimes, in a particular sense, for the computation of time: thus we say, "the Julian Account, the Gregorian Account, &c." in which sense it is equivalent to *style*.

To ACCOUNT, v. a. To esteem, to think, to hold in opinion. To reckon, to compute.—Neither the motion of the moon, whereby months are computed, nor the sun, whereby years are accounted, consisteth of whole numbers. *Brown.*—To assign to, as a debt; with the particle *to*.—For some years really accrued the yearly sum of two hundred thousand pounds to the king's coffers; and it was, in truth, the only project that was accounted to his own service. *Clarendon.*—To hold in esteem; with *of*.—Silver was nothing accounted of in the days of Solomon. *Chron.*

To ACCOUNT, v. n. To reckon. To give account, to assign the causes; in which sense it is followed by the particle *for*.—If any one should ask, why our general continued so easy to the last? I know no other way to account for it, but by that unmeasurable love of wealth, which his best friends allow to be his predominant passion. *Swift.*—To make up the reckoning; to answer; with *for*.

Then thou shalt see him plung'd, when least he fears,
At once accounting for his deep arrears. *Dryden.*

To appear as the medium, by which any thing may be explained.—Such as have a faulty circulation through the lungs, ought to eat very little at a time; because the increase of the quantity of fresh chyle must make that circulation still more uneasy; which, indeed, is the case of consumptive and some asthmatic persons, and accounts for the symptoms they are troubled with after eating. *Arbutnot.*

ACCOUNTABLE, adj. Of whom an account may be required; who must answer for: followed by the particle *to* before the person, and *for* before the thing:

Accountable to none,

But to my conscience and my God alone. *Oldham.*

The good magistrate will make no distinction; for the judgment is God's; and he will look upon himself as accountable at his bar for the equity of it. *Atterbury.*

ACCOUNTANT, adj. Accountable to; responsible for. Not in use.

ACCOUNTANT, f. A computer; a man skilled or employed in accounts.—In a more restricted sense, it is applied

to a person, or officer, appointed to keep the accounts of a public company or office; as the South-Sea and the India Companies, the Bank, the Exchequer, &c.

ACCOUNTANTSHIP, f. The art of keeping and balancing accounts. See **BOOK-KEEPING**.

ACCOUNTANT-GENERAL, f. an officer in the court of Chancery appointed by act of parliament to receive all moneys lodged in the court instead of the masters, and convey the same to the bank of England for security.

ACCOUNT-BOOK, f. A book containing accounts.

ACCOUNTING, f. The act of reckoning, or making up of accounts.—This method faithfully observed, must keep a man from breaking, or running behind-hand in his spiritual estate; which, without frequent accountings, he will hardly be able to prevent. *South.*

To ACCOUPLE, v. a. [*accoupler, Fr.*] To join, to link together. We now use *couple*.

To ACCOURAGE, v. a. To animate. Now obsolete.

To ACCOURT, v. a. To entertain with courtship, or courtesy. Not now in use.

To ACCOUTRE, v. a. [*accoutrer, Fr.*] To dress; to equip.

ACCOUTREMENT, f. [*accoutrement, Fr.*] Dress, equipage, furniture relation to the person; trappings, ornaments:

How gay, with all th' accoutrements of war,
The Britons come, with gold well-fraught. *Phil.*

ACCRETION, f. [*accretio, Lat.*] The act of growing to another, so as to increase it.—Plants do nourish; inanimate bodies do not: they have an *accretion*, but no alimantation. *Bacon.*

ACCRETION, in physics, the increase or growth of an organic body, by the accession of new parts. See **NUTRITION, PLANTS, and VEGETABLES**.

ACCRETION, among civilians, the property acquired in a vague or unoccupied thing, by its adhering to or following another already occupied: thus, if a legacy be left to two persons, one of whom dies before the testator, the legacy devolves to the survivor by right of accretion.

ACCRETIVE, adj. Growing; that which by growth is added.—If the motion be very slow, we perceive it not: we have no sense of the *accretive* motion of plants and animals; and the fly shadow steals away upon the dial; and the quickest eye can discover no more but that it is gone. *Glanville.*

To ACCROACH, v. a. [*acrocher, Fr.*] To draw to one as with a hook; to gripe; to draw away by degrees what is another's.

ACCROACHMENT, f. The act of accroaching.

ACCROCHE, f. in heraldry, denotes a thing's being hooked with another.

To ACCRUE, v. n. [from the participle *accrû*, formed from *accroître, Fr.*] To accede to, to be added to; as, a natural production or effect, without any particular respect to good or ill. To be added, as an advantage or improvement, in a sense inclining to good rather than ill; in which meaning it is more frequently used by later authors. To append to, to arise from: as, an ill consequence; this sense seems to be less proper. In a commercial sense, to be produced, or arise; as, profits. To follow, as loss; a vicious use.

ACCUBATION, f. a posture of the body, between sitting and lying. The word comes from the Latin *accubare*, compounded of *ad*, to, and *cubo*, I lie down. *Accubation*, or *accubitus*, was the table-posture of the Greeks and Romans; whence we find the words particularly used for the lying, or rather (as we call it) sitting, down to meat. The Greeks introduced this posture. The Romans, during the frugal ages of the republic, were strangers to it: but, as luxury got footing, this posture came to be adopted, at least by the men; for, as to women, it was reputed an indecency in them to lie down among the men: though, afterwards, this too was got over. But children did not lie down, nor servants, nor soldiers, nor persons of meaner condition,

condition, but took their meals sitting, as a posture less indulgent. The Roman manner of disposing themselves at table was this: A low round table was placed in the cœnaculum, or dining-room; and, about this, usually three, sometimes only two, beds or couches; according to the number of which, it was called *biclinium* or *triclinium*. These were covered with a sort of bed-clothes, richer or plainer according to the quality of the person, and furnished with quilts and pillows, that the guests might lie the more commodiously. There were usually three persons on each bed; to crowd more, was esteemed fordid. In eating, they lay down on their left sides, with their heads resting on the pillows, or rather on their elbows. The first lay at the head of the bed, with his feet extended behind the back of the second; the second lay with the back of his head towards the navel of the first, only separated by a pillow, his feet behind the back of the third; and so of the third, or fourth. The middle place was esteemed the most honourable. Before they came to table, they changed their clothes, putting on what they called *canatorii vestis*, the dining-garment; and pulled off their shoes, to prevent fouling the couch.

ACCUBITOR, *f.* an ancient officer of the emperors of Constantinople, whose business was to lie near the emperor. He was the head of the youth of the bed-chamber, and had the *cubicularis* and *procubitor* under him.

To **ACCUMB**, *v. a.* [*accumbo*, Lat.] To lie at table according to the ancient manner.

ACCUMBENT, *adj.* [*accumbens*, Lat.] Leaning.—The Roman recumbent, or, more properly, *accumbent*, posture in eating, was introduced after the first Punic war. *Arbutnot.*

To **ACCUMULATE**, *v. a.* [from *accumulo*, Lat.] To heap one thing upon another; to pile up, to heap together. It is used either literally, as, to *accumulate* money; or figuratively, as, to *accumulate* merit or wickedness:

If thou dost slander her, and torture me,
Never pray more; abandon all remorse;
On horror's head horrors *accumulate*;
For nothing canst thou to damnation add. *Shakespeare.*

ACCUMULATION, *f.* The act of accumulating. The state of being accumulated.

ACCUMULATION OF DEGREES, in an university, is the taking several of them together, or at smaller intervals than usual or than is allowed by the rules of the university.

ACCUMULATIVE, *adj.* That which accumulates. That which is accumulated.

ACCUMULATOR, *f.* He that accumulates; a gatherer or heaper together.—Injuries may fall upon the passive man, yet, without revenge, there would be no broils and quarrels, the great *accumulators* and multipliers of injuries.

ACCURACY, *f.* [*accuratio*, Lat.] Exactness, nicety.—Quickness of imagination is seen in the invention, fertility in the fancy, and the *accuracy* in the expression. *Dryden.*

ACCURATE, *adj.* [*accuratus*, Lat.] Exact, as opposed to negligence or ignorance, applied to persons. Exact, without defect or failure, applied to things. Determinate; precisely fixed.

ACCURATELY, *adv.* In an accurate manner; exactly, without error, nicely.—That all these distances, motions, and quantities of matter, should be so *accurately* and harmoniously adjusted in this great variety of our system, is above the fortuitous hits of blind material causes, and must certainly flow from that eternal fountain of wisdom. *Bentley.*

ACCURATENESS, *f.* Exactness, nicety.

To **ACCURSE**, *v. a.* To doom to misery; to invoke misery upon any one.

ACCURSED, *part. adj.* That which is cursed or doomed to misery. That which deserves the curse; execrable; hateful; detestable; and, by consequence, wicked; malignant.—In the Jewish idiom, *accursed* and *crucified* were synonymous. Among them every one was accounted ac-

cursed who died on a tree. This serves to explain the difficult passage in Rom. ix. 3. where the apostle Paul wishes himself “accursed after the manner of Christ,” i. e. crucified, if happily he might by such a death save his countrymen. The preposition *απο* here made use of, is used in the same sense, 2 Tim. i. 3. where it obviously signifies “after the manner of.”

ACCURSIUS, a law-professor in the 13th century, born in Florence. His authority was for some time so great, that he was called the Idol of the Lawyers.—Other three lawyers of note had the same name.

ACCURSIUS (Mariangelus), a famous critic of the 16th century, born at Aquilo in the kingdom of Naples. His *Diatresbes*, printed at Rome in folio, in 1524, on Ovid and Solinus, are a proof of his abilities in that kind of erudition. In his edition of Ammianus Marcellinus there are five books more than in any of the preceding ones; and he affirms he had corrected 5000 errors in that historian. His predominant passion was the searching for and collecting of old manuscripts: yet he made Latin and Italian verses; was complete master of the French, German, and Spanish, tongues; and understood optics and music. He purged himself by oath, being charged for being a plagiarist with regard to his Ausonius; it being reported, that he had appropriated to himself the labours of Fabricio Varana, bishop of Camerino.

ACCUSABLE, *adj.* That which may be censured; blameable; culpable.

ACCUSATION, *f.* The act of accusing. The charge brought against any one by the accuser. In the sense of the courts it is a declaration of some crime preferred before a competent judge, in order to inflict some judgment on the guilty person.—Writers on politics treat of the benefit and the inconveniences of public accusations. Various arguments are alleged, both for the encouragement and discouragement of accusations against great men. Nothing, according to Machiavel, tends more to the preservation of a state, than frequent accusations of persons trusted with the administration of public affairs. This, accordingly, was very strictly observed by the Romans, in the instances of Camillus, accused of corruption by Manlius Capitolinus, &c. Accusations, however, in the judgment of the same author, are not more beneficial than calumnies are pernicious; which is also confirmed by the practice of the Romans. Manlius, not being able to make good his charge against Camillus, was cast into prison.

By the Roman law, there was no public accuser for public crimes; every private person, whether interested in the crime or not, might accuse, and prosecute the accused to punishment, or absolution. Cato, the most innocent person of his age, had been accused forty-two times, and as often absolved. But the accusation of private crimes was never received but from the mouths of those who were immediately interested in them. None, for example, but the husband could accuse the wife of adultery.

The ancient Roman lawyers distinguished between *postulatio*, *delatio*, and *accusatio*. For, first, leave was desired to bring a charge against one, which was called *postulare*: then he against whom the charge was laid, was brought before the judge; which was called *deferre*, or *nominis delatio*: lastly, the charge was drawn up and presented, which was properly the *accusatio*. The accusation properly commenced, according to Pædianus, when the *reus* or party charged, being interrogated, denied he was guilty of the crime, and subscribed his name to the *delatio* made by his opponent.

In Britain, by Magna Charta, no man shall be imprisoned or condemned on any accusation, without trial by his peers, or the law; none shall be vexed with any accusation, but according to the law of the land; and no man may be molested by petition to the king, &c. unless it be by indictment or presentment of lawful men, or by process at common law. Promoters of suggestions, are to find surety to pursue them; and, if they do not make them good, shall pay damages to the party accused, and also a

fine to the king. No person is obliged to answer upon oath to a question whereby he may accuse himself of any crime.

ACCUSATIVE, *adj.* [*accusativus*, Lat.] A term of grammar, signifying the relation of the noun, on which the action implied in the verb terminates; and hence, in such languages as have cases, these nouns have a particular termination, called *accusative*: as, *Augustus vicit Antonium*, Augustus vanquished Antony. Here *Antonium* is the noun, on which the action implied in the verb *vicit* terminates; and, therefore, must have the accusative termination. Ovid, speaking of the palace of the sun, says, *Materiem superabat opus*, The work surpassed the materials. Here *materiem* has the accusative termination; because it determines the action of the verb *superabat*.—In the English language there are no cases, except the genitive; the relation of the noun being shewn by the assistance of prepositions, as *of*, *to*, *from*, &c.

ACCUSATORY, *adj.* That which produceth or containeth an accusation.—In a charge of adultery, the accuser ought to set forth, in the *accusatory* libel, some certain and definite time. *Ayliffe*.

To **ACCUSE**, *v. a.* [*accuso*, Lat.] To charge with a crime. It requires the particle *of* before the subject of accusation:

He stripp'd the bear's-foot of its leafy growth;
And, calling western winds, *accus'd* the spring of sloth.
Dryden.

It sometimes admits the particle *for*.—Never send up a leg of a fowl at supper, while there is a cat or dog in the house that can be *accus'd for* running away with it: but, if there happen to be neither, you must lay it upon the rats, or a strange greyhound. *Swift*.—To blame or censure, in opposition to applause or justification.—Their conscience bearing witness, and their thoughts the mean while *accusing* or else excusing one another. *Rom. ii. 15*.

ACCUSER, *f.* He that brings a charge against another.—There are some persons forbidden to be *accusers*, on the score of their sex, as women; others, of their age, as pupils and infants; others, upon the account of some crimes committed by them; and others, on the score of some filthy lucre they propose to gain thereby; others, on the score of their conditions, as libertines against their patrons; and others, through a suspicion of calumny, as having once already given false evidence; and, lastly, others on account of their poverty, as not being worth more than fifty aurei. *Ayliffe*.

ACCUSIORUM COLONIA, anciently an inland town in the Cavares, in Gallia Narbonensis: now Grenoble, in Dauphiné. See **GRENOBLE**.

To **ACCUSTOM**, *v. a.* [*accoutumer*, Fr.] To habituate, to enure, with the particle *to*. It is used chiefly of persons:

How shall we breathe in other air
Lefs pure, *accustom'd* to immortal fruits? *Milton*.

To **ACCUSTOM**, *v. n.* To be wont to do any thing. Obsolete.—A boat over-freighted sunk, and all drowned, saving one woman, that in her first popping up again, which most living things *accustom*, got hold of the boat. *Carew*.

ACCUSTOMABLE, *adj.* Of long custom or habit; habitual, customary.—Animals even of the same original, extraction, and species, may be diversified by *accustomable* residence in one climate, from what they are in another. *Hale*.

ACCUSTOMABLY, *adv.* According to custom.—Touching the king's fines *accustomably* paid for the purchasing of writs original, I find no certain beginning of them, and do therefore think that they grew up with the chancery. *Bacon*.

ACCUSTOMANCE, *f.* [*accoutumance*, Fr.] Custom, habit, use.—Through *accustomance* and negligence, and perhaps some other causes, we neither feel it in our own bodies, nor take notice of it in others. *Boyle*.

ACCUSTOMARILY, *adv.* In a customary manner; according to common or customary practice.

ACCUSTOMARY, *adj.* [from *accustom*.] Usual, practiced; according to custom.

ACCUSTOMED, *adj.* [from *accustom*.] According to custom; frequent; usual.—Look how she rubs her hands. It is an *accustomed* action with her, to seem thus washing her hands: I have known her continue in this a quarter of an hour. *Shakespeare*.

ACE, *f.* [As not only signified a piece of money, but any integer, from whence is derived the word *ace*, or unit. Thus *as* signified the whole inheritance. *Arbutnot on coins*.]—An unit; a single point on cards or dice.—When lots are shuffled together in a lap, urn, or pitcher; or if a man blindfold casts a die, what reason in the world can he have to presume, that he shall draw a white stone rather than a black, or throw an *ace* rather than a six. *South*.—A small quantity; a particle; an atom.—I'll not wag an *ace* farther; the whole world shall not bribe me to it. *Dryden*.

ACELUM, or **ACELIUM**, anciently a town of the Venetian territory, now called *Azolo*, situated to the west of Treviso, at the source of the rivulet Mufone. E. lon. 13°. N. lat. 45°.

ACENTETUM, or **ACANTETA**, in natural history, a name given by the ancients to the purest and finest kind of rock-crystal. They used the crystal in many ways; sometimes engraving on it, and sometimes forming it into vases and cups, which were held next in value to the *vasa murrhina* of those times. The crystal they obtained from the island of Cyprus was much esteemed; but often faulty in particular parts, having hairs, cracks, and foulnesses, which they called *salts*, in the middle of the large pieces. Pliny tells us, that, when it was used for engraving on, the artist could conceal all these blemishes among the strokes of his work; but, when it was to be formed into cups or precious vases, they always chose the acentetum which had no flaws or blemishes.

ACEPHALI, or **ACEPHALITÆ**, a term applied to several sects who refused to follow some noted leader. Thus the persons who refused to follow either John of Antioch or St. Cyril, in a dispute that happened in the council of Ephesus, were termed *Acephali*, without a head or leader. Such bishops, also, as were exempt from the jurisdiction and discipline of their patriarch, were stiled *Acephali*.

ACEPHALI, the levellers in the reign of king Henry I. who acknowledged no head or superior. They were reckoned so poor, that they had not a tenement by which they might acknowledge a superior lord.

ACEPHALOUS, *adj.* [*ακεφαλος*, Gr.] Without a head. The term is more particularly used in speaking of certain nations, or people, represented by ancient naturalists and cosmographers, as well as by some modern travellers, as formed without heads; their eyes, mouths, &c. being placed in other parts.

Such are the Blemmyes, a nation of Africa near the head of the Niger, represented to be by Pliny and Solinus; *Blemmyes traduntur capita abesse, ore et oculis pectore affixis*. Ctesias and Solinus mention others in India near the Ganges, *sine cervice, oculos in humeris habentes*. Mela also speaks of people, *quibus capita et vultus in pectore sunt*. And Suidas, Stephanus Byzantinus, Vopiscus, and others after them, relate the like. Some modern travellers still pretend to find acephalous people in America.

Several opinions have been framed as to the origin of the fable of the Acephali. The first is that of Thomas Bartholin, who turns the whole into a metaphor; being convinced, that the name Acephali was anciently given to such as had less brain, or conducted themselves less by the rules of prudence, than others. Olearius rather apprehends, that the ancient voyagers, viewing certain barbarous people from the coasts, had been imposed on by their uncouth dress; for that the Samogitians, being short of stature, and going in the severity of winter with their heads covered in hoods, seem at a distance as if they were headless.

headless. F. Lafitan says, that by *Acephali* are only meant, people whose heads are sunk below their shoulders. In effect, Hulfius, in his epitome of Sir Walter Raleigh's voyage to Guiana, also speaks of a people which that traveller found in the province of Iripinama, between the lakes of Panama and Cassipa, who had no head or neck; and Hondius, in his map, marks the place with the figures of these monsters. Yet De Laet rejects the story; being informed by others, that the inhabitants of the banks of the Caora, a river that flows out of the lake of Cassipa, have their head so far sunk between their shoulders, that many believed they had their eyes in their shoulders and their mouths in their breasts.

But, though the existence of a nation of *Acephali* be ill warranted, naturalists furnish several instances of individuals born without heads, by some lusus or aberration of nature. Wepfer gives a catalogue of such acephalous births, from Schenckius, Licetus, Paræus, Wolfius, Mauriceau, &c.

ACEPHALUS, an obsolete term for the tænia or tapeworm, which was long supposed to be acephalous. See **TÆNIA**. The first who gave it a head was Tulpius; and after him, Fehr: the former even makes it *biceps*, or two-headed.

ACEPHALUS, is also used to express a verse defective in the beginning.

ACER, *f.* [according to some from *acris*, on account of the hardness of the wood: according to others, from *acre ingenium*, because it was much employed by ingenious artificers in fine works,] the **MAPLE-TREE**. This belongs to the polygamia monœcia class, and ranks in the natural order of trihilatæ. The generic character of the hermaphrodite flowers are—Calyx: perianth one-leaved, five-cleft, acute, coloured, flat and entire at the base, permanent. Corolla: petals five, ovate, broader outward, obtuse, scarcely larger than the calyx, spreading. Stamina: filaments eight, subulate, short. Antheræ simple: pollen cruciform. Pistillum: germ compressed, immersed in a convex perforated large receptacle. Style filiform, advancing in height daily. Stigmas two (or three) pointed, slender, reflex. Pericarpium: capsules the number of the stigmas, coalescent at the base, roundish, compressed, each terminated by a very large membranous wing. Seeds: solitary, roundish. The male flowers are the same with the hermaphrodites, except that they have neither germ nor style, but only a bifid stigma. On the first unfolding of the flower, the stigma only appears; and, a few days after, the style. Hermaphrodite flowers in the same umbel are often of two kinds: the lower ones feminine hermaphrodites, of which the antheræ do not burst, but the pistil grows into a fruit; the upper ones masculine hermaphrodites, of which the antheræ scatter their dust, and the pistils do not grow, but fall off.—*Essential Character.* Calyx, five-cleft; corolla, five-petalled; stamina, eight (or ten); germs, two (or three) superior; style, simple; capsule, two (sometimes three) with one seed in each, terminated by a wing; males, without germ or style.

The genus acer or maple consists entirely of trees, most of them yielding a saccharine juice from the trunk, branches, and leaves. All, except the two last, have simple leaves, generally palmate, or else divided into three or five lobes. The flowers are either in racemes or corymbs, commonly from the sides of the twigs; of an herbaceous or yellowish-green colour (except in the fourth): there are males and imperfect hermaphrodites, either mixed with or distinct from the perfect flowers. Sometimes the petals are wanting, or else they resemble the leaflets of the calyx so as scarcely to be distinguished from them. Two united winged capsules generally succeed to each perfect flower; but sometimes there are three.

Species. 1. *Acer sempervirens*, evergreen-maple: leaves ovate, quite entire, evergreen. Mr. Miller describes this species as a shrub, with the leaves of the colour and consistence of box. It was sent him from the Duke d'Ayen's garden; and he had the seeds from the Levant. Lin-

neus retains this as a distinct species: it appears to be but a variety, though a remarkable one, of the Cretan maple.

2. *Acer tartaricum*, Tartarian maple: leaves heart-shaped, undivided serrate, lobes obscure; flowers in racemes. It is an inhabitant of southern Russia; by the Tanais, Volga, &c. The wood is whitish, with some brownish veins. The seeds are used as astringents by the Calmuc Tartars, boiled with milk and butter. Linnæus describes this as a lofty shrub, or rather a low tree, not exceeding twenty feet in height; with leaves like those of hornbeam, having scarcely any apparent lobes: with flowers in racemes; as in the great maple, but the raceme compound, and the flowers petaloid. They appear early, and are sometimes followed by ripe seeds in our gardens.

3. *Acer pseudoplatanus*, or great maple: leaves five-lobed, unequally serrate, flowers in racemes. It grows wild in Switzerland, Germany, Austria, and Italy, in mountainous situations. With us it is vulgarly called the *ycamore-tree*, and by some mock-plane. In Scotland it is known by the appellation of plane-tree. It grows to a great height, has frequently a clean straight bole and a spreading top. It is in leaf by the middle of April; and on their first appearance the leaves are of a pleasant green, but they exude a clammy juice so abundantly, that they attract a variety of insects, which soon perforate and disfigure them. The bunches of flowers are in full blow within a fortnight after the appearance of the leaves; but, being of an herbaceous colour, they make no great appearance. The great maple was formerly much planted for walks and avenues, but has lately given way to better or more tightly trees. This, however, the Norway, and some of the rest, are peculiarly proper to make plantations near the sea, or to shelter other trees in that situation; for they resist the spray better than most trees. They also do less damage to grafts in pastures. An enormous tree of this sort is said to have been growing before the duke of Dorset's seat at Knowle, in Kent. It is represented in Badeslade's view of that seat, and is preserved in Dr. Harris's history of the county. It was twelve or fourteen feet in girth. The original plantations of Vauxhall and Marybone gardens were chiefly of this tree. Before earthenware came into use at the table, the wood of the great maple, which is soft and white, was in much request for trenchers. It is still used by the turners for bowls, dishes, &c. by the saddlers for saddle-trees; and is recommended by Mr. Evelyn as excellent for cart and plow timber, being light and tough. It is however inferior to the ash for these purposes. In spring and autumn, this species will pour forth from the wounded stem, in the same manner as the birch, abundance of saccharine juice; from which a good wine may be made, as Mr. Ray affirms, from the information of Dr. Martin Lister. There are two varieties of this tree common in the nurseries; one which has only broader leaves and larger keys; the other with variegated leaves, producing a pleasing variety in the tints of large plantations.

4. *Acer rubrum*, or scarlet-flowering maple: leaves five-lobed, slightly toothed, glaucous underneath; peduncles very simple and aggregate. Of this species there are two varieties in the nurseries: 1. Virginian scarlet-flowering maple. 2. Sir Charles Wager's flowering maple. This sort is propagated with us for the sake of the scarlet flowers, which come out early in the spring. In Pennsylvania, where it grows in the swamps, the natives use it for almost all sorts of wood-work; with the bark they dye a dark-blue, and make a good black ink. The Canadians tap the tree for the juice, of which they make sugar and treacle.

5. *Acer saccharinum*, or American sugar maple: leaves five-parted-palmate, point-toothed, pubescent. This maple will grow to the height of forty feet. It has some resemblance to the Norway, when the plant is young; but, as they grow up, the leaves of this are more deeply divided, and their surfaces less smooth, so that the two species are then easily distinguished. From this tree the

inhabitants of North America make a very good sort of sugar, in large quantities, by tapping the trees early in the spring, and boiling the juice. Large tracts in North America are covered with the sugar maple; this tree yields a sugar equal to the best from the cane, and in great quantity, with no other labour than what women and girls can bestow, in drawing off and boiling the liquor; and when skilfully tapped will last many years. It is therefore believed by judicious persons that the country can not only supply their own demand, but even make sugar for exportation. We are assured by Dr. Rush, that this tree is so far from being injured by tapping, that it yields the more syrup the oftener it is tapped; and that a tree flourished after forty-two annual operations. From twenty-three gallons and one quart of sap, procured in twenty-four hours from two trees, four pounds and thirteen ounces of good grained sugar have been obtained. But a tree of an ordinary size yields in a good season from twenty to thirty gallons of sap, from which are made from five to six pounds of sugar. It is supposed that by transplanting to an open exposure, the quantity of sap may be increased, and its quality improved. For a farmer in Pennsylvania having planted a number of these trees above twenty years ago in his meadow, he obtains every year a pound of sugar from every three gallons of the sap. The season for tapping is in February, March, and April, according to the weather. Warm days and frosty nights are most favourable to a plentiful discharge of sap. The quantity obtained in a day from one tree is from five gallons to a pint: but twenty-three gallons were procured from a single tree on the 14th of April, 1789. For a number of years many hundred private families in New York and Pennsylvania have supplied themselves plentifully with this sugar. Many have made from 200 to 400 pounds in a year. One man sold 600 pounds, all made with his own hands in one season; another made 640 pounds, without any assistance, in less than four weeks, besides attending to the other business of his farm, for which he received 16l. and a family consisting of a man and his two sons made 1800 pounds weight in one season. The quality of this sugar is superior to that which is made in the West Indies from the cane; and it deposits less sediment when dissolved in water. The Indians of Canada have practised the making of sugar from the maple, time out of mind, and they gained a pound of sugar from eight pints of liquor. The French began to refine it in that country towards the close of the last century; and Dr. Robinson sent some of the sugar to Mr. Ray in 1684. A friend of Mr. Ray's tried the experiment with our great maple, and obtained a sugar from the juice, but in small quantity.

6. *Acer dissectum*, or cut-leaved maple: leaves many-parted-palmate, the divisions subpinnatifid and serrate. 7. *Acer japonicum*, or Japanese maple: leaves many-parted, gashed, and villous; flowers subumbellated. 8. *Acer palmatum*, or hand-leaved maple: leaves palmate-serrate smooth, flowers in umbels. 9. *Acer septemlobum*, or seven-lobed maple: leaves seven-lobed smooth, lobes pointed, regularly and sharply serrate. 10. *Acer pictum*, or painted maple: leaves seven-lobed smooth, lobes pointed entire.—These five species, and also the seventeenth, grow in Japan.

11. *Acer platanoides*, or Norway maple: leaves five-lobed pointed sharply toothed smooth, flowers in corymbs. This grows to a large size; the leaves being smooth and of a shining green, as large or larger than those of the sycamore, and being seldom eaten or defaced, because the tree abounds in a sharp milky juice disliked by insects; they have a much better appearance than those of the sycamore; and in the spring, when the flowers are out, which are of a fine yellow colour, this tree has great beauty. Hanbury observes, that in the autumn the leaves die to a golden-yellow colour, which produces a good effect at that season, when the different tints of the decaying vegetable world are displayed. He says farther that

it is a quick growing tree, arrives at a great bulk, and is one of the best trees for sheltering habitations. Linnæus recommends it for walks and plantations; as yielding a juice from which sugar may be made, if it be wounded in the winter; and as cutting out into a white smooth wood, fit for the stocks of guns, the joiner, and the turner. Dr. Hunter observes, that as it is a quick grower, arrives at a great bulk, and answers all the purposes of the sycamore, the raising it for use, as well as ornament and variety, should not be neglected. Norway maple is found on mountains in the northern countries of Europe, Germany, Switzerland, Stiria, Carniola, and Savoy.

12. *Acer montanum*, or mountain maple: leaves slightly five-lobed acute serrate, racemes compound, calyxes hairy. This is a native of North America.

13. *Acer pennsylvanicum*, or Pennsylvanian maple: leaves three-lobed acuminate, sharply double-serrate, racemes simple, calyxes smooth. It is a small tree, which in some situations may be considered rather as a shrub. It will grow to the height of about fifteen feet, with a slender stem, covered with a whitish bark, and sending forth several red branches. The flowers are on long pendulous racemes, of a greenish-yellow colour. The seeds generally fall off before they are ripe. It is a native of Pennsylvania, Virginia, and Canada. The thickness of the shade, the beauty of the bark, and the tree not being liable to insects, would make it desirable for plantations, were it not for the litter occasioned by the abundance of the leaves and fruits which it produces, and its being subject to be torn by storms.

14. *Acer campestre*, or common or small maple. The common maple, though it does not become a large tree, should not however have been degraded by Linnæus to a shrub; nor does it make a bad figure in plantations. Evelyn says, that by shredding up the boughs to a head, he has caused it to shoot to a wonderful height in a little time. The common maple is chiefly seen in hedge-rows and coppices. We meet with high encomiums on this wood among the ancients; and Virgil introduces Evander sitting on a maple throne. It was chiefly valued among them for the fineness of its grain. The timber is far superior to that of the beech for all uses of the turner, particularly dishes, cups, trenchers, and bowls; and when it abounds in knots, as it very frequently does, it is highly esteemed by the joiners for inlaying, &c. On account also of the lightness of the wood, it is often used by musical instrument makers; from its hardness, for gun-stocks and other purposes; and from its whiteness it was formerly in great request for tables. In the vale of Gloucester, where oak timber is scarce, it is used for gate-stuff and other purposes of husbandry; and sometimes screws for cyder-presses are made of this wood: but the principal value of the maple is for underwood: it is of quick growth and affords good fuel.

15. *Acer opalus*, or Italian maple: leaves roundish five-lobed, loosely serrate, capsules ovate, smooth, almost upright. This is common in many parts of Italy, particularly about Rome and Viterbo. It is one of the loftiest trees of that country, and is esteemed for the leaves, which are large, and afford a great shade; so that it is planted frequently there by the sides of roads, and near habitations. This tree is not noticed by Linnæus, and many other modern authors. It is rarely to be met with in England, though hardy enough to bear the open air; and, being a noble tree, acquiring a considerable stature, having a spreading head adorned with large and beautiful foliage, it deserves the attention of ornamental planters.

16. *Acer monspessulanum*, or Montpellier maple: leaves three-lobed very entire smooth annual. This species grows about twenty feet in height. The leaves resemble those of the common maple, but are of a much thicker substance, and not so large; they are of a shining-green colour, and continue their verdure very late in the autumn, which renders this tree more valuable. At present this sort is not common in England. The flowers have little

little beauty, their blow is soon over, and the seeds sometimes come to perfection with us. It is common in the South of France, and Italy: and was cultivated by Mr. Miller in 1739.

17. *Acer creticum*, or Cretan maple: leaves three-lobed very entire pubescent perennial. This bears some resemblance to the last, and gains the same height. The leaves of the young trees are ovate, but afterwards become shaped like those of ivy: they are of a much thinner texture than in that, and their petioles are covered with a soft hairy down; whereas those of the other are smooth and stiff: Where the trees are well sheltered, they continue green most part of the year. The flowers are seldom followed by good seeds. It grows naturally in the Levant.

18. *Acer trifidum*, or trifid-leaved maple: leaves undivided and trifid, without indentations on the edge. The twigs are round, smooth, and purplish. The leaves at the ends of the twigs, scattered, undivided, and of two or three lobes, smooth on both sides, pale underneath, ovate and sharp.

19. *Acer negundo*, or Virginian ash-leaved maple: leaves compound, flowers racemed. This is a very strong shooting tree, of quick growth, and is in Virginia and Carolina one of the largest trees of this kind. It is well adapted by its pale-green leaves, so different in form from those of the other species, to make a beautiful variety in woods, but they fall very soon in autumn; and it must be planted in places not too much exposed to violent winds, being subject to split. The timber is fit for the same uses with that of the Norway maple and sycamore, but is soft and brittle.

20. *Acer pinnatum*, or wing-leaved maple: leaves pinnate: leaflets oblong quite entire. The maple of Cochin China is a tree of a middling size, with a very hard wood, and spreading branches. The leaves have about four pairs of alternate, small, smooth, leaflets, terminated by an odd one. The flowers are white, in compound racemes. It is a native of woods in Cochin China.

Propagation and Culture. The genus *acer* consists of deciduous trees; most of them sufficiently hardy. They are easily propagated by sowing their seeds, soon after they are ripe, in a bed of common earth, covering them about half an inch thick with light mould. In the spring they will appear above ground; and, if kept clear from weeds, and watered in dry weather, some of the sorts will grow above a foot high the first summer. The autumn or spring following, if they are close in the seed-bed, it will be proper to transplant them into a nursery, in rows at three feet distance, and two feet asunder in the rows; in this situation they may remain three or four years, by which time they will be large enough to plant out for continuance. If the seeds are kept out of the ground till spring, they rarely come up the same year, and many times do not grow. When therefore they are to be transported to any distance, it will be proper to put them up in sand or earth.

The common, sugar, Norway, and ash-leaved, maples, being large-growing trees forty feet high and upwards, with large spreading heads, and exuberant foliage, are fit for large plantations; and the leaves being of different sizes, shapes, and colours, they will make a considerable variety, especially if we take in the variegated sorts: and the large pendulous branches of flowers, though deficient in colour, are not without their beauty, especially those of the Norway maple.—The other sorts are of inferior growth, seldom rising more than from twenty to thirty feet.

ACER, *f.* in botany. See *BANISTERIA* and *TRIOP-TERIS*.

ACERB, *adj.* [*acerbus*, Lat.] Acid, with an addition of roughness, as most fruits are before they are ripe.

ACERBITY, *f.* [*acerbitas*, Lat.] A rough four taste. Applied to men, sharpness of temper; severity.—True it is, that the talents for criticism, namely, smartness, quick

cenfure, vivacity of remark, indeed all but *acerbity*, seem rather the gifts of youth than of old age. *Pope*.

ACERNO, a town of Italy, in the citorior principality of Naples, with a bishop's fee. E. lon. 15. 46. N. lat. 40. 50.

ACERINA, *f.* in ichthyology, a name given by Pliny and other of the old naturalists, to the fish we at this time call the *ruffe*. See *PERCA*.

ACERRA, *f.* in antiquity, an altar erected, among the Romans, near the bed of a person deceased, on which his friends daily offered incense till his burial.—The real intention probably was to overcome any offensive smell that might arise about the corpse. The Chinese have still a custom like this: they erect an altar to the deceased in a room hung with mourning; and place an image of the dead person on the altar, to which every one that approaches it bows four times, and offers oblations and perfumes.

The *acerra* also signified a little pot wherein were put the incense and perfumes to be burnt on the altars of the gods and before the dead. It appears to have been the same with what was otherwise called *thuribulum*, and *pyxis*.

We find mention of *acerræ* in the ancient church. The Jews had also their *acerra*, in our version rendered *cenfers*; and the Romanists still retain them under the name of *incense-pots*. In Roman writers, we frequently meet with *plena acerra*, a full *acerra*: to understand which, it is to be observed, that people were obliged to offer incense in proportion to their estate and condition; the rich in larger quantities, the poor only a few grains; the former poured out *acerras* full on the altar, the latter took out two or three bits with their fingers.

ACERRA, a town of Italy, in the kingdom of Naples, and in the Terra di Lavarò; seated on the river Agno. E. lon. 15. 10. N. lat. 40. 55.

ACERRÆ, the ancient name of a town, now called *la Girola*, in the territory and to the south-east of Lodi, where the rivulet Serio falls into the Adda, to the west of Cremona and north of Placentia.

To *ACERVATE*, *v. a.* [*acervo*, Lat.] To heap up.

ACERVATION, *f.* The act of heaping together.

ACERVOSE, *adj.* Full of heaps.

ACESCENT, *adj.* [*acescens*, Lat.] That which has a tendency to sourness or acidity.—The same persons, perhaps, had enjoyed their health as well with a mixture of animal diet, qualified with a sufficient quantity of *acescents*; as bread, vinegar, and fermented liquors. *Asbuthnot*.

ACESTRIDES, a name used among the Greeks for female physicians or midwives.

ACETABULUM, in antiquity, a measure used by the ancients, equal to one eighth of our pint. It seems to have acquired its name from a vessel in which acetum or vinegar was brought to their tables, and which probably contained about this quantity.

ACETABULUM, in anatomy, a cavity in any bone for receiving the protuberant head of another, and thereby forming that species of articulation called *ENARTHROSIS*.

ACETABULUM, in botany, the trivial name of a species of the *peziza*, or *cup-peziza*, a genus belonging to the *cryptogamia fungi* of Linnæus. It has got the name of *acetabulum*, from the resemblance its leaves bear to a cup. See *PEZIZA*.

ACETARY, a pulpy substance in certain fruits, *e. g.* the pear, which is inclosed in a congeries of small calculous bodies towards the base of the fruit, and is always of an acid taste.

AC ETIAM are words or a clause in a writ, where, in order to intitle the court to jurisdiction, an additional cause of action is alleged; as where, upon the usual complaint of *trespass*, the defendant is required to be brought in to answer the plaintiff of a plea of *trespass*, and also (*ac etiam*) to a bill of debt: or where, to the usual complaint of breaking the plaintiff's close, a clause is added containing the real cause of action.

ACETOSA, *f.* sorrel; by Linnæus joined to the genus of dock, under the title of *Rumex*. See *RUMEX*.

ACETOSE, *adj.* That which has in it any thing four.

ACETOSELLA, *f.* in botany, a species of OXALIS. See OXALIS and RUMEX.

ACETOSITY, *f.* The state of being acetose, or of containing fourness.

ACETOUS, *adj.* [from *acetum*, vinegar, Lat.] Having the quality of vinegar; four.—Raisins which consist chiefly of the juice of grapes, inspissated in the skins or hulks by the avolation of the superfluous moisture through their pores, being distilled in a retort, did not afford any vinous, but rather an *acetous*, spirit. Boyle.

ACETUM, *f.* VINEGAR, the vegetable ACID of the chemists. See VINEGAR.

ACHABYTUS, a high mountain in Rhodes, on the top of which stood a temple of Jupiter.

ACHÆA, anciently a town of the island of Rhodes, in the district of Jolytus, and the first and most ancient of all, said to be built by the Heliades, or grandsons of the sun.

ACHÆA, a hamlet of Asiatic Sarmatia, on the Euxine. The inhabitants were called Achæzi, a colony of the Orchomenians.

ACHÆANS, the inhabitants of ACHAIA PROPRIA, a Peloponnesian state. This republic was not considerable in early times, for the number of its troops, nor for its wealth, nor for the extent of its territories; but it was famed for its probity, its justice, and its love of liberty. Its high reputation for these virtues was very ancient. The Crotonians and Sybarites, to re-establish order in their towns, adopted the laws and customs of the Achæans. After the famous battle of Leuctra, a difference arose betwixt the Lacedæmonians and Thebans, who held the virtue of this people in such veneration, that they terminated the dispute by their decision. The government of the Achæans was democratical. They preserved their liberty till the time of Philip and Alexander; but, in the reign of those princes, and afterwards, they were either subject to the Macedonians, who had made themselves masters of Greece, or oppressed by cruel tyrants. The Achæan commonwealth consisted of twelve inconsiderable towns in Peloponnesus. Its first annals are not marked by any great action, for they are not graced with one eminent character. After the death of Alexander, this little republic was a prey to all the evils which flow from political discord. A zeal for the good of the community was now extinguished. Each town was only attentive to its private interest. There was no longer any stability in the state; for it changed its masters with every revolution in Macedonia. Towards the 124th Olympiad, about the time when Ptolemy Soter died, and when Pyrrhus invaded Italy, the republic of the Achæans recovered its old institutions and unanimity. The inhabitants of Patræ and of Dymæ were the first assertors of ancient liberty. The tyrants were banished, and the towns again made one commonwealth. A public council was then held, in which affairs of importance were discussed and determined. A register was appointed to record the transactions of the council. This assembly had two presidents, who were nominated alternately by the different towns. But instead of two presidents, they soon elected but one. Many neighbouring towns which admired the constitution of this republic, founded on equality, liberty, the love of justice, and of the public good, were incorporated with the Achæans, and admitted to the full enjoyment of their laws and privileges.—The arms which the Achæans chiefly used were slings. They were trained to the art from their infancy, by slinging, from a great distance, at a circular mark of a moderate circumference. By long practice they took so nice an aim, that they were sure, not only to hit their enemies on the head, but on any part of the face they chose. Their slings were of a different kind from those of the Balearians, whom they far surpassed in dexterity.

ACHÆI (Achæans); the inhabitants of Achaia Propria. In Livy, the people of Greece; for the most part

called Achivi, by the Roman poets. In Homer, the general name for Grecians.

ACHÆORUM PORTUS, (Pliny;) now Porto Buon, a harbour of the Chersonesus Taurica, on the Euxine. Another, near Sigæum, into which the Xanthus, after being joined by the Simois, falls.

ACHÆMÈNES, according to Herodotus, was father of Cambyfes, and grandfather of Cyrus I. king of Persia. Most of the commentators of Horace are of opinion, that the Achæmenes whom that poet mentions, Ode xii. of his 2d Book, was one of the Persian monarchs: but, if that were true, he must have reigned before the Medes subdued the Persians; for we do not hear of any king of that name from the time that the Persians founded that great monarchy, which is looked upon as the second universal one. However this be, the epithet *achæmenians* is very frequently given to the Persians in the old Latin poets.

ACHÆMÈNES, son of Darius I. king of Persia, and brother of Xerxes, had the government of Egypt bestowed on him, after Xerxes had forced the Egyptians to return to their allegiance. He some time after commanded the Egyptian fleet in the celebrated expedition which proved so fatal to all Greece. The Egyptians having again taken up arms after the death of Xerxes, Achæmenes was sent into Egypt to suppress the rebellion; but was vanquished by Inarus, chief of the rebels, succoured by the Athenians.

ACHÆUS, cousin-german to Seleucus Ceraunus and Antiochus the Great, kings of Syria, became a very powerful monarch, and enjoyed the dominions he had usurped for many years; but at last he was punished for his usurpations in a dreadful manner, in the 146th year of Rome, as related by Polybius.

ACHAIA, a name taken for that part of Greece which Ptolemy calls Hellas; the younger Pliny, Græcia; now called Livadia: bounded on the north by Thessaly, the river Sperchius, the Sinus Maliacus, and mount Oeta; on the west by the river Achelous; on the east, turning a little to the north, it is washed by the Archipelago, down to the promontory of Sunium; on the south, joined to the Peloponnesus or Morea, by the isthmus of Corinth, five miles broad. It contained the cities of Athens, Thebes, Delphi, Pythia, &c. also the mounts Parnassus, Helicon, and several other places mentioned in ancient history.

ACHAIA PROPRIA, anciently a small district in the north of Peloponnesus, running westward along the bay of Corinth, and bounded on the west by the Ionian sea, on the south by Elis and Arcadia, and on the east by Sicynia: inhabitants, the Achæans, properly so called; its metropolis Patræ. It is now called Romania Alta, in the Morea.

Achaia was also taken for all those countries that joined in the Achæan league, reduced by the Romans to a province. Likewise for Peloponnesus.

ACHAË PRÆBYTERI, or the Presbyters of Achaia, were those who were present at the martyrdom of St. Andrew the Apostle, A. D. 59; and are said to have written an epistle in relation to it. Bellarmine, and several other eminent writers in the church of Rome, allow it to be genuine; while Du Pin, and some others, expressly reject it.

ACHAIS, a town near the river Oxus in Sogdiana, built by Alexander, and called Heraclea; afterwards overthrown and re-built by Antiochus, who gave it the name of Achais.

ACHAIUS, son of Ethwin, was raised to the crown of Scotland, A. D. 788. The emperor Charlemagne sent an embassy to desire an alliance with him against the English, whose pirates so infested the seas, that the merchants could not carry on their trade. This alliance was concluded in France upon conditions so advantageous to the Scots, that Achaius, to perpetuate the memory of it, added to the arms of Scotland a double field sowed with lilies. He died in 819.

ACHALALACTLI, *f.* in ornithology, a species of king's fisher. See ALCEO.

ACHAM,

ACHAM, an inland country of Asia, lying between Hindostan and China, and but little known to Europeans.

ACHAN, the son of Carmi, of the tribe of Juda, at the taking of Jericho concealed two hundred shekels of silver, a Babylonish garment, and a wedge of gold, contrary to the express command of God. This sin proved fatal to the Israelites, who were repulsed at the siege of Ai. In this dreadful exigence, Joshua prostrated himself before the Lord, and begged that he would have mercy upon his people. Achan was discovered by casting lots, and he and his children were stoned to death. This expiation being made, Ai was taken by stratagem. *Joshua*, chap. vii. ver. 3, 9.

ACHANE, an ancient Persian corn-measure, containing $\frac{1}{45}$ Attic midimni.

ACHANIA, *f.* [*αχανια*], because the corolla does not open.] In botany, a genus of the monadelphia polyandria class, of the natural order of columniferae. The generic characters are—Calyx: perianthium double. Outer many-leaved; leaflets linear, permanent, slightly coalescing at the base. Inner one-leaved, subcylindric, streaked half way, five-cleft, permanent. Corolla: subclavate, convoluted. Petals five, obovate-oblong, erect, with a lobe at the base on one side, involving the column of stamens. Stamina: filaments numerous, coalescing into a writhed tube longer than the corolla, free at top, capillary. Antheræ oblong. Pistillum: germ subglobular. Style filiform, the same length with the tube of the stamens, ten-cleft at top: the segments spreading. Stigmas capitate. Pericarpium: berry subglobular, fleshy, five-celled. Seeds: foliary, convex on one side, angular on the other.—*Essential Character.* Calyx, double; outer many-leaved. Corolla, convolute. Berry, five-seeded.

Species. 1. *Achania malvaviscus*, scarlet achania, or bastard hibiscus; leaves somewhat scabrous, acuminate, leaflets of the outer calyx erect. This is a native of Mexico and Jamaica, and flowers most part of the year.

2. *Achania mollis*, or woolly achania; leaves tomentose, leaflets of the outer calyx spreading. A native of South America, and the West-India islands. It flowers in August and September.

3. *Achania pilosa*, or hairy achania; leaves hairy, obtuse and acute. This species has a very different appearance from the two former. It is shrubby as they are, but the stem and branches are smaller, thinner, and not downy; and it continues only two or three years. It is a native of Jamaica, and flowers in November.

Propagation and Culture. Achania is generally propagated by cuttings, because the seeds do not often ripen here; if the cuttings are planted in pots filled with light earth, and plunged into a gentle hot-bed, keeping the air from them, they will soon take root, and should be gradually injured to bear the open air. These plants require a moderate stove to preserve them through the winter; and, if they are kept in warmth in summer, they will flower, and sometimes ripen fruit; they may be placed abroad in a sheltered situation for two or three months, but the plants so treated seldom flower well.

ACHARACA, anciently a town of Lydia, situate between Tralles and Nyssa; in which were the temple of Pluto, and the cave Charonium, where patients slept in order to obtain a cure.

ACHAT, *f.* in law, implies a purchase or bargain; and hence, probably, purveyors were called *Achators*, from their making bargains.

ACHATES, the companion of Æneas, and his most faithful friend, celebrated in Virgil.

ACHATES, *f.* in natural history. See AGATE.

ACHATES, anciently a river of Sicily, now the Drillo; which runs from north to south, almost parallel with, and at no great distance from, the Gela; and rises in the north of the territory of Noto. It gave name to the achates, or agate, said to be first found there.

ACHAZIB, or ACHZIB, anciently a town of Galilee,

in the tribe of Asher, nine miles from Ptolemais. Also a town in the more southern parts of the tribe of Judah.

ACHE, *f.* [*ace*, Sax. *ax*], Gr. now generally written *ake*, and in the plural *akes*, of one syllable; the primitive manner being preserved chiefly in poetry, for the sake of the measure.] A continued pain. See AKE.

To ACHE, *v. n.* To be in pain.—Upon this account, our senses are dulled and spent by any extraordinary intention, and our very eyes will *ache*, if long fixed upon any difficultly-discerned object. *Glanville.*

ACHEEN, ACHE', or ACHEN, a kingdom of Sumatra, in the East Indies, situated on the north-western part of the island. The capital is situated on a river which empties itself near the north-west point, or Acheen-head, about two miles from the mouth. It lies in a wide valley, formed like an amphitheatre by two lofty ranges of hills. The river is not large, and by emptying itself in several channels is rendered very shallow at the bar. In the dry monsoon it will not admit boats of any burthen, much less large vessels, which lie without, in the road formed by the islands off the point. Though no longer the great mart of eastern commodities, it still carries on a considerable trade with the natives of that part of the coast of Indostan called Telinga, who supply it with the cotton-goods of their country, and receive in return, gold-dust, sapan-wood, betel-nut, patch-leaf (*colpus Indicus*), a little pepper, sulphur, camphire, and benzoin. The country is supplied with Bengal opium, and also with iron, and many other articles of merchandise, by the European traders.

Acheen is esteemed, comparatively, healthy, being more free from woods and swamps than most other portions of the island; and the fevers and dysenteries to which these are supposed to give occasion, are there said to be uncommon. The soil is light and fertile; and the products, beside those already enumerated as articles of export trade, and a variety of fine fruits, are chiefly rice and cotton. There is likewise some raw silk procured in the country, of very inferior quality. Gold-dust is collected in the mountains near Acheen, but the greatest part is brought from the southern ports of Nalaboo and Soofoo. The sulphur is gathered from a volcanic mountain in the neighbourhood, which supplies their own consumption for the manufacture of gun-powder, and admits of a large exportation.

In their persons, the Acheneſe differ from the rest of the Sumatrans; being taller, stouter, and darker-complexioned. They appear not to be a genuine people; but are thought, with great appearance of reason, to be a mixture of Battas, Malays, and Moors, from the west of India. In their dispositions they are more active and industrious than their neighbours; they possess more penetration and sagacity; have more general knowledge; and, as merchants, they deal upon a more extensive and liberal footing. Their religion is Mahometanism; and, having a great number of mosques and priests, its forms and ceremonies are strictly observed.

The appearance of the town, and the nature of the buildings, are much the same as are found in the generality of Malay bazars, excepting that the superior wealth of this place has occasioned a great number of public edifices, but without the smallest pretensions to magnificence. The king's palace, if it deserves the appellation, is a very rude and uncouth piece of architecture, designed to resist the force of an enemy, and surrounded for that purpose by strong walls, but without any regular plan, or view to the modern system of military attack. The houses in common are built of bamboos and rough timber, and raised some feet from the ground, on account of the place being overflowed in the rainy season.

A considerable fabric of a thick species of cotton-cloth, and of stuff for the short drawers worn both by Malays and Acheneſe, is established here, and supplies an extensive demand. They weave also very handsome silk-pieces, of a particular form, for that part of the dress which is called by the Malays *cayen farrong*.

The Achenese are expert and bold navigators, and employ a variety of vessels, according to the voyages they undertake, and the purposes for which they design them. The river is covered with a multitude of fishing sampans or canoes, which go to sea with the morning breeze, and return in the afternoon, with the sea-wind, full laden.—Having no convenient coins, though most species of money will be taken there at a valuation, they commonly make their payments in gold-dust, and for that purpose are all provided with scales or small steelyards. They carry their gold about them, wrapped up in pieces of bladder, and often purchase to so small an amount as to make use of grain or seeds for weights.—The monarchy is hereditary; and the king usually maintains a guard of 100 feyops about his palace.

According to Mr. Marsden, “the grand council of the nation consists of the king or sultan, four *oolooballangs*, and eight of a lower degree, who sit on his right hand, and sixteen *cajoorangs*, who sit on his left. At the king's feet sits a woman, to whom he makes known his pleasure; by her it is communicated to an eunuch, who sits next to her, and by him to an officer named *Cajoorang Gondong*, who then proclaims it aloud to the assembly. There are also present two other officers, one of whom has the government of the bazar or market, and the other the superintending and carrying into execution the punishment of criminals. All matters relative to commerce and the customs of the port come under the jurisdiction of the *Shabandar*, who performs the ceremony of giving the *chap* or licence for trade; which is done by lifting a golden-hafted creese over the head of the merchant who arrives, and without which he dares not to land his goods. Presents, the value of which are become pretty regularly ascertained, are then sent to the king and his officers. If the stranger be in the style of an ambassador, the royal elephants are sent down to carry him and his letters to the monarch's presence; these being first delivered into the hands of an eunuch, who places them in a silver dish, covered with rich silk, on the back of the largest elephant, which is provided with a machine (houder) for that purpose. Within about an hundred yards of an open hall where the king sits, the cavalcade stops, and the ambassador dismounts, making his obeisance by bending his body, and lifting his joined hands to his head. When he enters the palace, if an European, he is obliged to take off his shoes; and, having made his second obeisance, is seated upon a carpet on the floor, where betel is brought to him. The throne was some years ago of ivory and tortoiseshell; and, when the place was governed by queens, a curtain of gauze was hung before it, which did not obstruct the audience, but prevented any perfect view. The stranger, after some general discourse, is then conducted to a separate building, where he is entertained with the delicacies of the country, by the officers of state, and in the evening returns in the manner he came, surrounded by a prodigious number of lights. On high days (*aree ryah*) the king goes in great state mounted on an elephant richly caparisoned, to the great mosque, preceded by his *oolooballangs*; who are armed nearly in the European manner.”

The country under the immediate jurisdiction of Acheen is divided into three districts, named *Duo pooloo duo*, *Duo pooloo leemo*, and *Duo pooloo anam*. Each district is governed by a pangleemo, and under him an imaum and four pangceches to each mosque.

“Acheen has ever been remarkable for the severity with which crimes are punished by their laws; the same rigour still subsists, and there is no commutation admitted, as is regularly established in the southern countries. There is great reason, however, to conclude, that the poor alone experience the rod of justice; the nobles being secure from retribution in the number of their dependants. Petty theft is punished by suspending the criminal from a tree, with a gun or heavy weight tied to his feet; or by cutting off a finger, a hand, or leg, according to the nature of the theft. Many of these mutilated and wretched ob-

jects are daily to be seen in the streets. Robbery on the highway and house-breaking are punished by drowning, and afterwards exposing the body on a stake for a few days. If the robbery is committed on an imaum or priest, the sacrilege is expiated by burning the criminal alive. A man who is convicted of adultery is seldom attempted to be screened by his friends, but is delivered up to the friends and relations of the injured husband. These take him to some large plain, and, forming themselves in a circle, place him in the middle. A large weapon, called a *gadoobong*, is then delivered to him by one of his family; and if he can force his way through those who surround him, and make his escape, he is not liable to further prosecution: but it commonly happens that he is instantly cut to pieces. In this case his relations bury him as they would a dead buffalo, refusing to admit the corpse into their house, or to perform any funeral rites.” These discouragements to vice might seem to bespeak a moral and virtuous people; yet all travellers agree in representing the Achenese as one of the most dishonest and flagitious nations of the east.

Acheen was visited by the Portuguese in 1509, only twelve years after they had discovered the passage to the East Indies by the Cape of Good Hope. They made various attempts to establish themselves in the country, but were expelled with disgrace. See SUMATRA.

ACHELOUS, in fabulous history, wrestled with Hercules, for no less a prize than Deianira, daughter to king Oenus: but, as Achelous had the power of assuming all shapes, the contest was long dubious: at last, as he took that of a bull, Hercules tore off one of his horns; so that he was forced to submit, and to redeem it by giving the conqueror the horn of Amalthea, the same with the cornucopia, or horn of plenty; which Hercules, having filled with a variety of fruits, consecrated to Jupiter. Some explain this fable, by saying, That Achelous is a winding river of Greece, whose stream was so rapid, that it roared like a bull, and overflowed its banks; but Hercules, by bringing it into two channels, broke off one of the horns, and so restored plenty to the country. See the next article.

ACHELOUS, a river of Acarnania; which rises in mount Pindus, and, dividing Ætolia from Acarnania, falls from north to south into the Sinus Corinthiacus. It was formerly called *Thoas*, from its impetuosity, and *King of Rivers*, (Homer.) The epithet *Achelous* is used for *Aqueus*, (Virgil;) the ancients calling all water *Achelous*, especially in oaths, vows, and sacrifices, according to Ephorus: now called Aspro Potamo. Rivers are by the ancient poets called *Tauriformes*, either from the bellowing of their waters, or from their ploughing the earth in their course: Hercules, restraining by dykes and mounds the inundations of the Achelous, is said to have broken off one of his horns, and to have brought back plenty to the country. See the preceding article.

ACHERI (Luke D'), a learned Benedictine of the congregation of St. Maur, was born at St. Quintin, in Picardy, in 1609; and made himself famous by printing several works, which till then were only in manuscript: particularly, The Epistle attributed to St. Barnabas; the Works of Lanfrank, archbishop of Canterbury; a collection of scarce and curious pieces, under the title of *Spicilegium*, i. e. Gleanings, in thirteen volumes quarto. The prefaces and notes, which he annexed to many of these pieces, show him to have been a man of genius and abilities. He had also some share in the pieces inserted in the first volumes of the Acts of the Saints of the Order of St. Bennet; the title whereof acquaints us that they were collected and published by him and father Mabillon. After a very retired life, till the age of 73, he died at Paris the 29th of April, 1685, in the abbey of St. Germain in the Fields, where he had been librarian.

ACHERNER, or ACHARNER, *f.* a star of the first magnitude in the southern extremity of the constellation ERIDANUS, but invisible in our latitude.

ACHERON, a river of Epirus. The poets feigned it

to have been the son of Ceres, whom she hid in hell for fear of the Titans, and turned into a river, over which souls departed were ferried in their way to Elysium.

ACHERON, a river of Thesprotia, in Epirus; which, after forming the lake of Acherusia, at no great distance from, falls into the sea near, the promontory of Chimerium, to the west of the Sinus Ambracius, in a course from north to south.

ACHERON, or ACHEROS, a river of the Brutii, in Italy, running from east to west; where Alexander king of Epirus was slain by the Lucani, being deceived by the oracle of Dodona, which bade him beware of Acheron.

ACHERSET, *f.* an ancient measure of corn, conjectured to be the same with our quarter, or eight bushels.

ACHERUSIA PALUS, a lake between Cumæ and the promontory Misenum, now *il Lago della Collucia*, (Cluverius.) Some confound it with the Lacus Lucrinus, and others with the Lacus Averni. But Strabo and Pliny distinguish them. The former takes it to be an effusion, exundation, or washes of the sea, and therefore called by Lycophron, *Ασχηρσίου χυμός*.—Also a lake of Epirus, through which the Acheron runs.—There is also an Acherusia, a peninsula of Sithynia, on the Euxine, near Heraclæa; and a cave there of the same name, through which Hercules is fabled to have defended to hell to drag forth Cerberus.

ACHIAR, *f.* a Malayan word, which signifies all sorts of fruits and roots pickled with vinegar and spice. The Dutch import from Batavia all sorts of achiar, but particularly that of BAMBOO (see ARUNDO), a kind of cane, extremely thick, which grows in the East Indies. It is preserved there whilst it is still green, with very strong vinegar and spice; and is called *bamboo-achiar*. The name changes according to the fruit with which the achiar is made.

ACHICOLUM, *f.* is used to express the *fornix, tholus*, or *sudatorium*, of the ancient baths: which was a hot room where they used to sweat. It is also called architholus.

To ACHIEVE, *v. a.* [*achever*, Fr. to complete.] To perform, to finish a design prosperously. To gain, to obtain:

Show all the spoils by valiant kings *achiev'd*,
And groaning nations by their arms reliev'd. *Prior.*

ACHIEVER, *f.* He that performs; he that obtains what he endeavours after.—A victory is twice itself, when the *achiever* brings home full numbers. *Shakespeare.*

ACHIEVEMENT, *f.* [*achievement*, Fr.] The performance of an action. The escutcheon, or ensigns armorial, granted to any man for the performance of great actions:

Then shall the war, and stern debate, and strife
Immortal, be the bus'ness of my life;
And in thy fane, the dusty spoils among,
High on the burnish'd roof, my banner shall be hung;
Rank'd with my champion's bucklers, and below,
With arms revers'd, th' *achievements* of the foe. *Dryden.*

Achievement, in the first sense, is derived from *achieve*, as it signifies to perform: in the second, from *achieve*, as it imports to gain.

ACHILLEA, [so named from Achilles the famous Grecian hero, who is supposed to have imbibed the knowledge of botany from his master Chiron.] A plant belonging to the syngenesia polygamia superflua class, and ranking in the natural order of compositæ discoidææ. The generic characters are—Calyx: common ovate, imbricate; scales ovate, acute, converging. Corolla: compound, radiate; corollets hermaphrodite, tubular, in the disk. Females ligulate, five to ten; in the ray. Proper of the hermaphrodite, funnel-shaped, five-cleft, spreading. Female obcordate, spreading, trifid; the middle cleft less than the others. Stamens: in the hermaphrodites, filaments five, capillary, very short. Antheræ cylindrical, tubular. Pistillum: in the hermaphrodites germ small. Style filiform, the length of the stamens. Stigma obtuse,

emarginate. In the females germ small. Style filiform, the same length as in the others. Stigmas two, obtuse, reflex. Pericarpium: none. Calyx scarcely changed; receptacle filiform, elongate, as the disk of the seeds, ovate, twice the length of the calyx. Seeds: solitary, ovate, furnished with flocks; but having no down. Receptaculum: chaffy, elevated; chaffs lanceolate, the length of the florets.—*Essential Character.* Calyx, ovate, imbricate. Florets of the ray about four. Down, none. Receptaculum, chaffy.

Most of the milfoils are hardy, herbaceous, fibrous-rooted perennials; with the flowers commonly in corymbs at the ends of the stalk and branches; the ray in some yellow, in others white, in a few purple: the leaves in many of the species are pinnate, bipinnate, or superdecompound; in a few they are simple. They are chiefly inhabitants of the Levant or the south of Europe: the 12th and 20th only are natives of England. The species want to be better described; and probably it may be found that culture has produced some changes which have been taken for specific differences.

Species. 1. With yellow corollas. 1. *Achillea santolina*, or lavender-cotton leaved milfoil: leaves bristle-shaped toothed, toothlets nearly entire subulate reflex. This has large yellow flowers, which stand upon pretty long peduncles singly, not in close bunches, as in the common fort. It has leaves like those of lavender-cotton, which, when rubbed, emit a strong oily odour. It flowers in June and July. It is an inhabitant of the Levant.

2. *Achillea ageratum*, or sweet milfoil or maudlin: leaves lanceolate-obtuse sharply ferrate. It is a native of Italy, about Florence, Leghorn, Nice, &c. of the south of France, about Montpellier, Orange, &c. and of Spain; by road sides: flowering from August to October. Being now scarcely used in medicine, it is not cultivated in the gardens for sale: or, if it is asked for, the people in the markets give the thirteenth fort, which is a very hardy plant, and easily propagated. For, though this is hardy in respect to cold; yet in wet winters the roots are often killed, especially in good ground; but, when the plants grow out of the joints of walls, or in rubbish, they will live many years without care. There are two varieties of this plant; one of them having longer and more compact corymbs; the other broader leaves and smaller flowers. It is sweet to the smell, bitter to the taste, and aromatic. Linnæus sets it down as obsolete and superfluous. Allione, on the contrary, thinks it an efficacious plant, and recommends it in all disorders arising from a debility of the nerves. He prefers it much to tanfy.

3. *Achillea falcata*, or sickle-leaved milfoil: leaves linear toothed obtuse flat, toothlets crenate. It is a native of the east, where it is used in medicine.

4. *Achillea tomentosa*, or woolly milfoil: leaves pinnate hirsute, pinnae linear toothed. This is often planted in gardens for the sake of variety: is of humble growth, but the flowers continue long in beauty. It grows naturally in Spain, the south of France, the Valais, and Italy; but bears the open air very well in England.

5. *Achillea pubescens*, or downy milfoil: leaves pinnate, leaflets lanceolate gashed ferrate wool-bearing beneath. This hath no chaffs to the receptacle, and therefore recedes in that circumstance from the generic character. It is a native of the Levant, and was cultivated in the botanic garden at Chelsea in 1739.

6. *Achillea abrotanifolia*, or southernwood-leaved milfoil: leaves pinnate superdecompound, divisions linear distant. This is also a native of the Levant. It grows to the height of two feet and a half, and it flowers in June and July.

7. *Achillea bipinnata*, or bipinnate milfoil: leaves bipinnate tomentose, leaflets ovate entire. A native of the Levant.

8. *Achillea Ægyptiaca*, or Egyptian milfoil: leaves pinnate, leaflets obtusely lanceolate ferrate-toothed. It rises from nine inches to a foot in height. The flowers are produced

produced in corymbs, on the top of the stalks; appear from June to September, and some of them frequently continue the greater part of the winter. It is a native of the Levant.

II. Corollas white in the ray. 9. *Achillea macrophylla*, or feverfew-leaved milfoil: leaves pinnate, pinnae gash-ferrate, the outmost larger and connected. It is a native of the Alps, is very hardy, thrives in almost any soil, but loves an open exposure, and deserves a place in gardens. It flowers in July and August.

10. *Achillea impatiens*, or impatient milfoil: leaves pinnate, pinnae distant linear-lanceolate, acute from the base upwards. This species is frequent in all Siberia.

11. *Achillea clavennæ*, or silvery-leaved milfoil: leaves jagged flat obtuse tomentose. Silvery-leaved milfoil is a very humble plant, rarely rising above six inches high. The flowers are white, and grow in flat corymbs; they appear in June and July. The leaves have some likeness to those of common wormwood, and are very hoary, growing close to the ground, and decaying in autumn. It is a native of the Alps of Switzerland, Austria, Pannonia, and Carinthia.

12. *Achillea ptarmica*, or sneefewort milfoil: leaves lanceolate acuminate finely ferrate. This species grows wild in all the temperate parts of Europe. In Britain it is found not very uncommon in meadows, by the sides of ditches, on the banks of corn-fields, in moist woods and shady places. It creeps greatly by the roots. In the spring the young tender shoots are put into sallads, to correct the coldness of other herbs; and the roots, being hot and biting, are used for the tooth-ach, whence some have given the title of field or bastard pellitory to this plant. From the form of the leaf it is called goose-tongue. The dried powder of the leaves, snuffed up the nostrils, provokes sneezing, and hence its trivial and English name. In Siberia it is said to be used with success in internal hæmorrhages, taken in form of a decoction of the whole herb. There is a variety with double flowers, which is preserved in gardens, and is commonly known by the name of *double ptarmica*, or batchelors buttons. When this is planted in pots, so as to confine the roots from creeping, the stalks will grow closer together, and then it makes a tolerable appearance when in flower, which is in July and August.

13. *Achillea alpina*, or alpine milfoil: leaves lanceolate tooth-ferrate, toothlets very finely ferrate. This bears some resemblance to the last, but the leaves are longer, deeper cut on their edges, and of a darker green. It is very hardy; and is a native of Switzerland, Savoy, and Siberia. Linnæus questions whether situation may not have altered this from the last; and Gmelin suspects that it is only a variety.

14. *Achillea ferrata*, or notched-leaved milfoil: leaves linear-lanceolate sessile tomentose, deeply ferrate, lacinate at the base. It flowers in August and September.

15. *Achillea cristata*, or slender-branched milfoil: leaves linear ferrate, ferratures transverse crested, stem branched weak. This is a native of the east. It flowers here in July and August.

16. *Achillea atrata*, or camomile-leaved or black milfoil: pinnules pectinate almost entire, peduncles villous. This species is found on the mountains of Switzerland, the Valais, and Austria.

17. *Achillea moschata*, or musk milfoil, or Swiss genipi, leaves pinnate dotted, pinnae remote linear subulate almost entire, rays the length of the calyx. This bears so much resemblance to the last, as not readily to be distinguished, unless its pleasant aromatic smell be attended to. It is the true genipi of the Swifs. In Savoy they call it genipi batard, and give the name of true genipi to the *artemisia rupestris*. Either of them is an excellent sudorific; but hot, and frequently injurious in the pleurisy when the fever is high. It promises to be of much service in disorders arising from a debility of the solids: and is a

grateful food to all sorts of cattle. It grows wild in Switzerland on the high Alps, in Savoy, Piedmont, and Austria: and was introduced in 1775 by doctors Pitcairn and Fothergill.

18. *Achillea nana*, or dwarf milfoil: leaves pinnate toothed extremely hirsute, flowers glomerate-umbelled. The smell of this is somewhat weaker than that of the last, for which it is frequently sold. It grows on the high Alps of Switzerland, the Valais, and Savoy. It is hardy, and will thrive with us in almost any soil, but loves an open exposure. It deserves a place in gardens.

19. *Achillea magna*, or great milfoil or yarrow: leaves bipinnate rather hairy, the divisions linear and toothed; earlets decussated. This sort very much resembles common milfoil, but is twice the size. The stem has hairs thinly scattered over it. The leaves are also like those of common milfoil, but larger, and with two ears at the base, one under the leaf, the other prominent above the rib. It grows in Italy.

20. *Achillea millefolium*, or common milfoil or yarrow: leaves bipinnate naked, divisions linear toothed; stems furrowed towards the top. It is abundant in pastures and by road sides, flowering from June to September. The inhabitants of Dalecarlia mix it with their ale, instead of hops, in order to increase the inebriating quality of the liquor. This plant has been generally execrated as a noxious weed in pastures: it is found however to be eaten by cattle, at least by sheep; and has lately been even recommended for cultivation. Perhaps other plants besides this, may be of service to cattle in pastures, rather as medicine than as food. Linnæus recommends the bruised herb fresh as an excellent vulnerary and styptic: many foreign physicians still have an opinion of it in hæmorrhages; according to Dr. Hill, it is excellent in dysenteries, taken in form of a strong decoction: an ointment is made of it for the piles, and it is reckoned good against the scab in sheep. An essential oil is extracted from the flowers. It is not in use with us in the present practice. The variety with purple flowers of different shades is not uncommon, wild; and is frequently seen in gardens. The alpine is a variety arising merely from situation; and is different from the thirteenth sort. In cultivation they both approach to the common species.

21. *Achillea nobilis*, or noble milfoil: leaves bipinnate, the lower ones naked flat, the upper obtuse tomentose, the flowers in convex and very crowded corymbs. This approaches near to the foregoing or common sort, but the leaves are of a pale-green, and not so long, or so much cut: these have a strong sweet scent when bruised. It is a native of Italy, Germany, Switzerland, Narbonne, and Tartary.

22. *Achillea odorata*, or scented milfoil: leaves bipinnate oval almost naked, corymbs fastigate crowded. Gerard and Haller make this only a variety of the foregoing.

23. *Achillea cretica*, or Cretan milfoil: leaves linear, pinnae roundish imbricate backwards, stem tomentose. Cretan milfoil has the air of the common sort. The flowers are white; and it is a native of Crete.

24. *Achillea squarrosa*, or rough-headed milfoil: leaves lanceolate-linear pinnatifid, pinnae ovate, wedge-shaped, gash-acuminate vertical, stem somewhat villous.

25. *Achillea herbarota*, or herbarota milfoil: leaves wedge-shaped entire, toothed at the top. This species is in great and general esteem among the peasants of the Alps: and is recommended as a sudorific; against worms, flatulencies, and intermittent fevers.

26. *Achillea ligustica*, or marjoram-scented milfoil: leaves pinnate, pinnae sharply toothed flat smooth. This species, as well as the last, has a very strong smell, like mauldin.

27. *Achillea tanacetifolia*, or tanfy-leaved milfoil: leaves pinnate, pinnae lacinate flat gashed and entire. It is a native of the Grisons; and not uncommon in the pastures and valleys of the Alps.

Propagation and Culture. All the species of *Achillea* may be propagated by parting the roots either in spring or autumn. Many of them ripen their seeds, and may therefore be increased that way by sowing them in March or April; and transplanting them at Michaelmas. They will flower the summer following. Some also will grow from slips or cuttings, planted in a shady border in summer. They are mostly hardy, and require little care in the cultivation.

Those which are most commonly seen in gardens are, the purple variety of common milfoil, the double variety of common sneezewort, called double ptarmica, and woolly milfoil.

Whatever merit the alpine sorts may possess as medicines, it cannot answer to cultivate them with that view in gardens, for they owe their efficacy to their peculiar situation. But they, who are desirous of having them for variety, will find that they are very hardy, and will thrive almost in any soil, but that they love an open exposure.

ACHILLEA INODORA. See *ATHANASIA*.

ACHILLEA MONTANA. See *SENECIO*.

ACHILLEA TANECITIFOLIA. See *CHRYSANTHEMUM*.

ACHILLEA, an island, in the Euxine, opposite the Borythenes, where the monument of Achilles was erected.

ACHILLEID, *ACHILLEIS*, a celebrated poem of Statius, in which that author proposed to deliver the whole life and exploits of Achilles; but, being prevented by death, he has only treated of the infancy and education of his hero. See *STATIUS*.

ACHILLES, one of the greatest heroes of ancient Greece, was the son of Peleus and Thetis. He was a native of Phthia, in Thessaly. His mother, it is said, in order to consume every mortal part of his body, used to lay him every night under live coals, anointing him with ambrosia, which preserved every part from burning but one of his lips, owing to his having licked it. She dipped him also in the waters of the river Styx: by which his whole body became invulnerable, except that part of his heel by which he held him. But this opinion is not universal, nor is it a part of his character as drawn by Homer; for in the *Iliad*, b. xxi. 261, he is actually wounded in the right arm, by the lance of Asteropæus, in the battle near the river Scamander. Thetis afterwards intrusted him to the care of the centaur Chiron, who, to give him the strength necessary for martial toil, fed him with honey and the marrow of lions and wild boars. To prevent his going to the siege of Troy, she disguised him in female apparel, and hid him among the maidens at the court of king Lycomedes: but Ulysses, discovering him, persuaded him to follow the Greeks. Achilles distinguished himself by a number of heroic actions at the siege. Being disgusted, however, with Agamemnon for the loss of Briseis, he retired from the camp. But, returning to avenge the death of his friend Patroclus, he slew Hector, fastened his corpse to his chariot, and dragged it round the walls of Troy. At last Paris, the brother of Hector, wounded him in the heel with an arrow, while he was in the temple treating about his marriage with Philoxena, daughter to king Priam. Of this wound he died, and was interred on the promontory of Sigæum; and after Troy was taken, the Greeks sacrificed Philoxena on his tomb, in obedience to his desire, that he might enjoy her company in the Elysian fields. It is said, that Alexander, seeing this tomb, honoured it by placing a crown upon it; at the same time crying out, that "Achilles was happy in having, during his life, such a friend as Patroclus; and, after his death, a poet like Homer." Achilles is supposed to have died 1183 years before the Christian æra.

ACHILLES TATIUS. See *TATIUS*.

Tendo ACHILLIS, in anatomy, is a strong tendinous cord formed by the tendons of several muscles, and inserted into the os calcis. It has its name from the fatal wound Achilles is said to have received in that part from Paris the son of Priam.

ACHILLINI (Alexander), born at Bologna, and doctor of philosophy in that university. He flourished in the 15th and 16th centuries, and by way of eminence was styled the great philosopher. He was a steadfast follower and accurate interpreter of Averroes upon Aristotle, but most admired for his acuteness and strength of arguing in private and public disputations. He made a surprising quick progress in his studies, and was very early promoted to a professorship in the university; in which he acquitted himself with so much applause that his name became famous throughout all Italy. He continued at Bologna till the year 1506; when the university of Padua made choice of him to succeed Antonio Francatiano in the first chair of philosophy, and his fame brought vast numbers of students to his lectures at Padua: but the war, wherein the republic of Venice was engaged against the league of Cambray, putting a stop to the lectures of that university, he withdrew to his native country; where he was received with the same marks of honour and distinction as before, and again appointed professor of philosophy in Bologna. He spent the remainder of his life in that city, where he died, and was interred with great pomp in the church of St. Martin the Great, which belongs to the Carmelite friars. He wrote several pieces on philosophical subjects, which he published, and dedicated to John Bentivogli.

ACHILLINI (Claudius), grandson of the former, read lectures at Bologna, Ferrara, and Parma: where he was reputed a great philosopher, a learned divine, an excellent lawyer, an eloquent orator, a good mathematician, and an elegant poet. He accompanied Cardinal Ludovino, who went as legate into Piedmont; but being afterward neglected by this cardinal, when he became pope under the name of Gregory XV. he left Rome in disgust, and retired to Parma; where the duke appointed him professor of law, with a good salary. He published a volume of Latin letters, and another of Italian poems, which gained him great reputation: he died in 1640, aged 66.

ACHIMENES, *f.* in botany. See *COLUMNÆA*.

ACHING, *f.* [from *ache*.] Pain; uneasiness.—When old age comes to wait upon a great and worshipful sinner, it comes attended with many painful girds and *achings*, called the gout. *South*.

ACHIOTTE, or *ACHIOTL*, a foreign drug used in dyeing, and in the preparation of chocolate. It is the same with the substance more usually known by the name of *ARNOTTO*; which see.

ACHIROPOETOS, a name given by ancient writers to certain miraculous pictures of Christ and the Virgin, supposed to have been made without hands.—The most celebrated of these is the picture of Christ, preserved in the church of St. John Lateran at Rome; said to have been begun by St. Luke, but finished by the ministry of angels.

ACHLAM, a village twelve miles from York, where the body of the emperor Severus, who died at York, was burnt to ashes, agreeable to the custom of those times.

ACHMET, son of Seerim, has left a book concerning the interpretation of dreams according to the doctrine of the Indians, Persians, and Egyptians, which was translated out of Greek into Latin by Leo Tuscus in 1160. He lived in the 9th century.

ACHMET GEDUC, a famous general under Mahomet II. and Bajazet II. in the 15th century. When Mahomet II. died, Bajazet and Zezan both claimed the throne: Achmet sided with the former, and by his bravery and conduct fixed the crown on his head. But Bajazet took away his life; shining virtue being always an unpardonable crime in the eyes of a tyrant.

ACHMETSCHET, a town of the peninsula of Crimea, the residence of the sultan Galga, who is eldest son of the khan of Tartary. Lat. 45. o. lon. 51. 20.

ACHMIM, a large town of Upper Egypt, situated on the eastern bank of the Nile. "One admires there (says Abulfeda, as quoted by Mr. Savary) a temple, which is comparabile

comparable to the most celebrated monuments of antiquity. It is constructed with stones of a surprising size, on which are sculptured innumerable figures." Though this town be fallen from its ancient splendour, it is still one of the most beautiful of Upper Egypt. According to Mr. Savary, an Arab prince commands there, and the police is well attended to. The streets are wide and clean, and commerce and agriculture flourish. It has a manufactory of cotton, stuffs, and pottery, which are conveyed over all Egypt. It is the fame that Herodotus calls Chemmis, and Strabo Panopolis, or the City of Pan, who was worshipped there. Herodotus says, that Perseus was a native of this city, and that his descendants had established festivals there in his honour. It has lost its ancient edifices, and much of its extent; the ruins of the temple, described by Abulfeda, being without its limits, to the north. Nothing remains of it but some stones, of such magnitude that the Turks have not been able to move them. They are covered with hieroglyphics. On one of them are traced four concentric circles, in a square. The innermost of these contains a sun. The two succeeding ones, divided into twelve parts, contain, one, twelve birds, the other, twelve animals almost effaced, which appear to be the signs of the zodiac. The fourth has no divisions, and presents twelve human figures; which Mr. Savary imagines to represent the twelve gods, the twelve months of the year, and the twelve signs of the zodiac. The Egyptians, says Herodotus, are the first who divided the year into twelve months, and employed the names of the twelve gods. The four seasons occupy the angles of the square, on the side of which may be distinguished a globe with wings. Mr. Savary thinks it probable that this stone belonged to a temple dedicated to the sun, that the whole of these hieroglyphics mark his passage into the signs of the zodiac, and his course, whose revolution forms the year. The columns of this temple have been partly broken to make lime and millstones. Some of them have been transported into one of the mosques of Achmim, where they are placed without taste; others are heaped up in the squares of the town.

Mr. Savary tells us of a serpent which is worshipped here, and is the wonder of the country. "Upwards of a century ago (says he), a religious Turk called Scheilk Haridi died here. He passed for a saint among the Mahometans; who raised a monument to him, covered with a cupola, at the foot of the mountain. The people flocked from all parts to offer up their prayers to him. One of their priests, profiting by their credulity, persuaded them that God had made the soul of Scheilk Haridi pass into the body of a serpent. Many of these are found in the Thebais, which are harmless; and he had taught one to obey his voice. He appeared with his serpent, dazzled the vulgar by his surprising tricks, and pretended to cure all disorders. Some lucky instances of success, due to nature alone, and sometimes to the imagination of the patients, gave him great celebrity. He soon confined his serpent Haridi to the tomb, producing him only to oblige princes and persons capable of giving him a handsome recompence. The successors of this priest, brought up in the same principles, found no difficulty in giving sanction to so advantageous an error. They added to the general persuasion of his virtue that of his immortality. They had the boldness even to make a public proof of it. The serpent was cut in pieces in presence of the emir, and placed for two hours under a vase. At the instant of lifting up the vase, the priests, no doubt, had the address to substitute one exactly resembling it. A miracle was proclaimed, and the immortal Haridi acquired a fresh degree of consideration. This knavery procures them great advantages. The people flock from all quarters to pray at this tomb; and, if the serpent crawls out from under the stone, and approaches the suppliant, it is a sign that his malady will be cured. It may be imagined, that he does not appear till an offering has been made proportioned to the quality and richness of the different persons. In

extraordinary cases, where the sick person cannot be cured without the presence of the serpent, a *pure virgin* must come and solicit him. To avoid inconveniences on this head, they take care to choose a *very young girl indeed*. She is decked out in her best clothes, and crowned with flowers. She puts herself in a praying attitude; and, as the priests are inclined, the serpent comes out, makes circles round the young suppliant, and goes and reposes on her. The virgin, accompanied by a vast multitude, carries him in triumph amidst the general acclamation. No human reasoning would persuade these ignorant and credulous Egyptians that they are the dupes of a few impostors: they believe in the serpent Haridi as firmly as in the prophet."

ACHONRY, a small town of Ireland, in the province of Connaught and county of Sligo, seated on the river Shannon.

ACHOR, *f.* [achor, Lat. *axor*, Gr. *surfur*.] A species of the HERPES. It appears with a crusty scab, which causes an itching on the surface of the head, occasioned by a salt sharp serum oozing through the skin.

ACHOR, *f.* Lactumen: abas, acores, cerion; favus. The *crusta lactea* of authors, and in England the SCALD HEAD. Trallian says, that it is a sore on the outside of the head, full of little perforations, which discharge a humour like ichor, whence its name. He farther says, that the *cerion* resembles an achor; but that the mouths of the perforations are larger, resembling the cells of a honey-comb, whence the name; the matter is also nearly of the consistence of thin honey. When these diseases spread, the serum, which oozes out, dries, and forms a scab.

The achor differs from the *favus* and *tinea* only in the degree of virulence. It is called favus when the perforations are large; and tinea when they are like those made by moths in cloth: but generally by tinea is understood a dry scab on the hairy scalp of children, with thick scales and an offensive smell; when this disorder affects the face, it is called *crusta lactea* or MILK-SCAB. Mr. Bell, in his Treatise on Ulcers, says, that the *tinea capitis* & *crusta lactea*, may both be reduced to the same species of herpes, viz. the *herpes pustulosus*, they being naturally the same, differing only in situation; the tinea is on the hair-scalp, and the *crusta lactea* on the face. Dr. Cullen places this disease under *ULCERS*, as a synonyme; where also he places the *crusta lactea*, the *claus locales*, and *order dialyses*. When it happens to children, if in other respects they are healthy, the best treatment, besides keeping the belly moderately lax, is cleanliness and a moderate diet. An issue may be made and continued till the disorder is cleared, and the strength of the constitution is established; keep the hair short, and wash the head with soap suds. Some instances of this sort are very difficult of cure, and attended with violent itching, a pale countenance, &c. but still the same method generally succeeds in all the species and degrees of virulence. Small doses of calomel may be given as an alterative rather than as a laxative, and the vin. antim. in such doses, at proper intervals, as the stomach will easily retain. Externally unguent e pice may be used two or three times in a week, or cream mixed with chalk in fine powder. If the humour is repelled, give warm sudorifics until it returns. Scabby eruptions on children should not be repelled when about the mouth, ears, or indeed on any part of the body. Though these eruptions depend not on the habit, but the difficulty of passing through the skin, yet cold bathing should not be used. Cleanliness and a frequent use of the warm bath are of great service. The practice of tearing up the roots of the hair is useless, therefore cruel. Keep the hair short, and wash the part with aq. pur. ℞i. in qua solut. est gr. x. hydrargyri muriati.

ACHOR, a valley of Jericho, lying along the river Jordan, not far from Gilgal; so called from Achan, the troubler of Israel, being there stoned to death.

ACHOR, in mythology, the God of Flies; to whom, according to Pliny, the inhabitants of Cyrene sacrificed,

in order to obtain deliverance from the insects and the divisions occasioned by them.

ACHRADINA, anciently one of the four cities or divisions of Syracuse, and the strongest, largest, and most beautiful, part of it; separated by a very strong wall from the outer town, Tycha and Neapolis. It was adorned with a very large forum, with beautiful porticos, a most elegant prytaneum, a spacious senate-house, and a superb temple of Jupiter Olympius.

ACHRAS, *f.* [the Greek name of a tree in Theophrastus, commonly translated the *wild pear*.] In botany, a genus of the hexandria monogynia class, ranking in the natural order of *dumosæ*. The generic characters are—**Calyx**: perianthium six-leaved; leaflets ovate, concave, erect; outer broader shorter, inner coloured. **Corolla**: one-petalled, ovate, of the same height with the calyx; border cut into six subovate flat divisions; scales at the jaws of the corolla, equal in length to the divisions, narrower, spreading, emarginate. **Stamina**: filaments short, awl-shaped, at the jaws of the corolla, alternate with the divisions, bent inwards; antheræ sharp. **Pistillum**: germ roundish, flattened; style awl-shaped, longer than the corolla; stigma obtuse. **Pericarpium**: a globose very succulent pome, with twelve cells. **Seeds**: solitary, ovate, shining, scarred on one side and pointed at the base.—*Essential Character*. **Calyx**: six-leaved. **Corolla**: ovate, sexfid; with six scales alternate, more within. **Pome**, ten-celled. **Seeds** solitary, with a scar on the edge, and a tail or process at the top.

Species. 1. *Achras mammosa*, or mamme sapota, otherwise called the nipples sapota or American marmalade, grows in America to the height of thirty-five or forty feet, having a straight trunk, covered with an ash-coloured bark. The branches are produced on every side, so as to form a regular head. The leaves are a foot in length, and near three inches broad in the middle. The flowers are cream-coloured, and are succeeded by large oval or top-shaped fruit, covered with a brownish skin, under which is a thick pulp of a russet colour, very luscious, called natural marmalade, from its likeness to marmalade of quinces. This tree is commonly planted in gardens for the fruit, in Jamaica, Barbadoes, Cuba, and most of the West-India islands. This species has a sixth part less in the parts of fructification.—There is also a variety of this, called the bully or nishery-bully tree, because it generally grows the tallest of all the trees in the woods: its fruit is small, and the seeds oblong and narrow. It is esteemed one of the best timber-trees in Jamaica.

2. *Achras sapota*, or common sapota: flowers solitary, leaves lanceolate-ovate. This is a large, tall, straight, tree, without knots or branches, for sixty or seventy feet or more. The head spreads into many small branches, which grow pretty thick and close together. The bark is dark grey, thick and rough, full of large chops. The fruit is bigger than a quince, round, and covered with a thick grey rind, which when the fruit is ripe becomes yellow and tough. The flesh is yellow as a carrot, and in the middle are two large rough stones, flat, and each much bigger than an almond. The fruit smells very well, and the taste is unagreeable. It is described by Swartz as a soft roundish berry, the size of a small apple, having from six to twelve cells, with several seeds in each: he remarks, however, that most of the seeds are usually lost by cultivation.—The American sapota, or nishery-tree, is common about Panama, and some other places in the Spanish West Indies, but is not to be found in many of the English settlements.—The sapodilla is thus described by Browne. It rises to a considerable height, throwing out its branches on all sides. Leaves smooth and beautiful; and the fruit, which generally grows among them, of a moderate size, and when ripe of a delicate mellow taste. All the tender parts are full of a milky juice, extremely harsh, and bitterish; but the fruit, though full of this while young, is very sweet and agreeable when it ripens. The

shells that cover the seeds are generally of a shining or glossy brown cast, but the inward edge is always whitish and rugged. The kernel is bitter, and may be used occasionally in strengthening emulsions. The sapadillo-tree, says Dampier, is as big as a large pear-tree, the fruit much like a Bergoma pear in colour, shape, and size; but in some trees the fruit is a little longer. When it is green or first gathered the juice is white and clammy, and will stick like glue; then the fruit is hard, but, when it has been gathered two or three days, it grows soft and juicy, and then the juice is clear as spring water, and very sweet; in the midst of the fruit are two or three black stones or seeds, about the bigness of a pompon-seed. This is an excellent fruit.

3. *Achras difsecta*, or cloven-flowered sapota: flowers crowded, corollas cloven into eight parts, leaves obovate, bluntly notched at the end. This is a lofty tree, with a thick upright trunk, and abundance of branches, tubercled, and bearing leaves and branches at the ends. The flowers are white, and about half an inch in diameter. All the herbaceous parts of this tree are milky. It is cultivated in Malabar for the fruit, which is a pome of the form and size of an olive, succulent, the pulp of a sweetish acid flavour, and containing only one or two seeds, the rest of the cells being usually abortive. The leaves are used for cataplasms to tumours, being bruised and boiled with the root of curcuma and the leaves of ginger. It is supposed to be a native of the Philippine islands, whence it is called *Manykara* and *Manil-gale*, and by the Portuguese *Fruita Manilha*. It probably grows also in China, for the Dutch call it *Chineefche pruynen*. Forster found it flowering in September, in the island of Tongataboo.

4. *Achras falcifolia*, or willow-leaved sapota: flowers crowded, leaves lanceolate-ovate, acuminate. This tree, called in Jamaica white-bully tree or galimeta-wood, grows to a considerable height, with many branches towards the top, rising irregularly, at distant stages, as in most firs. It is commonly straight and tapering, and most frequently found in the lower lands. The wood is pale yellow, and reckoned good timber, but is mostly used in such parts of the building as are least exposed to the weather. No part of the tree is milky.

The bark of the sapota and mammosa is very astringent, and goes under the name of *Cortex Jacamienfis*. It was once supposed by some to be the true jesuit's bark, has been given as such to the negroes with very ill effect, and has been tried in England. It is an excellent astringent, but very different from jesuit's bark.

Propagation and Culture. As these trees are natives of very warm countries, they cannot be preserved in England, unless they are placed in the warmest stoves and managed with great care. They are propagated by planting the stones, but, as these will not keep good long out of the ground, the surest method to obtain these plants is, to have the stones planted in tubs of earth as soon as they are taken out of the fruit, and the tubs placed in a situation where they may have the morning sun, and kept duly watered. When the plants come up, they must be secured from vermin, and kept clear from weeds, but should remain in the country till they are about a foot high, when they may be shipped for England; they should be brought over in the summer, and, if possible, time enough for the plants to make good roots after they arrive. During their passage they must have some water, while they continue in a warm climate; but, as they come into colder weather, they should have very little moisture; and they must be secured from salt water, which will soon destroy the plants if it gets at them. When these plants arrive in England, they should be carefully taken out of the tubs, preserving some earth to their roots, and planted into pots filled with fresh earth, and then plunged into a moderate hot-bed of tanners' bark, observing, if the weather is hot, to shade the glasses with mats every day, to screen the plants from the

fun until they have taken new root; observing also not to water them too much at first, especially if the earth in which they come over is moist; because too much water is very injurious to the plants before they are well rooted, but afterward they must be frequently refreshed with water in warm weather; and they must have a large share of air admitted to them, otherwise their leaves will be infested with insects, and become foul; in which case they must be washed with a sponge to clean them, without which the plants will not thrive. In the winter these plants must be placed in the warmest stove, and in cold weather they should have but little water given to them, though they must be frequently refreshed when the earth is dry; especially if they retain their leaves all the winter, they will require a greater share of water than when they drop their leaves; so that this must be done with discretion, according to the state in which the plants are. As these plants grow in magnitude, they should be shifted into pots of a larger size, but they must not be over-potted, for that will infallibly destroy them.

ACHROMATIC, *adj.* in optics, without colour; a term which, it seems, was first used by M. de la Lande, in his astronomy, to denote telescopes of a new invention, contrived to remedy aberrations and colours. See **ABERRATION** and **TELESCOPE**.

ACHROMATIC TELESCOPE, a singular species of refracting telescope, said to be invented by the late Mr. John Dollond, optician to the king, and since improved by his son Mr. Peter Dollond, and others.

Every ray of light passing obliquely from a rarer into a denser medium, changes its direction towards the perpendicular; and every ray passing obliquely from a denser into a rarer medium, changes its direction from the perpendicular. This bending of the ray, caused by the change of its direction, is called its refraction; and the quality of light which subjects it to this refraction, is called its refrangibility. Every ray of light, before it is refracted, is white, though it consists of a number of component rays, each of which is of a different colour. As soon as its refracted, it is separated into its component rays, which, from that time, proceed diverging from each other, like rays from a center: and this divergency is caused by the different refrangibility of the component rays, in such sort, that the more the original or component ray is refracted, the more will the compound rays diverge when the light is refracted by one given medium only.

From hence it has been concluded, that any two different mediums that can be made to produce equal refractions, will necessarily produce equal divergencies: whence it should also follow, that equal and contrary refractions should not only destroy each other, but that the divergency of the colours caused by one refraction should be corrected by the other; and that to produce refraction that would not be affected by the different refrangibility of light, is impossible.

But Mr. Dollond has proved, by many experiments, that these conclusions are not well founded; from which experiments it appeared, that a ray of light, after equal and contrary refractions, was still spread into component rays differently coloured; in other words, that two different mediums may cause equal refraction, but different divergency; and equal divergency, with different refraction. It follows therefore that refraction may be produced, which is not affected by the different refrangibility of light. In other words, that, if the mediums be different, different refractions may be produced, though at the same time the divergency caused by one refraction shall be exactly counteracted by the divergency caused by the other; and so an object may be seen through mediums which, together, cause the rays to converge, without appearing of different colours.

This is the foundation of Mr. Dollond's improvement of refracting telescopes. By subsequent experiments he found, that different sorts of glass differed greatly in their refractive qualities, with respect to the divergency of co-

lours. He found that crown glass causes the least divergency, and white flint the most, when they are wrought into forms that produce equal refractions. He ground a piece of white flint glass into a wedge, whose angle was about 25 degrees; and a piece of crown glass to another, whose angle was about 29 degrees; and these he found refracted nearly alike, but that their divergency of colours was very different.

He then ground several other pieces of crown glass to wedges of different angles, till he got one that was equal, in the divergency it produced, to that of a wedge of flint glass of 25 degrees; so that when they were put together, in such a manner as to refract in contrary directions, the refracted light was perfectly free from colour. Then, measuring the fractions of each wedge, he found that that of the white flint glass was to that of the crown glass nearly as two to three. And hence any two wedges, made of these two substances, and in this proportion, would, when applied together so as to refract in contrary directions, refract the light without any effect arising from the different refrangibility of the component rays.

Therefore, to make two spherical glasses that refract the light in contrary directions, one must be concave, and the other convex; and as the rays, after passing through both, must meet in a focus, the excess of the refraction must be in the convex one: and, as the convex is to refract most, it appears from the experiment that it must be made of crown glass; and, as the concave is to refract least, it must be made of white flint.

And farther, as the refraction of spherical glasses are in an inverse ratio of their focal distances, it follows that the focal distances of the two glasses should be in the ratio of the refractions of the wedges; for, being thus proportioned, every ray of light that passes through this combined glass, at whatever distance from its axis, will constantly be refracted by the difference between two contrary refractions, in the proportion required; and therefore the effect of the different refrangibility of light will be prevented.

The removal of this impediment, however, produced another: for the two glasses, which were thus combined, being segments of very deep spheres, the aberrations from the spherical surfaces became so considerable, as greatly to disturb the distinctness of the image. Yet considering that the surfaces of spherical glasses admit of great variations, though the focal distance be limited, and that by these variations their aberration might be made more or less at pleasure, Mr. Dollond plainly saw that it was possible to make the aberrating of any two glasses equal; and that, as in this case the refractions of the two glasses were contrary to each other, and their aberrations being equal, these would destroy each other.

Thus he obtained a perfect theory of making object glasses, to the apertures of which he could hardly perceive any limits; for, if the practice could come up to the theory, they must admit of apertures of great extent, and consequently bear great magnifying powers.

The difficulties of the practice are, however, still very considerable. For first, the focal distances, as well as the particular surfaces, must be proportioned with the utmost accuracy to the densities and refracting powers of the glasses, which vary even in the same sort of glass, when made at different times. Secondly, there are four surfaces to be wrought perfectly spherical. However, Mr. Dollond could construct refracting telescopes upon these principles, with such apertures and magnifying powers, under limited lengths, as greatly exceed any that were produced before, in-forming the images of objects bright, distinct, and uninfected with colours about the edges, through the whole extent of a very large field or compass of view; of which he has given abundant and undeniable testimony. See **TELESCOPE**.

There has lately appeared in the Gentleman's Magazine (1790, p. 890) a paper on the refracting telescope, by an author who signs *Veritus*, in which the invention is ascribed

to another person, not heretofore mentioned, in these words:—"As the invention has been claimed by M. Euler, M. Klingenshierna, and some other foreigners, we ought, for the honour of England, to assert our right, and give the merit of the discovery to whom it is due; and, therefore, without farther preface, I shall observe, that the inventor was Chester More Hall, Esq. of More-hall, in Essex; who, about 1729, as appears by his papers, considering the different humours of the eye, imagined they were placed so, as to correct the different refrangibility of light. He then conceived, that if he could find substances having such properties as he supposed these humours might possess, he should be enabled to construct an object glass that would shew objects colourless. After many experiments he had the good fortune to find those properties in two different sorts of glass, and, making them disperse the rays of light in different directions, he succeeded. About 1733 he completed several achromatic object glasses (though he did not give them this name) that bore an aperture of more than $2\frac{1}{2}$ inches, though the focal length did not exceed 20 inches; one of which is now in the possession of the Rev. Mr. Smith, of Charlotte-street, Rathbone-place. This glass has been examined by several gentlemen of eminence and scientific abilities, and found to possess the properties of the present achromatic glasses.

Mr. Hall used to employ the working opticians to grind his lenses; at the same time he finished them with the radii of the surfaces, not only to correct the different refrangibility of rays, but also the aberration arising from the spherical figure of the lenses. Old Mr. Baf, who at that time lived in Bridewell Precinct, was one of these working opticians, from whom Mr. Hall's invention seems to have been obtained.

In the trial at Westminster-hall about the patent for making achromatic telescopes, Mr. Hall was allowed to be the inventor; but Lord Mansfield observed, "It was not the person that locked up his invention in his scrutoire that ought to profit by a patent for such an invention, but he who brought it forth for the benefit of the public." This, perhaps, might be said with some degree of justice, as Mr. Hall was a gentleman of property, and did not look to any pecuniary advantage from his discovery; and, consequently, it is very probable that he might not have an intention to make it generally known at that time.

That Mr. Ayscough, optician, in Ludgate-street, was in possession of one of Mr. Hall's achromatic telescopes in 1754, is a fact which at this time will not be disputed."

ACHTELING, *f.* a measure for liquids used in Germany. Thirty-two *achtelings* make a *heemer*; four *sciltings*, make an *achteling*.

ACHYR, a strong town and castle of the Ukraine, subject to the Russians since 1667. It stands on the river Uorsklo near the frontiers of Russia, 127 miles west of Kiow. Lat. 49. 32. lon. 36. 0.

ACHYRANTHES, *f.* [*αχρῶν* chaff, and *ανθη* a flower.] In botany, a genus of the pentandria monogynia class, and in the natural order of amaranthi. The generic characters are—Calyx: perianthium, outer three-leaved, lanceolate, acute, permanent; inner five-leaved, permanent. Corolla: none; nectary of five valves surrounding the germ, bearded at the tip, concave, caducous. Stamina: filaments filiform, the length of the corolla; antheræ ovate, incumbent. Pistillum: germ superior, turbinate; style filiform, the length of the stamina; stigma bifid, villous. Pericarpium: capsule roundish, one-celled, not gaping. Seed: single, oblong.—*Essential Character*. Calyx, five-leaved. Corolla, none. Stigma, bifid. Seed, solitary.

Species. 1. *Achyranthes aspera*, or rough achyranthes: stem shrubby erect; calyxes reflex, pressed to the spike. The Sicilian plant grows near three feet high, with oblong pointed leaves; the flowers come out in long spikes from the extremity of the branches. As found in Malabar, Ceylon, Jamaica, and almost every where within the tropics, it has the leaves smooth and green on both sides, like *Plumbago zeylanica*; broader than in the Sicilian plant, and

dotted underneath: but the appearance, spike, stature, flower, &c. being the same in both, they are not distinct species.

2. *Achyranthes lappacea*, or burry achyranthes: stem shrubby, diffused, prostrate; spikes interrupted; lateral flowers having a bundle of hooked bristles on each side. This is a native of Malabar and Ceylon.

3. *Achyranthes muricata*, or prickly achyranthes: stem shrubby, patulous; leaves alternate; flowers in remote ovate spikes; calyxes squarrose. Leaves petiolcd, ovate, entire, almost naked. Spike alternate, peduncled, long, as in the first species, but the flowers more remote, more ovate, and not reflex, but three scales of the calyx shorter. Native of India.

4. *Achyranthes patula*, or spreading achyranthes: stem shrubby, patulous, pubescent; flowers in orbicular spikes, hedgehog-hooked. In a state of sleep, the opposite leaves of this species are bent down under the branch, and approximate to the under surface. It is a native of the East Indies.

5. *Achyranthes alternifolia*, or alternate-leaved achyranthes: stem herbaceous, erect; flowers in subglobular burrs. This species is also a native of the East Indies.

6. *Achyranthes corymbosa*, or corymbcd achyranthes: leaves four-fold, linear; panicle dichotomous corymbcd. The flowers resemble those of *celofia*, and it was put into that genus formerly by Linnæus. It is found in Ceylon.

7. *Achyranthes dichotoma*, or dichotomous achyranthes: stems suffruticose, leaves opposite linear flat acute; cyme dichotomous. This very much resembles the foregoing: it grows in Virginia.

8. *Achyranthes prostrata*, or prostrate achyranthes: the stems prostrate shrubby; spikes oblong; floscules in pairs, with a hooked fascicle on each side. This is a native of India.

9. *Achyranthes nivea*, or white achyranthes: leaves veicilled ovate tomentose, corymbs compact dichotomous, flowers corolled. It is a native of the Canary islands, whence it was introduced here by Mr. Francis Masson, in 1780. It flowers from May to July.

10. *Achyranthes altissima*, or tall achyranthes: stem suffruticose scandent, panicles terminating and axillary, branched. The stalks of this species climb up trees to the height of twenty feet. It is common among low bushes about Spanish Town and Kingston, in Jamaica; and in the woods of St. Domingo.

11. *Achyranthes polygonoides*: stem decumbent four-cornered, leaves ovate-cordate, spikes lax, short. This species was found in Arabia by Forskahl, and in Malabar by Koenig. It resembles the *polygonum orientale* in leaves and spikes, but the latter are less compact. The Arabians call this plant *didjar* and *budjer*: from the first of these the trivial name is formed.

Propagation and Culture. The first sort has been long known in England; but neither this, nor any of the others, having much beauty to recommend them, they are only preserved in botanic gardens. The first may be raised on a hot-bed from the seeds, and when the plants have acquired strength, they may be removed into the full ground, where they will flower in July, and the seeds will ripen in September. If they are kept in pots, and set into a warm green-house in winter, they will live two or three years.—The other sorts must be placed in a stove to preserve them through the winter: except the ninth, which will live in a green-house.

ACIA, *f.* [from the vernacular name *acioua*, in Guiana.] In botany, a genus of the monadelphica dodecandria class, of the natural order of pomaceæ. The generic characters are—Calyx: perianthium one-leaved, turbinate, curved; border five-parted; parts roundish, spreading; the uppermost and two lowest larger; the two middle ones smaller. Corolla: petals five, oblong, rounded; the three upper longer, ascending; the two lower shorter. Stamina: filaments twelve, unequal, uniting at bottom in a linear fleshy membrane, inserted into the calyx between the

two smaller petals; antheræ roundish, small. Pistillum: germ ovate, above the base adhering by the membrane of the stamina to a rib internally prominent from the bottom of the calyx; style filiform, curved; stigma acute. Pericarpium: drupe ovate, fibrous, chinked, large. Seed: nut ovate, with a brittle shell.—*Essential Character*. Calyx, five-parted. Corolla five-petalled, unequal. Drupe, full of chinks.

This is a tree, with a trunk sixty feet in height, and three or four feet in diameter, covered with a smooth grey bark. The branches which form the head are numerous, thick, and twisted. The leaves are alternate, smooth, entire, firm, waved about the edge, five inches long and three wide, on a very short petiole, at the base of which are two small stipules which fall off. The flowers grow in corymbs at the extremities of the twigs. Calyx white. Corolla violet. Fruit the size of a walnut, covered with a thick woody fibrous coriaceous skin, of a brown colour, cracking irregularly and adhering to the stone, which is thin and easily breaks. It incloses a large kernel, of an irregular form, dividing into two lobes, and covered with a russet membrane. The taste of it is agreeable; the Creoles eat it, when it is brought to market in August at Cayenne, and reckon it good fruit. They also extract an oil from it as sweet as that of almonds. They call the tree *coupi*. The timber of this tree is very hard, and heavy, of a white colour inclining to yellow.

ACICANTHERA, *f.* in botany, the trivial name of a species of **RHEDIA**.

ACICULÆ, the small pikes or prickles of the hedgehog, *echinus marinus*, &c.

ACID, *adj.* [*acidus*, Lat. *acide*, Fr.] Sour, sharp.—Wild trees last longer than garden trees; and, in the same kind, those whose fruit is *acid*, more than those who fruit is sweet. *Bacon*.

ACIDALIUS (Valens), was born at Wittstock, in Brandenburg; and, having visited several academies in Germany, Italy, and other countries, where he was greatly esteemed, he afterwards took up his residence at Breslaw, the metropolis of Silesia; and was chosen rector of a school at Nicla. It is related, that, as he was following a procession of the host, he was seized with a sudden phrenzy; and, being carried home, expired in a very short time. But Thuanus tells us, that his excessive application to study was the occasion of his untimely death; and that his sitting up at nights in composing his Conjectures on Plautus, brought upon him a distemper which carried him off in three days, on the 25th of May 1595, being just turned of 28. He wrote a Commentary on Quintus Curtius; also, Notes on Tacitus, on the Twelve Panegyrics; besides Speeches, Letters, and Poems. His poetical pieces are inserted in the *Deliciæ* of the German poets, and consist of epic verses, odes, and epigrams. A little piece, printed in 1595, under the title of *Mulieres non esse homines*, "That women were not of the human species," was falsely ascribed to him. But the fact was, that Acidalius happening to meet with the manuscript, and thinking it very whimsical, transcribed it, and gave it to the bookseller, who printed it. The performance was highly exclaimed against, inasmuch that the bookseller being seized, he discovered the person who gave him the manuscript, and a most terrible outcry was made against Acidalius. A story goes, that being one day to dine at a friend's house, there happened to be several ladies at table; who, supposing him to be the author, were moved with so much indignation, that they threatened to throw their plates at his head. Acidalius, however, ingeniously diverted their wrath. In his opinion, he said, the author was a judicious person, the ladies being certainly more of the species of *angels* than of *men*.

ACIDALUS, a fountain in Orchomenus, a city of Boeotia, in which the Graces, who are sacred to Venus, bathed. Hence the epithet *Acidalia*, given to Venus.

ACIDITY, *f.* The quality of being acid; an acid taste; sharpness; sourness.—When the taste of the mouth is bit-

ter, it is a sign of a redundancy of a bilious alkali, and demands a quite different diet from the case of *acidity* or sourness. *Arbutnot*.

ACIDNESS, *f.* The quality of being acid; acidity.

ACIDOTON, *f.* in botany, a genus of the monoecia polyandria class. The generic characters are—Male flowers. Calyx: perianthium five-leaved; leaflets ovate-lanceolate, reflex. Stamina: filaments numerous (35—40), placed on a globular receptacle; the outer shorter, the inner longer, upright; antheræ cordate-ovate, upright small.—Females on the same or a different tree. Calyx: perianthium six-leaved; leaflets linear-lanceolate, spreading. Pistillum: germ three-cornered; style short, acute, thick, trifid at the tip; stigmas tomentose, reflex. Pericarpium: capsule three-grained, hirsute, three-celled. Seeds: solitary, ovate.—*Essential Character*. Male. Calyx, five-leaved; stamina, fixed to a globular receptacle. Female. Calyx, six-leaved; style, trifid; capsule, three-grained.

Its height is eight or ten feet. Trunk round, straight, woody, the size of the little finger, covered with a smooth, brownish bark. Leaves towards the top, alternate, narrow-lanceolate, three or four inches long, and three quarters of an inch broad in the middle, even about the edges, except one small jag in some towards the top, making them appear as if eared. Petioles one-eighth of an inch in length: colour dark green, with several ribs on the under side; and on its surface and edges many long small prickles, which are said to sting very much. The shrub thus described by Sloane seems to have been young; and he never saw either the flower or fruit. Native of Jamaica.

ACIDOTON, *f.* in botany. See **ADELIA**.

ACIDS, *f.* in chemistry, the name by which one of the general classes of salts are distinguished. The characteristic marks of them are, 1. The peculiar taste which we call sour; though this does not hold universally: for the acid of arsenic has not this sour taste; nor are the volatile sulphureous acids, or those of *tungsten* and *molybdena*, very distinguishable in this way. 2. With water they combine into a fluid, the specific gravity of which is not a medium betwixt the water and acid separately taken. 3. With spirit of wine they unite into a very volatile and inflammable substance, called *ether*. This however must be understood only of the strong mineral acids, or of the acetous when concentrated. 4. They change the blue colour of vegetables to red, and heighten the colour of those that are already red. 5. They unite with all kinds of earths excepting the siliceous, with fixed and volatile alkalies, and with metals, so as to form compounds which cannot be separated without some difficulty. This is their most universal and distinguishing mark. 6. When mixed with any fermentable liquor, they prevent that process, or check it if already begun. This also must be understood only of the stronger acids. 7. They cannot be frozen but in cold below the freezing point. This property is also confined to the stronger acids.

The nature of acids has long been a matter of speculation, and of late has engaged the attention of philosophers very considerably. Some have supposed them to be simple chemical elements, while others imagined them to be composed of water and earth. But the late discoveries concerning air of different kinds have suggested a new theory, first published by M. Lavoisier, and strenuously maintained by the French chemists, viz. That the acid principle is contained in the air; which, according as it combines itself with different substances, forms acids of different denominations.

This theory he considers established by indisputable experiments; and his conclusions from the whole are, That "dephlogisticated air enters as a constituent part into the composition of several acids, particularly the phosphoric, vitriolic, and nitrous; that this pure and highly respirable air is the constitutive principle of acidity common to all acids; and that the difference by which they are distinguished from each other is produced by the union of one or more principles besides this air, so as to constitute the particular

particular form under which each acid appears." To dephlogisticated air in its state of fixity, therefore, he gives the title of the *acidifying* or *oxygenous* principle; and concludes farther from his experiments, 1. "That, when combined with the matter of fire, heat, and light, this principle produces dephlogisticated air; though he considers this position as not capable of absolute demonstration. It must not, therefore, be confounded with the following; which, he says, are supported by experiment and positive proofs. 2. That the same acidifying principle, combined with phlogistic substances or charcoal, forms fixed air. 3. That with sulphur it forms vitriolic acid. 4. That with nitrous air it forms nitrous acid. 5. That with Kunckel's phosphorus it forms the phosphoric acid. 6. With sugar it forms the acid of sugar, &c.

The opinion of M. Lavoisier has in part been adopted by Mr. Kirwan; whose Treatise in 1787, informs us, "that dephlogisticated air becomes an essential constituent part of acids. All acids (he adds) consist of two principles: one peculiar to each, which, in the opinion of the antiphlogistians, has not as yet been decomposed, and consequently must be looked upon, relatively to the present state of our knowledge, as a simple substance: the other, *pure air*, in a concrete state; that is, deprived of the greater part of its specific heat, and condensed into a smaller volume. The first they call the *acid basis*; the last, the *oxygenous principle*; thus the vitriolic acid, according to them, consists of sulphur as its basis, and pure air in a concrete state as its acidifying or oxygenous principle. This doctrine has been admitted by some of the ablest defenders of phlogiston, and particularly by M. de Morveau, with this single modification, that the bases of acids contain phlogiston, which they lose on uniting to pure air: yet it seems very difficult to conceive how pure air can unite to phlogiston, a substance to which it has the greatest affinity, without forming a new compound endowed with very different properties from those which it possessed before such union. It seems therefore more reasonable to conclude, either that it forms water, as Mr. Cavendish thinks; or fixed air," as Mr. Kirwan afterwards endeavours to prove.

With regard to the nitrous acid, the experiments of Mr. Cavendish, as well as of the French chemists, leave no room to doubt that it is produced during the deflagration of dephlogisticated and inflammable air. Mr. Cavendish has shewn, that the nitrous acid may be formed by taking the electric spark in a mixture of three measures of phlogisticated air, and seven of dephlogisticated air; or, in weight, one part of the former, and about 2.6 of the latter. Mr. Kirwan is of opinion, that 100 grains of pure dry, and colourless, nitrous acid, contain 38.17 grains of fixed air as its acidifying principle, 57.06 of nitrous basis, and 4.77 of phlogiston united to the nitrous basis. With regard to the nitrous basis itself, he says that one third of its weight is phlogisticated and two thirds dephlogisticated air, both in a concrete state.

"Nitrous basis (says Mr. Kirwan), saturated with phlogiston, constitutes nitrous air: 100 grains of this basis take up nearly 22 of phlogiston. Hence the constituent principles of nitrous acid are fixed air, dephlogisticated air, phlogisticated air, and inflammable air, all in their concrete state.

"Red, yellow, green, and blue, nitrous acids, when those colours are intense, owe their origin to the absorption of nitrous air; and consequently the proportion of their principles is variable, though all have the dephlogisticated acid for their ground. From Dr. Priestley's experiments it appears, that nitrous vapour consists of nitrous acid united to three or four times its weight of nitrous air and a little water."

To shew that nitrous air is not a constituent principle of the nitrous acid, but that fixed air is, Mr. Kirwan observes, that pure nitrous acid enters without decomposition into fixed alkalies, and forms nitre. Now if nitre be

distilled in a good earthen retort, it will be wholly decomposed; and so also will the acid itself, except a few drops which pass in the beginning of the distillation, and nothing but dephlogisticated air, more or less pure, and consequently intermixed with phlogisticated air and a slight proportion of fixed air, will be found: these, therefore, are its true constituent parts when disengaged from substances that cannot communicate phlogiston to it in any remarkable quantity, such as alkalies and earths; but if it be separated from substances that contain phlogiston, such as metals, it will then indeed be resolved into nitrous air, and dephlogisticated air more or less pure, the phlogiston of the fixed air being detained by the metal. Mr. Berthollet, who seems to have made the experiment with the greatest exactness, produced 714 cubic inches of dephlogisticated air from a Troy ounce of nitre. This, however, was far from being of the purest kind; and Dr. Priestley, Mr. Berthollet, and Mr. Succow, observed, that the air which first passes contains fixed air, and renders lime-water turbid. Here then we have three of the constituent parts of the nitrous acid, with scarcely any nitrous air; which the antiphlogistians suppose to be one of the constituent parts of the acid, and to make two-thirds of its bulk when exhibited in an aerial form."

To obviate an objection that the quantity of fixed air thus obtained is too small to deserve to be ranked among the constituent parts of the nitrous acid, Mr. Kirwan first enquires in what proportion it ought to exist there; and though this is variable, according to the different states of the nitrous acid with respect to phlogistication, he reckons it at one third of the acid as existing in the nitre; and from the decomposition of this fixed air, and the phlogiston emitted by it of consequence, he attributes the phlogistication and redness of the nitrous acid when exposed to more heat. As a proof that fixed air may be decomposed in this manner, he adduces two experiments of Dr. Priestley. In one of these, dephlogisticated air was obtained by means of acetic acid in that concentrated state in which it is called *radical vinegar*. Having mixed half an ounce of the acid with two ounces of calcined whiting, he obtained from it 350 ounce-measures of air; of which about one-third was fixed more in the first portions, and less in the last. The standard of the residuum in the first portions was 1.66, in the second 1.42, and in the third 1.38; which is very near the goodness of common air. The whiting then weighed 760 grains. On adding a quarter of an ounce more of radical vinegar, and repeating the operation, 120 ounce-measures of air were obtained, and the whiting was reduced to 730 grains. A third operation, in which another quarter of an ounce of vinegar was added, reduced the matter to 489 grains; but the last portion of air extracted had no fixed air, and was considerably better than that of the atmosphere.—The other experiment was made with lime-stone alone; from four ounces of the *white crystals* of which were obtained 830 ounce-measures of air, the first portion of which had only one-fourth of fixed air, and the standard of the residuum was never better than 1.56, nor worse than 1.66; so that it was nearly of the goodness of common air.

After detailing many other experiments, he says; "Here then are several ways of decomposing the nitrous acid; and in one only it is resolved into nitrous and dephlogisticated air; and in this way it may, at least, be strongly suspected to receive an addition of another principle. Why then should these be regarded as its constituent principles? And as in the two simplest methods of decomposition, in which the re-action of no foreign substance can be suspected, it appears in the form of dephlogisticated, phlogisticated, and fixed, air (the former always containing a portion of the two last), why then should not these be accounted its true constituent parts?—This theory is further confirmed by reflecting on the manner in which nitrous acid is generated by nature. Mr. Thouvenel found that this acid is constantly produced when chalk is exposed to

a mixture of putrid air and common air, or putrid and dephlogisticated air; but, if the putrid air be passed through lime-water, it is never generated; and that it is rarely produced by the exposure of quick-lime or fixed alkalies to these airs. The reason that alkalies, though aerated, are not so proper, is, that they do not combine with phlogisticated air as calcareous earths do. Mr. Cavendish, indeed, produced nitrous acid without any apparent mixture of fixed air; but the atom of it necessary for the formation of the small quantity of nitrous acid he produced (about one-third of a grain), might well be contained in the phlogisticated air he employed, or perhaps formed in the operation."

We shall now notice some experiments made by Mr. Watt, in order to determine whether the dephlogisticated air produced from nitre really proceeds from a decomposition of the acid, or what quantity of the latter is required to constitute a determinate quantity of the former. To ascertain this, 240 grains of mercury were put into a glass retort with 480 grains of diluted dephlogisticated nitrous acid, which was the quantity necessary to dissolve the whole of the mercury; and, as soon as the common air was expelled, a proper vessel was applied to receive the air produced in the operation. Sixteen ounce-measures of nitrous air came over during the solution, and on changing the receiver, a quantity of dilute, but highly phlogisticated nitrous acid, was obtained. The air receiver being again applied, four ounce-measures of strong and pure nitrous air were obtained, which, by the dephlogisticated air that arose immediately after, were reduced to half an ounce-measure. The production of dephlogisticated air continued very rapid, the mercury being all the while revived, until the operation was ended by the distillation or sublimation of the whole of the mercury. Two hundred and eighteen grains of the metal were obtained in its running form, and 22 remained in the form of an orange-coloured sublimate in the upper part of the retort. The 16 ounce-measures of nitrous air, first obtained, were then converted into nitrous acid by the gradual admission of common air, and then added to the water in the basin in which the receiver had been inverted; the whole quantity being about two quarts, and very acid to the taste, sparkling at the same time with nitrous air. To determine the quantity of acid thus recovered, as well as that which remained in the sublimate, a solution of alkali of tartar was made; and by experiment it was found that 120 grains of the acid, originally employed in dissolving the mercury, saturated 352 grains of this solution; the orange-coloured sublimate and all the acid liquor recovered being saturated by 1395 grains of the same. Hence it appears, by the rule of proportion, that, out of 480 grains of nitrous acid originally employed, only five were lost; "a smaller quantity (as Mr. Watt justly observes) than what might reasonably be supposed to be lost in the process by the extreme volatility of the nitrous acid." His conclusion therefore is, that "the nitrous acid does not enter into the composition of dephlogisticated air: it seems only to serve to absorb phlogiston from the watery part of the mercurial nitre."

This experiment was repeated with cubic nitre, and only 30 ounce-measures of air distilled from an ounce of the mineral alkali exactly saturated with nitrous acid. The water through which the air passed was acid, and the residuum in the retort alkaline; but, on mixing the two together, the solution was found to be exactly neutral by every possible test.

Not satisfied with these experiments, Mr. Watt engaged in others which appeared to be still more decisive, but to which, as well as the foregoing, Mr. Kirwan replies—"This opinion is exposed to insurmountable difficulties. For, in the first place, nitre affords dephlogisticated air at the rate of 146.125 cubic inches for every 100 grains of nitre, which, by the proper allowances for phlogisticated air, should weigh 46.77 grains; but then dephlogisticated air is only one of the constituent parts of water, for it

contains 13 per cent. of inflammable air, that is to say, 87 grains of dephlogisticated air: to form 100 grains of water requires an addition of 13 grains of inflammable air; consequently 46.77 grains of dephlogisticated air require nearly 7 of inflammable air, and would then form 53.77 grains of water, which exceeds half the weight of the nitre; a quantity of water, as Mr. Watt owns, certainly inadmissible. Mr. Watt found, that the water, over which the air proceeding from the decomposition of 960 grains of nitre had been received, contained only the acid belonging to 120 grains of nitre; and even this small quantity he inferred only from my experiments. But my experiments are totally inapplicable in this case; for I used only the dephlogisticated nitrous acid: and alkalis are saturable by a much smaller quantity of phlogisticated than of dephlogisticated acids, as is evident in the case of the *dephlogisticated marine acid*, as Stahl long ago observed; for he says, that the volatile acid of sulphur saturates ten times as much alkali as the fixed. Mr. Bergman and Mr. Scheele observe, that melted nitre is still neutral, though it be phlogisticated; therefore it is air, and not water, which it wants. Accordingly Dr. Priestley found it to injure common air by attracting its dephlogisticated part: but, if it be kept in fusion for some time, it loses its acid, and becomes alkaline; and the air it receives must surely be deemed rather to recompose the acid than to form water; of whose formation, in the temperature of the atmosphere, we have no sort of proof. On the contrary, the impossibility of accounting for the loss of acid in this case is an evident proof of the fallacy of that hypothesis.—By M. Lavoisier's analysis, 100 grains of nitre contain 57 of caustic alkali; by Mr. Bergman's, 49; by Mr. Wenzel's, 52; by Mr. Wiegand's, 46½; by mine, 63: the mean of all which is, 53½; which leaves 46.5 for acid and water, which is very nearly the weight of the air expelled. The different quantity of acid assigned by different persons to nitre, is in part owing to its degree of phlogistication in nitre. I believe at present, that 100 grains of nitre contain 34 of acid and about 12 of water, including the water in the acid and that of crystallization."

Mr. Kirwan next proceeds to consider the composition of the other acids.—The marine acid, according to him, consists of a peculiar basis united to phlogiston, and a certain quantity of fixed air; to both of which the basis seems to have a strong affinity.

M. Lavoisier, and other philosophers, who deny the existence of phlogiston, are of opinion, that the common marine acid consists of a peculiar basis united to a small proportion of pure air, or oxygenous principle, and the dephlogisticated marine acid differs from it only by containing an excess of this principle.—This opinion they are chiefly induced to maintain, because the acid in its dephlogisticated state is procured by distilling common marine acid from manganese; and the manganese, if distilled by itself, before the acid is distilled from it, affords dephlogisticated air; but, after the acid is distilled from it, it yields none.—"This experiment, however, (says Mr. Kirwan,) proves no more but that the manganese contains some air which is dephlogisticated during the calcination: And that this air is fixed air, appears from the following considerations: The black calx of manganese almost always gives out fixed air at first, before any dephlogisticated air appears; whence it is natural to think, that the dephlogisticated air proceeds from the dephlogistication of the fixed. And hence, if it be distilled with filings of iron, or in a gun-barrel, it scarcely gives out any other than fixed air; if at any time it gives out dephlogisticated air with little or no mixture of fixed air, this is owing to a very perfect dephlogistication of the calx, and to its containing very little moisture. Thus Dr. Priestley, having passed the steam of boiling water through manganese heated in an earthen tube, obtained a very large quantity of fixed air, and scarcely any other; though, on repeating this experiment with manganese well freed from calcareous earth, I obtained a large portion of dephlogisticated air; but

but I believe much depends on the degree of heat to which the tube is subjected. But having distilled manganese, which yielded of itself some fixed air with common spirit of salt, I obtained dephlogisticated marine acid, and not a particle of fixed air; which shews that this last combined with the dephlogisticated basis, and formed the dephlogisticated acid."

Several other experiments are related by Mr. Kirwan; but the following, he is of opinion, fully confirms his hypothesis, and subverts that of the antiphlogisticians. "Six cubic inches of inflammable air were mixed with as much dephlogisticated marine air over lime-water. In about ten minutes after the greater part of the diminution had taken place, a white cloud appeared on the surface of the lime-water, and by agitation it became still more turbid. As it was possible that the manganese might be mixed with calcareous earth, some dephlogisticated marine air was extracted from another portion of it, and received on lime-water; but it was wholly absorbed, without forming the least cloud, though there was lime enough; for, on adding aerated water, a cloud appeared."

The other acids particularly treated of by Mr. Kirwan are the phosphoric and saccharine. In his treatise on the former, he adopts the analysis of M. Lavoisier, changing only his acid principle of dephlogisticated for fixed air. From this it appears, that the phosphoric acid consists of a peculiar basis united to 2.265 of its weight of the acid principle; or, in other words, 100 grains of dry phosphoric acid contain about 69 of fixed air and 31 of its peculiar basis: 100 grains of the phosphoric basis take up 226.5 of fixed air, or 32.9 of phlogiston when it becomes phosphorus; and 100 grains of phosphorus contain 75.24 of basis and 24.76 of phlogiston.—The basis of this acid is the only one that can be procured free, both from the phlogiston and the acidifying principle; it is called, though improperly, as it is not soluble in water, the *glacial phosphoric acid*. M. Lavoisier and others are of opinion, that phosphorus is a simple substance containing no phlogiston, and that the acid consists of the oxygenous principle united to it.

With regard to the acid of fugar, Mr. Kirwan observes, that fugar itself is a compound of fixed air with a much larger proportion of inflammable air, and some water, all condensed to a degree of which we are ignorant, but retaining, upon the whole, much more specific heat than either oil or charcoal; though he seems inclined to the hypothesis of M. Morveau, that this substance has for its basis a fine ethereal oil, to which a large proportion of condensed inflammable air is superadded. The acid of fugar, then, according to him, consists of this peculiar basis deprived of its superfluous phlogiston, and united to a great quantity of fixed air in a concrete state. He is also of opinion, that it does not exist ready formed in the fugar, but is produced in the operations that substance undergoes: that it derives most of its acid principle from the nitrous acid employed; the nitrous basis taking up the phlogiston, and the fixed air of the nitrous acid combining with the saccharine basis. He contests strongly an opinion of M. Lavoisier, that fugar is a sort of *charcoal*, which uniting with the oxygenous principle of the nitrous acid, decomposes it, sets loose the nitrous air, and forms the saccharine acid; and that, towards the end of the operation, the saccharine acid itself is decomposed; the consequence of which is the production of fixed air, which, according to him, is only the oxygenous principle combined with charcoal. Among other objections, Mr. Kirwan says, "If the acid of fugar be distilled, it is wholly converted into water, fixed inflammable air, and not a particle of coal or dephlogisticated air is found in it. It is not therefore reasonable to look on either of them as its constituent principles; but, as fixed air alone can be extracted from all vegetable acids, it seems to be the true acidifiable principle."

Having given a view of the present opinions relative to the original formation of acids, it remains to treat a little

more particularly of each of the different kinds. They are divided into three different classes, expressive of their origin, viz. the Mineral, Vegetable, and Animal. The mineral acids are, those of vitriol, nitre, sea-salt, borax, amber, fluor, arsenic, tungsten, molybdena, &c. The vegetable are, those of vinegar, tartar, fugar, benzoïn, apples, citrons, lemons, tamarinds, sorrel, cork, &c. The animal acids are, the microcosmic or acid of urine, and that of bones, both of which are also called the *phosphoric*, though this might be accounted a vegetable acid, as it is procured by distilling mustard and some other vegetables by a violent fire. Besides these, there are the acids of ants, wasps, bees, silk-worms, milk, &c. It has also been discovered, that the human calculus is formed for the most part of a peculiar acid, which has received the name of *lithæic acid*. Lastly, as an acid distinct from all these, we may now add *fixed air*, by some called the *aerial* and by others the *cretaceous acid*: the latter appellation it derives from *creta*, chalk, because it is found in that substance in great quantity. See AEROLOGY.

The general properties of acids have already been enumerated; the most remarkable of which is their attraction for alkaline salts, earths, and metals. Though this is common to all, yet very considerable differences are observed among them in this respect, and on those differences depend almost all the phenomena of that part of CHEMISTRY which treats of salts. As these phenomena are particularly considered under that article, we shall here only in general take notice, that the three acids, named the *vitriolic*, *nitrous*, and *marine*, are the strongest of them all; that is, if any other acid be united to an alkali, earth, or metal, the union will be broken by adding to that compound any of the three acids just mentioned. Neither are these equal in power among themselves; for the vitriolic is stronger than the nitrous, and the nitrous stronger than the marine. The rule, however, is liable to certain exceptions and variations, depending chiefly on the circumstances of heat or cold, moisture or dryness, and particularly on the state of the marine acid with regard to its being in the form of an aqueous fluid or reduced to a dry vapour. In this last case it seems stronger than either the vitriolic or nitrous; and even when in an aqueous state, both the nitrous and marine acids, when added in great quantity, seem to oppress and overwhelm the stronger vitriolic acid, so that they will partly expel it from an alkaline salt. This does not depend on the mere quantity of acidity they possess: for the acetous acid may be concentrated to such a degree as to become stronger in this respect than spirit of salt; yet it will always be inferior in point of real strength, when tried with an alkali in competition with the latter. The aerial acid is the weakest of all; and may be expelled not only by vinegar, but by the acid juices of fruits, tartar, and the acids of tungsten and molybdena.

Some acids have the property of resisting the fire, and melting into a kind of glass, such as that of borax and phosphorus. This circumstance gives them an advantage over the stronger acids, which are volatile; and thus the two just mentioned, as well as those of arsenic and tungsten, will, in a very strong heat, expel the acid of vitriol itself, though the latter will, in the cold, expel any one of them with great ease.

Both the vitriolic and nitrous acids have a very strong attraction for phlogiston; and unite with certain oily and inflammable matter so vehemently as to occasion great heat, and sometimes even violent and unextinguishable flame. This is particularly the case with the nitrous acid, or with a mixture of the two; and indeed the nitrous acid, though weaker than the vitriolic, shews itself in every instance to be far more active, and to perform all its operations with vastly greater rapidity, than the other. All these however fall under the articles CHEMISTRY, &c.

We owe to Scheele not only the discovery of the oxygenated muriatic acid, commonly called dephlogisticated marine acid, but also that of the effects which it produces upon the

the colouring parts of vegetables. "It is in its elastic state (says that great chymist) that the qualities of this air are best discovered. In a sand-bath is to be placed a glass retort, in which muriatic acid has been poured upon manganese; to this small receivers are to be adapted, capable of containing about twelve ounces each, into which are to be poured about two drachms of water, without any other lute than a slip of blotting paper about the neck of the retort. In about a quarter of an hour, a yellow air is perceived in the receiver, which is to be taken off. If the paper has been properly applied, the air rushes out forcibly; the receiver must be quickly stopped, and another applied. Thus many receivers may be filled with the dephlogisticated muriatic acid; but it is necessary to place the retort in such a manner that the drops which rise into its neck may be able to fall back. The water serves to retain the vapours of the acid. I use many receivers that I may not be obliged to repeat a similar distillation for every experiment. It is not proper to employ large ones, because, every time they are opened, a great part of the acid is dissipated in the air. What I submitted to examination with this dephlogisticated muriatic acid was placed in the neck of the receiver, which I had stopped. The cork was turned yellow, as by aqua fortis. Paper tinged with turnsol became almost white; all red, blue, and yellow, flowers, as also green plants, turned yellow in a short time, and the water in the receiver was changed into a pure but weak muriatic acid. Neither alkalies nor acids were able to restore the colours of the flowers, or of the plants."

I took up the experiments of Scheele, says Mr. Berthollet, and I attempted to throw more light on the nature of the oxygenated muriatic acid, and upon its principal properties. I have shewn that one portion of the muriatic acid dissolved the calx of manganese, and separated a part of the base of vital air, or oxygene, (which was in excess in the calx of manganese,) that the dissolution might be performed; that this oxygene, being in a non-elastic state, or, according to the expression of Dr. Priestley, in a nascent one, and thereby very much disposed to form new combinations, unites itself with another portion of the muriatic acid, and that this combination constitutes the oxygenated muriatic acid gas.

According to Scheele, "The muriatic acid deprived of phlogiston, which is one of its constituent parts, does not unite with water but in very small quantity, and does not render it very acid." He appears to have contented himself with examining the water which had not been in contact with the gas except during the time of the operation, and to have concluded therefrom that the gas was very slightly soluble therein; so that it appeared to him better to employ the gas itself in his experiments than the water, which would be but weakly impregnated; and which at the same time would contain a small quantity of muriatic acid, which comes over in the distillation, when the necessary precautions are not taken to retain it by an intermediate bottle.

The first object which I proposed to myself was to examine the solubility of the oxygenated muriatic acid gas in water, because I imagined, that, if I was able to obtain a slightly concentrated solution, it might be more easy to submit this liquor to different experiments than the gas itself. I soon perceived that this gas dissolved in water more readily, and in greater quantity, than carbonic acid gas, or fixed air; and that the water which was saturated with it acquired a very strong odour, a yellowish colour, and other properties very strongly marked. I had made my first trials by agitating water in contact with the gas, in the manner in which water is generally impregnated with fixed air; but the suffocating vapour which exhaled determined me to employ Mr. Woulfe's apparatus, instead of that process. I placed, between the retort and the bottles filled with water, (designed to be impregnated with the gas,) a small bottle, which I surrounded with ice, to condense the muriatic vapour which was not oxygenated;

I also surrounded with ice the bottles filled with water. I observed during this operation, that, when the water became saturated with the gas, this last took a concrete form, and fell slowly to the bottom of the water.

If there is filled with water, impregnated with the gas that is disengaged, (that is to say, with oxygenated muriatic acid,) a bottle having a long tube bent and plunged under a recipient filled with water, and this bottle is exposed to the light of the sun, bubbles are soon observed to be disengaged, which pass into the recipient, and which are of pure air (vital air, or oxygene gas); when the bubbles cease to be disengaged, the liquor has lost its odour, its colour, and all its distinguishing properties; it is then no other than water impregnated with common muriatic acid. This simple experiment is sufficient to convince us that the oxygenated muriatic acid is really nothing but a combination of the muriatic acid with the base of vital air, or oxygene, which is in such quantity in the black calx of manganese, that we need only urge this calx by a violent heat to draw off a great quantity; and then it is no longer proper for forming the oxygenated muriatic acid, inasmuch as it is deprived of that portion of oxygene which should combine with a part of the muriatic acid.

It is observable, that light has the property of disengaging the oxygene which has combined with the muriatic acid, by restoring to it that elasticity of which it was partly deprived; which heat alone is not able to do. It appears that light combines with the oxygene, and that it is to this combination the elastic state of vital air is owing, which, in losing afresh its elasticity by combustion, (that is to say, by a rapid union with certain substances,) lets also the principle of light escape, and at the same time much heat is disengaged; the true relation of which to light we are as yet ignorant of.

If vegetable colours are plunged into the oxygenated muriatic acid, they disappear more or less speedily, and more or less completely; when there is a mixture of different colouring particles, some of them disappear more easily, and admit only those to be perceived which offer a great resistance, but which have nevertheless suffered a greater or less alteration. It is most commonly the yellow parts which resist the most, but all at last disappear; and, when the oxygenated muriatic acid has spent its power, it is brought back to the state of common muriatic acid; the colouring particles have therefore taken away its oxygene, and have acquired by that combination new properties, having lost that of producing colours. We shall not say any more at present about the properties of these oxygenated particles; the oxygenated muriatic acid evidently owes the property of destroying colours to oxygene, with which it is combined in great quantity, but with which it is very loosely connected, and therefore easily enters into combination with those substances which have any affinity with it. The affinities of these colouring particles (so various in nature) with oxygene, with light, with alkalies, and other chemical agents, cannot but form a very interesting, and almost entirely new, part of philosophy.

ACIDITY, also *Acor*, *f.* Diseases from this cause are frequent.

The feat of acidity in our bodies, as a disease, is principally the stomach and the small intestines. An acid acrimony is never sensibly prevalent in the blood; yet urine hath been fermented into wine.

An acid acrimony may derive its origin either from too great laxity and debility of the organs of digestion, or from an excess of acrescent food. The ferment excited in our food by the stomach is *sui generis*; if any part of our aliment is not digested by the proper ferment of the stomach, it will run into its own ferment, and if vegetable it will become four. The food of children is for the most part of the vegetable kind, and readily turns four in the stomach, if the body be in any way disordered; hence most of their disorders are accompanied with the evident signs of acidity, as green stools, gripes, &c. Many assert a prevailing acid to be the cause of all diseases in children, but
acidity

acidity in their stomach, is oftener an effect than a cause of their complaints. It is not acidity, but its excess, that injures.

The redundant acid in the primæ viæ is known by the sourness of the eructations, the frequent cardialgia, with curdling of the chyle, &c. in the stomach, flatulence, and spasms in the intestines; when this cause is excessive in its degree, the bile is inert, the belly costive, and the nourishment is unduly supplied, a paleness becomes general in the skin, an itching comes on, and pustules appear here and there, and a train of nervous symptoms soon succeed. Indeed in all diseases peculiar to children, there are for the most part the symptoms of an excess of irritation, the pulse sometimes beats one hundred, or one hundred and twenty, in a minute, the stomach is sick, the vessels of the skin are contracted, and epileptic or convulsive symptoms appear.

Infants are frequently swept off by this disorder. Among adults, the weakly and sedentary are the only subjects of it, except among the poor, whose scanty supplies reduce them to this unhappy state.

The cure, when adults are the subjects, consists of a diet fitted to oppose this faulty habit; animal food, and vegetables of the aromatic alkaline kind: these, with moderate exercise at proper intervals, bid fair for a recovery. Absorbent medicine may palliate symptoms in the stomach and intestines, but the limat. ferri will most conduce to an effectual and lasting cure. Children should be exercised more, and fed less, than is usual; irregularity in these begets flatus, acidity, &c. Antinomial emetics repeated at intervals of two or three days, until the more disagreeable symptoms abate, are highly useful. Small doses of P. Rhæi, with magnes. alb. so as to keep the belly soluble, is better than purging; and to this end give small doses frequently. To free from flatulency, R. ol. ess. sem. fenic. d. gr. i. ocul. 69. pp. gr. v—x. m. & rep. bis vel ter in die. As to absorbents, a mixture of the magnesia alba with the ocul. 69. or other calcareous earths, ought generally to be preferred, and the doses should be very frequently repeated until some relief is obtained, and then their distances may be increased. Indeed in some cases, small doses of fixed, or volatile alkali, particularly liquor. C. C. have been highly beneficial, and warm stimulant plaisters applied to the umbilical region.

ACIDULOUS, *adj.* denotes a thing slightly acid; it is synonymous with the word *sub-acid*.

ACIDULÆ, *f.* [that is, *aqua acidula*.] Medicinal springs impregnated with sharp particles, as all the nitrous, chalybeate, and alum, springs are.—The *acidula*, or medical springs, emit a greater quantity of their minerals than usual; and, even the ordinary springs, which were before clear, fresh, and limpid, become thick and turbid, and are impregnated with sulphur and other minerals, as long as the earthquake lasts. *Woodward*.

Mineral waters that contain a brisk spirit when unaccompanied with heat are thus named; but, if they are hot also, they are called thermæ. In Paracelsus *fontale acetosum* is of the same import. As to the antiquity of their use, see Galen, Cælius Aurelianus, Pliny, &c. who speak largely of their virtues.

Hoffman and many authors highly extol them, whilst others observe that a pure water, on account of its simplicity, such as that from Malvern and Toplitz springs, is to be preferred both for drinking and for bathing; and that, in want of these, they may be well supplied by distilled rain, or any other that is soft and pure. Objectors say, that the medicinal qualities in these waters only quicken their operation as water, but contribute nothing farther, and that solutions of the like materials are of equal efficacy: to which the best reply has been, that the mineral contents are often volatile, and of parts more subtil than those of art's producing; and that, when the powers of nature are expiring, experience proves their efficacy by their success as a last resource.

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In general their views are according to the qualities of their contents; these known, their use is easily determined.

Bleeding, or purging, or both, are frequently prescribed before the use of mineral waters; but, except a plethora attends, they are not to be admitted. As these waters are designed to pass, so rest or exercise must be advised; rest and a cool situation favour their diuretic tendency; exercise and a warm air determine them to the skin; these, observed with temperance and moderation in the regimen, are the principal directions on which success depends.

Their brisk sparkling property is owing to the quantity of fixed air which they possess; and indeed to this, perhaps, is owing their chief use as medicine.

To ACIDULATE, *v. a.* [*aciduler*, Fr.] To impregnate or tinge with acids in a slight degree.

ACIDULATED, *f.* a name given to medicines that have an acid in their composition.

ACIDUM AEREUM, *f.* the same with FIXED AIR.

ACIDUM PINGUE, *f.* an imaginary acid, which some German chemists supposed to be contained in fire, and by combining with alkalies, lime, &c. to give them their caustic properties; an effect which is found certainly to depend on the loss of their fixed air.

ACILA, OCILA, or OCELIS, anciently a staple or mart town in Arabia Felix, on the Arabian gulf, from which, according to Pliny, they set sail for India. Now Ziden.

ACILIUS GLABRIO (Marcus), consul in the year of Rome 562, and 211 years before the Christian æra, distinguished himself by his bravery and conduct in gaining a complete victory over Antiochus the Great, king of Syria, at the straits of Thermopylæ in Thessaly, and on several other occasions. He built the Temple of Piety at Rome, in consequence of a vow he made before the above-mentioned battle: and the reason of his giving it that name is very remarkable. The story is mentioned by Pliny, Valerius Maximus, and others.

ACINACES, *f.* in antiquity, a kind of scymetar or cutlafs used among the Persians.

ACINIPPO, anciently a town of Bætica; its ruins, called *Ronda la Vieja*, are to be seen near Arunda, in the kingdom of Granada.

ACINODENDRUM, *f.* in botany, the trivial name of a species of MELASTOMA.

ACINOS, *f.* in botany, a trivial name of a species of THYMUS. See THYMUS.

ACINUS, or ACINI, *f.* the small protuberances of mulberries, strawberries, &c. and by some applied to grapes. Generally it is used for those small grains growing in bunches, after the manner of grapes, as ligustrum, &c.

ACIS, in fabulous history, the son of Faunus and Simetheis, was a beautiful shepherd of Sicily, who being beloved by Galatea, Polyphemus the giant was so enraged, that he dashed out his brains against a rock; after which Galatea turned him into a river, which was called by his name.

ACIS (Ovid, Theocritus); a river of Sicily, running from a very cold spring, in the woody and shady foot of mount Ætna, eastward into, and not much above a mile from, the sea, along green and pleasant banks, with the speed of an arrow, from which it takes its name. It is now called *Aci Iaci*, or Chinci, according to the different Sicilian dialects: Antonine calls it Acius. Also the name of a hamlet at the mouth of the Acis.

To ACKNOWLEDGE, *v. a.* [a word formed, as it seems, between the Latin and English, from *agnosco*, and *knowledge*, which is deduced from *cnathan*, Sax. to know.] To own the knowledge of; to own any thing or person in a particular character:

None that acknowledge God, or Providence,
Their soul's eternity did ever doubt.

Davis.

To confess; as, a fault.—For I acknowledge my transgressions; and my sin is ever before me. *Psalms*, ii. 3.—To own; as, a benefit; sometimes with the particle *to* before the

the person conferring the benefit.—In the place, therefore, I thankfully *acknowledge* to the Almighty power the assistance he has given me in the beginning, and the prosecution of my present studies. *Dryden*.

ACKNOWLEDGING, *adj.* Grateful; ready to acknowledge benefits received. A Gallicism, *reconnoissant*.

ACKNOWLEDGMENT, *f.* Concession of any character in another; as, existence, superiority.—The due contemplation of the human nature doth, by a necessary connexion and chain of causes, carry us up to the unavoidable *acknowledgment* of the Deity; because it carries every thinking man to an original of every successive individual. *Hale*.—Concession of the truth of any position. Confession of a fault. Confession of a benefit received; gratitude. Act of attestation to any concession; such as homage. Something given or done in confession of a benefit received.—The second is an *acknowledgment* to his majesty for the leave of fishing upon his coasts; and, though this may not be grounded upon any treaty, yet, if it appear to be an ancient right on our side, and custom on theirs, not determined or extinguished by any treaty between us, it may with justice be insisted on. *Temple*.

ACKNOWLEDGMENT-MONEY, *adj.* a certain sum paid by tenants, in several parts of England, on the death of their landlords, as an acknowledgment of their new lords.

ACKWORTH, Yorkshire, near Pontefract. In this village, the Society of the Friends in Great-Britain have a seminary, for their children of both sexes.

ACLIDES, *f.* in Roman antiquity, a kind of missive weapon, with a thong affixed to it, whereby to draw it back. Most authors describe it as a sort of dart or javelin; but Scaliger makes it roundish or globular, and full of spikes, with a slender wooden stem to poise it by.

ACLOWA, *f.* in botany, a barbarous name of a species of *COLUTEA*. It is used by the natives of Guinea to cure the itch: they rub it on the body as we do unguents.

ACME, *f.* [*ακμή*, Gr.] The height of any thing; more especially used to denote the height of a distemper, which is divided into four periods. 1. The *arche*, the beginning or first attack. 2. *Anabasis*, the growth. 3. *Acme*, the height. And, 4. *Paracme*, which is the declension of the distemper.

ACMELLA, *f.* in botany, the trivial name of a species of *SPILANTHUS*.

ACMONIA, and **AGMONIA**, in Peutinger's map, a town of Phrygia Major, now in ruins. The inhabitants are called Acmonenses by Cicero, and the city Civitas Acmonensis. Also a city of Dacia, on the Danube, near the ruins of Trajan's bridge, built by Severus, and called Severicum; distant 12 German miles from Temeswar, to the south-east.

ACNIDA, *f.* [*ακανθία*, a nettle; to which it bears some resemblance, without having its puriency.] In botany, a genus of the dioecia pentandria class, ranking in the natural order of scabridæ. The generic characters are—Male. Calyx: perianthium five-leaved; leaflets ovate, concave, acute, membranaceous on the edge. Stamina: filaments five, capillary, very short; antheræ versatile, bilocular, forked each way.—Female. Calyx: involucre many-leaved, linear, deciduous; perianthium two-leaved (three-cleft *g.*) linear, very small, permanent. Pistillum: germ superior, ovate; styles five, long, reflex, pubescent; stigmas simple. Pericarpium: fruit ovate, compressed, many-angled, (three-furrowed, three-sided *g.*) furrowed, covered with the succulent calyx. Seed: solitary, round, compressed.—*Essential Character*. Male. Calyx, five-leaved. Female. Calyx, two-leaved; styles, five; seed one, covered with the succulent calyx.

This plant, which is called Virginian hemp, grows naturally in Virginia, and in some other parts of North America, but is rarely cultivated in Europe, except in some few botanic gardens. It is near of kin to hemp, under which title it has been ranged by some former bota-

nists; there is little beauty in it, and at present no use has been made of it.

ACNUA, *f.* in Roman antiquity, signified a measure of land, about the English rood, or fourth part of an acre.

ACOEMETÆ, or **ACOEMETI**, in church history; or, men who lived without sleep: a set of monks who chanted the divine service night and day in their places of worship. They divided themselves into three bodies, who alternately succeeded one another, so that their churches were never silent. This practice they founded upon the precept, *Pray without ceasing*. They flourished in the east about the middle of the 5th century. There are a kind of acoemeti still subsisting in the Roman church, viz. the religious of the holy sacrament, who keep up a perpetual adoration, some one or other of them praying before the holy sacrament day and night.

ACOLUTHI, or **ACOLUTHISTS**, *f.* in antiquity, was an appellation given to those persons who were steady and immovable in their resolutions: and hence the stoics, because they would not forsake their principles, nor alter their resolutions, acquired the title of acoluthi. The word is Greek, and compounded of *α*, priv. and *κολεῖσθαι*, way; as never turning from the original course.

ACOLUTHI, among the ancient Christians, implied a peculiar order of the inferior clergy in the Latin church; for they were unknown to the Greeks for above 400 years. They were next to the sub-deacon; and we learn from the fourth council of Carthage, that the archdeacon, at their ordination, put into their hands a candlestick with a taper, giving them thereby to understand that they were appointed to light the candles of the church; as also an empty pitcher, to imply that they were to furnish wine for the eucharist. Some think they had another office, that of attending the bishop wherever he went. The word is Greek, and compounded of *α*, priv. and *καλῶναι*, to hinder or disturb.

ACOLYTHIA, *f.* in the Greek church, denotes the office or order of divine service; or the prayers, ceremonies, hymns, &c. whereof the Greek service is composed.

ACOMA, a town of North America, in New Mexico, seated on a hill with a good castle. To go into the town, you must walk up fifty steps cut out of the rock. It is the capital of that province, and was taken by the Spaniards in 1599. Lat. 35. 0. lon. 104. 15. W.

ACOMAC, the name of a county in Virginia. It is on the eastern side of the Chesapeake-bay, on a slip of land, by the Virginians called the Eastern Shore.

ACOMINATUS (Nicetas), was secretary to Alexius Comnenus and to Isaacus Angelus successively: he wrote an History from the death of Alexius Comnenus 1118, where Zonaras ended his, to the year 1203, which has undergone many impressions, and is much applauded by the best critics.

ACONCROBA, *f.* in botany, the indigenous name of a plant which grows wild in Guinea, and is in great esteem among the natives for its virtues in the small-pox. They give an infusion of it in wine. The leaves of this plant are opaque, and as stiff as those of the phillyrea; they grow in pairs, and stand on short foot-stalks; they are small at each end, and broad in the middle; and the largest of them are about three inches in length, and an inch and a quarter in breadth in the middle. Like those of our bay, they are of a dusky colour on the upper side, and of a pale green underneath.

ACONITE, *f.* [*aconitum*, Lat.] Properly the herb wolf's-bane, but commonly used in poetical language for poison in general:

Our land is from the rage of tygers freed,
Nor nourishes the lion's angry feed;
Nor pois'nous aconite is here produc'd,
Or grows unknown, or is, when known, refus'd.

Dryden.

ACONITI,

ACONITI, *f.* in antiquity, an appellation given to some of the **ATHLETÆ**, but differently interpreted. Mercurialis understands it of those who only anointed their bodies with oil, but did not smear themselves over with dust, as was the usual practice.

ACONITUM, *f.* [*aconitos, pulveris experts*; because this plant grows on rocks destitute of soil.] In botany, a genus of the polyandria tryginia class, ranking in the natural order of multiflora. The generic characters are—Corolla: petals five, unequal, opposite in pairs. 1. The highest helmet-tubed, inverted, the back upwards, obtuse; the top reflected to the base, acuminate, to which top the connecting base is opposite. 2, 3, The two lateral ones broad, roundish, opposite, converging. 4, 5, The two lowest oblong, pointing downwards. Nectaries two, concealed under the first petal, fistulous, nodding; mouth oblique, tail recurved; sitting on long subulate peduncles. Six little, very short, coloured, scales, in the same circle as the nectaries. Stamina: filaments subulate, very small, broader at the base, inclining towards the first petal; antheræ erect, small. Pistillum: germs three (five) oblong, ending in styles the length of the stamina; stigmas simple, reflex. Pericarpium: capsules as many as the styles, ovate-subulate, straight, one-valved, gaping inward. Seeds: very many, angular, wrinkled.—*Essential Character*. Petals five, the highest arched, shaped like a hood or helmet; nectaries two, peduncled, recurved; capsules three or five.

Description. The aconites are hardy, herbaceous perennials, with tuberous or strong fibrous roots; stems from two to six feet in height, upright, strong, furnished with many digitate or palmate leaves, and terminated by panicles or loose spikes of blue or yellow flowers.

Species. 1. With three capsules. 1. *Aconitum lycoctonum*, or great yellow monk's-hood or wolf's-bane: leaves palmate multifid villous. This species flowers about the middle of June, and, if the season is not too hot, will continue in blow till August. In Sweden it is reckoned among the earliest spring-flowers. A decoction or the powder of the root is used for destroying flies and other insects. Linnaeus gives an account of its being eaten in Medelpadia, a province of Sweden, without injury. It seems indeed to be milder than some of the other species; and goats and horses are said to eat it. The mountains of Lapland, Sweden, Switzerland, Germany, Austria, Carniola, Italy, and Siberia, produce it, in a wild state: and it was cultivated here in 1596 by Gerard.

2. *Aconitum japonicum*, or Japanese monk's-hood: leaves trifid-palmate; divisions gashed, blunt. It differs but little from the first, and is a native of Japan, where it is called *foo huo*.

3. *Aconitum napellus*, or common monk's-hood or wolf's-bane: divisions of the leaves linear, broader above, and scored with a line. Linnaeus says, that this species is fatal to kine and goats, especially when they come fresh to it, and are not acquainted with the plant; but that it does no injury to horses, who eat it only when dry. He also relates (from the Stockholm acts) that an ignorant surgeon prescribed the leaves, and, on the patient refusing to take them, he took them himself, and died. The ancients, who were unacquainted with chemical poisons, regarded the aconite as the most violent of all poisons; and accordingly fabled it to be the invention of Hecate, and to have sprung from the foam of Cerberus. Its real virulence is however sufficiently established by fatal experiment. Some persons, only by taking in the effluvia of the herb in full flower by the nostrils, have been seized with swooning fits, and have lost their sight for two or three days. But the root is unquestionably the most powerful part of the plant. Mathioli relates, that a criminal was put to death by taking one drachm of it. Wepfer informs us, that a wolf would probably have died from a dose of two drachms, had not the animal been dissected living, in order to observe the effects of the poison. Dodonæus gives us an instance, recent in his time, of five persons at Antwerp, who ate the

root by mistake, and all died. Dr. Turner also mentions, that some Frenchmen at the same place, eating the shoots of this plant for those of masterwort, all died in the course of two days, except two, who quickly evacuated all they had taken, by vomit. We have an account, in the Philosophical Transactions, of a man who was poisoned, in the year 1732, by eating some of this plant in a salad, instead of celery. Dr. Willis also, in his work *De Anima Brutorum*, gives an instance of a man who died in a few hours, by eating the tender leaves of this plant also in a salad. He was seized with all the symptoms of mania.—The aconite, thus invested with terrors, has however been so far subdued as to become a powerful remedy in some of the most troublesome disorders incident to the human frame. Baron Stoeck led the way by administering it in violent pains of the side and joints, in glandulous schirrh, tumours, ulcerous tubercles of the breast, &c. to the quantity of from ten to thirty grains in a dose, of an extract, the method of making which he describes. In Sweden, successful experiments have been made of an extract of the juice of the leaves, in cases of rheumatisms and intermittent fevers, given in doses of from a grain to a scruple twice or oftener in a day. A much larger dose has also been safely administered. It is recommended, however, to begin with a small quantity: a caution the more necessary when we consider the fatal effects, which the recent plant ignorantly eaten has sometimes produced. According to Dr. Murray in his App. Med. the chief virtue of the plant is in rheumatic and other chronic disorders. In all these cases the extract above-mentioned is the best preparation. It has also been said to be of considerable service in venereal cases, even those of a confirmed nature; to have even dissolved nodes, and cured obstinate ulcers, &c. In the *Gutta Serena* its efficacy has been commended; but perhaps not so certainly as in the before-mentioned disorders. This species comes into blow in August, and, were it not for its noxious quality, would deserve a place in every garden. It was cultivated in 1596, by Gerard; and it is found wild in Sweden, Switzerland, France, Germany, Austria, Carniola, Italy, Siberia, and Virginia.

4. *Aconitum pyrenaicum*, or Pyrenean or fennel-leaved monk's-hood or wolf's-bane: leaves many-parted, divisions linear incumbent and squarrose. This species grows wild on the Pyrenees, in Tartary and Siberia. The spike nods before the time of flowering, which in our gardens is July: the height there is about four feet, and it has a long spike of yellow flowers of a middling size. It may be allowed a place among shrubs, or in such parts of the garden as are not frequented by children.

II. With five capsules. 5. *Aconitum anthora*, or salutory monk's-hood: flowers with five pistils; divisions of the leaves linear. It flowers in the middle of August, and often continues in beauty till the middle of September; the flowers are not so large as those of some other sorts, but, being of a sulphur colour, make a pretty appearance in the borders of the flower-garden. It was formerly made use of in medicine, and recommended as an antidote to the poisonous species. The taste of the root is sweet with a mixture of bitterness and acrimony. The smell is pleasant. It purges vehemently when fresh, but loses its qualities when dried; it is disused in the present practice; and is certainly poisonous, though in a smaller degree than the others. The native places are the Pyrenees, the Alps of Switzerland, Savoy, and Piedmont; Dauphiné, Austria, Carniola, Siberia, &c. Cultivated in 1596 by Gerard.

6. *Aconitum variegatum*, or variegated or small blue monk's-hood: flowers with five pistils; divisions of the leaves parted half-way, broader above. This is a native of Italy and Bohemia. It flowers at the end of June; seldom grows more than two feet high, and the spikes of flowers are much shorter than in the first sort.

7. *Aconitum album*, or white wolf's-bane or monk's-hood: flowers with five pistils; leaves smooth three-parted, segments acutely gashed; the claw of the upper petal longer than the side ones. This species was found by Tournefort

Tournefort in the Levant, and was first raised in the royal garden at Paris, from the seeds which he sent, but afterwards became rare in Europe.

8. *Aconitum cammarum*, or purple monk's-hood or wolf's-bane: flowers mostly with five styles; divisions of the leaves wedge-shaped, gashed, acute. It is found wild in Switzerland, Austria, Stiria, Piedmont, &c. Haller found it with a white flower; and others have remarked it in Switzerland with flowers of a pale blue, variegated with white.

9. *Aconitum uncinatum*, or American monk's-hood or wolf's-bane: flowers mostly with five styles; leaves many-lobed; helmet extended very far. This species, which is a native of Pennsylvania, has flowers resembling those of the last, but leaves approaching more to the third.

Propagation and Culture. All the sorts of monk's-hood may be propagated by seeds, which should be sown in the autumn, in a shady situation; thus they will appear the spring following; whereas if they are sown in the spring, they generally lie till the year after, before they come up. The ground must be kept clean from weeds all the summer; and the plants should be watered in dry weather, till they are fit to transplant; when they are to be carefully taken up, and planted in shady borders, at the distance of fourteen inches each way, observing to water them till they have taken good root; after which they will require no other care, but to keep them clean from weeds, till the following autumn, when they may be transplanted to the places where they are to remain. They then require no attention but to cut down the stalks in autumn, after they have done flowering. The common monk's-hood will grow under the shade of trees, and is therefore proper to plant in ornamental woods and wildernesses. It will also increase very fast by means of its creeping roots, every piece of which will grow. The other sorts may be increased the same way; though most of these delight in shade, yet few of them will thrive under the drip of trees; they should be planted therefore in shady borders, not immediately overhung by trees, and thus they will continue much longer in flower, and thrive better than in an open exposure. They are all hardy perennials, require little care or culture, and have mostly handsome spikes of specious flowers; and are therefore desirable plants for shrubberies, and wilderness quarters.

ACONITUM HYEMALE, *f.* in botany. See **HELLEBORUS**.

ACONTIAS, *f.* in zoology, an obsolete name of the anguis jaculis, or dart-snake, belonging to the order of amphibia serpentes. See **ANGUIS**.

ACONTIUM, *f.* [*αcontion*], in Grecian antiquity, a kind of dart or javelin, resembling the Roman pilum.

ACONTIUS (Jaimes), a philosopher, civilian, and divine, born at Trent in the 16th century: he embraced the reformed religion; and, coming into England in the reign of Queen Elizabeth, was much honoured by her, which he acknowledges in a book dedicated to that queen. This work is his celebrated Collection of the Stratagems of Satan, which has been so often translated, and borne so many editions.

ACOPA, or *Αcopon*, *f.* [*α, non, and πορος, lassitude.*] At first this word signified the quality of the medicines which was to relieve pain, stiffness, and other ill effects of excessive weariness; but afterwards it only signified the degree of confidence which the medicines were of. These medicines were always external ones. In time the word was used to express those kinds of soft cerates which were applied to tumors, &c. It is also a name of the *trifolium paludosum*.

ACOSTAN, a mountainous island in the north seas between Asia and America, observed by Captain Cook.

ACORN, *f.* [*acern*, Sax. from *ac*, an oak, and *corn*, corn or grain; that is, the grain or fruit of the oak.] The seed or fruit borne by the oak:

The lofty oak from a small acorn grows,
And to the skies ascends with spreading boughs;

As years increase, it shades th' extended plain,
Then, big with death, and vengeance, ploughs the main.
Hence rises fame and safety to our shore,
And from an acorn springs Britannia's power.

ACORN, *f.* in sea-language, a little ornamental piece of wood, fashioned like a cone, and fixed on the uppermost point of the spindle, above the vane, on the malt-head. It is used to keep the vane from being blown off the spindle in a whirlwind, or when the ship leans much to one side under sail.

ACORNED, *adj.* Stored with acorns:

Like a full acorn'd boar.

Shakespeare.

ACORUS, *f.* [*αcoros*, from *αcoron*, the pupil, because it was esteemed good for disorders of the eyes.] In botany, a genus of the hexandria monogynia class, ranking in the natural order of piperitæ. The generic character, are—Calyx: spadix cylindric, entirely simple, covered with floscules; spathe, none; perianthium, none, unless the calyx be so named. Corolla: petals six, obtuse, concave, loose, thicker at the top, and in a manner truncate. Stamina: filaments thickish, a little longer than the corolla; antheræ thickish, twin, terminal, adnate. Pistillum: germ gibbous, rather oblong, the length of the stamina; style, none; stigma, a prominent point. Pericarpium: a short triangular capsule, attenuated to both ends, obtuse, three-celled. Seeds: many, ovate-oblong.—**Essential Character.** Spadix cylindric, covered with floscules. Corollas five-petalled, naked. Capsule three-celled.

Species. 1. *Acorus calamus*, or common sweet rush: the point of the scape very long and leafy. This species is sufficiently distinguished by its long sword-shaped leaves, resembling those of the flag (*iris pseudacorus*), but narrower, and of a brighter green. The root is also like that of the flag; long, cylindric, tuberos, spongy, marked with rings, and putting out abundance of fibres, which indeed are the proper roots. Linnæus observes, that the root powdered might supply the place of foreign spices; and that it is the only native aromatic plant of northern climates. It has a strong aromatic smell, and a warm, pungent, bitterish, taste. The flavour is greatly improved by drying. The roots are commonly imported from the Levant; but those of our own growth are full as good. The Turks candy them, and regard them as a preservative against contagion. They are also said to have cured agues, when the Peruvian bark has failed. No cattle whatever eat the plant. *Calamus aromaticus* grows naturally on the banks of rivers, and in standing waters that are shallow. It is found wild in many parts of England, as on Hounslow-heath near Uxbridge, and Harefield, in Middlesex; near Hedley, in Surrey; in the river Yare near Norwich, and about Lynn and Hillington, in Norfolk; in the river Waveney, by Bungay, in Suffolk; near Cambridge; in the Soar, between Loughborough and Kegworth; about Tamworth; in the Avon, near Pershore; and in many parts of Cheshire. With us it is not very abundant; but it grows plentifully in most of the ditches and standing waters of Holland, and is common in many other parts of Europe.—The Indian *calamus*, which grows in marsh ditches in the East Indies, differs little from the European, except that in all its parts it is more tender and narrow, and at the same time is of a more hot and biting taste. According to Father Loureiro's description, the leaves of this are much shorter than in ours, for he says they are scarcely a foot in length.

2. *Acorus gramineus*, or grass-leaved sweet-rush, or Chinese sweet-grass: the point of the stalk scarcely extending beyond the top of the spadix. The whole herb has an aromatic smell when bruised, much resembling our English sweet-flag; from which the present species is distinguished by the shortness of that portion of its stalk, which is above the spadix, as well as by all its parts, except the florets, being five times smaller than in that plant. It is probably a native of China; at least it is frequently cultivated, for the sake of its smell, in pots, about the habitations

habitations of the Chinese, from whence Mr. Aiton obtained it in 1786, by means of Allan Cooper, Esq. commander of the *Atlas* Indiaman. It flowers in the spring.

Propagation and Culture. The sweet-flag will succeed very well in gardens, if the ground be moist; but never produces its spikes unless it grows in the water. It loves an open situation, and does not thrive well under the shade of trees. The spikes of flowers appear towards the latter end of June, and continue till August. When this plant is fixed in a proper situation, it will multiply by its creeping roots fast enough.—The Chinese sweet-grass must be kept in a dry stove, and does not require a great degree of heat.

ACORUS, *f.* in the materia medica, a name sometimes given to the great galangal. See *KEMPFERIA*.

ACORUS, *f.* in natural history, blue coral. The true fort is very scarce; some, however, is fished on the coasts of Africa, particularly from Rio del Re to the river of the Camarones. This coral is part of the merchandise which the Dutch trade for with the Camarones: that of the kingdom of Benin is also very much esteemed. It grows in form of a tree on a rocky bottom.

ACOSMIA, *f.* An irregularity or disturbed state of

things, particularly of the critical days of fevers, as *κοσμος* meant their regular order, from *α*, neg. and *κοσμος*, ornament; called also *madifis*, *madroles*. Bald people were called *acofmoi*, because they had lost their great ornament. Blancard says it is an ill state of health, joined with a loss of colour in the face.

ACOUSMATICI, *f.* sometimes also called *Acouffici*, in Grecian antiquity, such of the disciples of Pythagoras as had not completed their five years probation.

ACOUSTIC, *adj.* [*ακουστικα*, Gr.] in general, denotes any thing that relates to the ear, the sense of hearing, or the doctrine of sounds.

ACOUSTIC DUCT, in anatomy, the same with *meatus auditorius*, or the external passage of the ear.

ACOUSTIC VESSELS, in the ancient theatres, were a kind of vessels, made of brass, shaped in the bell fashion, which, being of all tones within the pitch of the voice or even of instruments, rendered the sounds more audible, so that the actors could be heard through all parts of theatres, which were even 400 feet in diameter.

ACOUSTIC DISCIPLES, among the ancient Pythagoreans, those more commonly called *ACOUSMATICI*.

A C O U S T I C S.

ACOUSTICS, *f.* [*ακουστικα*, of *ακουω*, Gr. to hear.] is a science which instructs us in the nature of sound. As no sounds can be heard in *vacuo*, it is evident, that air is a vehicle for sound. However, we must not assert, that it is the only vehicle; for water, metals, and almost all substances of any density of texture, will not only transmit sound, but even convey it more regularly and perfectly than air, which is by no means a good vehicle. Fishes have a strong perception of sounds, even at the bottom of deep rivers. From hence, it would seem not to be very material in the propagation of sounds, whether the fluid which conveys them be elastic or otherwise. One thing, however, is certain, that whether the medium be elastic or not, whatever sound we hear is produced by a stroke, which the founding body makes against the fluid, whether air or water. The fluid being struck upon, carries the impression forward to the ear, and there produces its sensation. But the manner in which this conveyance is made, is still disputed. Whether the sound be diffused into the air, in circle beyond circle, like the waves of water when we disturb the smoothness of its surface by dropping in a stone; or whether it travels along, like rays diffused from a centre, somewhat in the swift manner that electricity runs along a rod of iron; are questions which have greatly divided the learned.

Newton was of the first opinion. He has explained the progression of sound by an undulatory, or rather a vermicular, motion in the parts of the air. If we have an exact idea of the crawling of some insects, we shall have a tolerable notion of the progression of sound upon this hypothesis. The worm for this instance, in its motion, first carries its contractions from the hinder part, in order to throw its fore part to the proper distance, then it carries its contractions from the fore part to the hinder to bring that forward. Something similar to this is the motion of the air when struck upon by a founding body, as the string of an harpichord screwed to a proper pitch, and made to vibrate by a stroke of the finger. From an impression thus made, there will be an alternate condensation and relaxation of the air during the time of one vibration; and, as the air going forward strikes any opposing body with great

er force than upon retiring, so each of these accelerated progressions has been called by Newton a *pulse* of sound. These pulses will move every way; for all motion impressed upon fluids in any direction whatsoever, operates all around in a sphere: so that sounds will be driven in all directions, and will go on succeeding each other, one on the outside of the other, like circles in disturbed water; or rather, they will lie one without the other, like the coats of an onion.

All who have remarked the tone of a bell, while its sounds are decaying away, must have an idea of these pulses of sound, which, according to Newton, are formed by the air's alternate progression and recession. And it must be observed, that, as each of these pulses is formed by a single vibration of the string, they must be equal to each other; for the vibrations of the string are known to be so.

The velocity with which sounds travel, Newton determines to be in proportion to the thickness of the parts of the air, and the distance of these parts from each other. He proves that each little part moves backward and forward like a pendulum; and demonstrates, that, if the atmosphere were of the same density every where as at the surface of the earth, a pendulum, that reached from its highest surface down to the surface of the earth, would by its vibrations discover to us the proportion of the velocity with which sounds travel. From hence he calculates, that the motion of sound will be 979 feet in one second. But, this not being consonant to experience, he takes in another consideration, namely, vapours in the air; and then finds the motion of sound to be 1142 feet in one second, or near 13 miles in a minute; a proportion which experience had established nearly before.

Various objections, however, have been made to the Newtonian System of Sounds. It is urged, that this theory can only agree with the motion of sound in an elastic fluid, whereas sounds are known to move forward through water, which is not elastic. To explain their progress therefore through water, a second theory must be formed; so that two theories must be made to explain a similar effect; which is contrary to true philosophy and the simplicity of nature.

nature. It is further urged, that this slow vermicular motion but ill represents the velocity with which sounds travel, as we know by experience that it is almost thirteen miles in a minute. In short, it is urged, that such undulations as have been described, when coming from several ignominious bodies at once, would cross, obstruct, and confound, each other; so that, if they were conveyed to the ear by this means, we should hear nothing but a medley of discord and broken articulations. These objections have given rise to the following theory:

Every sound may be considered as driven off from the sounding body in straight lines, and impressed upon the air in one direction only: but whatever impression is made upon the fluid in one direction, is diffused upon its surface into all directions; so that the sound first driven directly forward soon fills up a wide sphere, and is heard on every side. Now, as to the pulses, which a sounding body is known to make, each pulse (say the supporters of this theory) is itself a distinct and perfect sound, and the interval between every two pulses is profoundly silent. Continuity of sound from the same body is only a deception of the hearing; for, as each distinct sound succeeds at very small intervals, the organ has no time to transmit its images with equal swiftness to the mind, and the interval is thus lost to sense: just as when children run with their sticks along a rail, a continuing sound is thus represented, though the stroke against each is perfectly distinct.

According to this theory, therefore, the pulses are nothing more than distinct sounds repeated by the same body, the first stroke or vibration being ever the loudest, and travelling farther than those that follow; while each succeeding vibration gives a new sound, but with diminished force, till at last the pulses decay away totally, as the force decays that gives them existence.

Some bodies, wanting elasticity, give back no repetition of sound; the noise is at once begotten and dies: while other bodies, more elastic and capable of vibration, give back a sound, and repeat it several times successively. These last are said to have a *tone*. This tone of the elastic string, or bell, is notwithstanding nothing more than a similar sound of what the former bodies produced, but with the difference of being many times repeated. So that, if we would give the former bodies a tone, it will be necessary to make them repeat their sound, by repeating our blows swiftly upon them.

Let us now suppose, that by swift and continued strokes we give a non-elastic body its tone: it is very obvious, that no alterations will be made in this tone by the quickness of the strokes, though repeated ever so fast. These will only render the tone more equal and continuous, but make no alteration in the tone it gives. On the contrary, if we make an alteration in the force of each blow, a different tone will then undoubtedly be excited. The difference will be small, for the tones of inflexible bodies are capable but of small variation; however, there will certainly be a difference. The table on which we write, for instance, will return a different sound when struck with a club, from what it did when struck only with a switch. Thus non-elastic bodies return a difference of tone, not in proportion to the swiftness with which their sound is repeated, but in proportion to the greatness of the blow which produces it: for, in two equal non-elastic bodies, that body produces the deepest tone which is struck by the greatest blow.

We now then come to a critical question: What is it that produces the difference of tone in two elastic sounding bells, or strings? Or what makes one deep, and the other shrill? This question has been answered by saying, that the depth or height of the note proceeded from the slowness or swiftness of the times of the vibrations. The slowest vibrations, it has been said, are qualified for producing the deepest tones, while the swiftest vibrations produce the highest tones. In this case an effect has been given for a cause. It is in fact the force with which the sounding string strikes the air when struck upon, that

makes the true distinction in the tones of sounds. It is this force, with greater or less impressions, resembling the greater or less force of the blows upon a non-elastic body, which produces correspondent affections of sound. The greatest forces produce the deepest sound: the high notes are the effect of small efforts. In the same manner a bell, wide at the mouth, gives a grave sound; but, if it be very massy withal, that will render it still graver; but if massy, wide, and long or high, that will make the tone deepest of all.

Thus then will elastic bodies give the deepest sound, in proportion to the force with which they strike the air; but, if we should attempt to increase their force by giving them a stronger blow, this will be in vain; they will still return the same tone; for such is their formation, that they are sonorous only because they are elastic, and the force of this elasticity is not increased by our strength, as the greatness of a pendulum's vibration will not be increased by falling from a greater height.

Thus far of the length of chords. Now, as to the frequency with which they vibrate the deepest tones, it has been found, from the nature of elastic strings, that the longest strings have the widest vibrations, and consequently go backward and forward slowest; while, on the contrary, the shortest strings vibrate the quickest, or come and go in the shortest intervals. From hence those who have treated of sounds, have asserted, as was said before, that the tone of the string depended upon the length or the shortness of the vibrations. This, however, is not the case. One and the same string, when struck, must always, like the same pendulum, return precisely similar vibrations; but it is well known, that one and the same string, when struck upon, does not always return precisely the same tone: so that in this case the vibrations follow one rule, and the tone another. The vibrations must be invariably the same in the same string, which does not return the same tone invariably, as is well known to performers on the violin, who can alter the tone of a string an octave, by a softer method of drawing the bow; and these are called *flute-notes*. The only reason, it has been alleged, that can be assigned for this, must certainly be the different force of the strokes made upon the air. In one case, it has double the tone of the other; because, upon the soft touches of the bow, only half of its elasticity is put into vibration.

This being understood (continue the authors of this theory), we shall be able clearly to account for many things relating to sound that have hitherto been inexplicable. Thus, for instance, if it be asked, When two strings are stretched together of equal lengths, tensions, and thickness, how does it happen, that one of them being struck, and made to vibrate throughout, the other shall vibrate throughout also? The answer is obvious: The force that the string struck receives is communicated to the air, and the air communicates the same to the similar string; which therefore receives all the force of the former; and, the force being equal, the vibrations must be so too. Again, If one string be but half the length of the other, and be struck, how will the vibrations be? The answer is, The longest string will receive all the force of the string half as long as itself, and therefore it will vibrate in proportion, that is, through half its length. In the same manner, if the longest string were three times as long as the other, it would only vibrate in a third of its length; or, if four times, in a fourth of its length. In short, whatever force the smaller string impresses upon the air, the air will impress a similar force upon the longer string, and partially excite its vibrations.

From hence also we may account for the cause of those charming melancholy gradations of sound in the Eolian lyre; an instrument easily made, being nothing more than a long narrow box of thin deal, about 30 inches long, 3 inches broad, and $1\frac{1}{2}$ inches deep, with a circle in the middle of the upper side or belly about $1\frac{1}{2}$ inch diameter, pierced with small holes. On this side are from seven to fifteen strings of very fine gut, stretched over bridges at each

each end, like the bridge of a fiddle, and screwed up with screw-pins. The strings are all tuned to the same note; and the instrument is placed in some current of air, such as a window with the sash just raised. The air brushing the strings, will excite different tones of sound, and sometimes bring out all the tones in full concert, so as to occasion very pleasing gradations of sound.

It remains, lastly, to consider (by this theory) what the musicians call the strength and softness of sound. In vibrating elastic strings, the loudness of the tone is in proportion to the deepness of the note; that is, in two strings, all things in other circumstances alike, the deepest tone will be loudest. In musical instruments upon a different principle, as in the violin, it is otherwise; the tones are made in such instruments by a number of small vibrations crowded into one stroke. The refined bow, for instance, being drawn along a string, its roughness catches the string at very small intervals, and excites its vibrations. In this instrument, therefore, to excite loud tones, the bow must be drawn quick, and this will produce the greatest number of vibrations. But it must be observed, that the more quick the bow passes over the string, the less apt will the roughness of its surface be to touch the string at every instant: to remedy this, therefore, the bow must be pressed the harder as it is drawn quicker, and thus its fullest sound will be brought from the instrument. If the swiftness of the vibrations in an instrument thus rubbed upon, exceed the force of the deeper sound in another, then the swift vibrations will be heard at a greater distance, and as much farther off as the swiftness in them exceeds the force in the other.

By the same theory (it is alleged) may all the phenomena of musical sounds be easily explained. Let us suppose an anvil, or several similar anvils, to be struck upon by several hammers of different weights or forces. The hammer, which is double that of another, upon striking the anvil will produce a sound double that of the other: this double sound musicians have agreed to call an *octave*. The ear can judge of the difference or resemblance of these sounds with great ease, the numbers being as one and two, and therefore very readily compared. Suppose that an hammer, three times less than the first, strikes the anvil, the sound produced by this will be three times less than the first: so that the ear, in judging the similitude of these sounds, will find somewhat more difficulty; because it is not so easy to tell how often one is contained in three, as it is to tell how often it is contained in two. Again, suppose that an hammer four times less than the first strikes the anvil, the ear will find greater difficulty still in judging precisely the difference of the sounds; for the difference of the numbers four and one cannot so soon be determined with precision as three and one. If the hammer be five times less, the difficulty will increase. If the hammer be six times less, the difficulty still increases, and so also of the seventh, inasmuch that the ear cannot always readily and at once determine the precise gradation. Now, of all comparisons, those which the mind makes most easily, and with least labour, are the most pleasing. There is a certain regularity in the human soul, by which it finds happiness in exact, striking, and easily-made, comparisons. As the ear is but an instrument of the mind, it is therefore most pleased with the combination of any two sounds, the differences of which it can most readily distinguish. It is more pleased with the concord of two sounds which are to each other as one and two, than of two sounds which are as one and three, or one and four, or one and five, or one and six or seven. Upon this pleasure, which the mind takes in comparison, all harmony depends. The variety of sounds is infinite; but, because the ear cannot compare two sounds so as readily to distinguish their discriminations when they exceed the proportion of one and seven, musicians have been content to confine all harmony within that compass, and allowed but seven notes in musical composition.

Let us now then suppose a stringed instrument fitted up

in the order mentioned above. For instance, Let the first string be twice as long as the second; let the third string be three times shorter than the first; let the fourth be four times, the fifth string five times, and the sixth six times, as short as the first. Such an instrument would probably give us a representation of the lyre as it came first from the hand of the inventor. This instrument will give us all the seven notes following each other, in the order in which any two of them will accord together most pleasingly; but yet it will be a very inconvenient and a very disagreeable instrument: inconvenient, for, in a compass of seven strings only, the first must be seven times as long as the last; and disagreeable, because this first string will be seven times as loud also; so that, when the tones are to be played in a different order, loud and soft sounds would be intermixed with the most disgusting alternations. In order to improve the first instrument, therefore, succeeding musicians very judiciously threw in all the other strings between the two first, or, in other words, between the two octaves, giving to each, however, the same proportion to what it would have had in the first natural instrument. This made the instrument more portable, and the sounds more even and pleasing. They therefore disposed the sounds between the octave in their natural order, and gave each its own proportional dimensions. Of these sounds, where the proportion between any two is most obvious, the concord will be most pleasing. Thus octaves, which are as two to one, have a most harmonious effect; the fourth and fifth also sound sweetly together, and they will be found, upon calculation, to bear the same proportion to each other as the octaves do. Let us then cease to assign the coincidences of vibrations as the cause of harmony, since these coincidences in two strings vibrating at different intervals must at best be but fortuitous; whereas concord is always pleasing.

But there is another property in the vibration of a musical string not yet taken notice of, and which is alleged to confirm the foregoing theory. If we strike the string of an harpsichord, or any other elastic sounding chord whatever, it returns a continuing sound. This till of late was considered as one simple uniform tone; but all musicians now confess, that instead of one tone it actually returns four tones, and that constantly. The notes are, beside the fundamental tone, an octave above, a twelfth above, and a seventeenth. One of the bass-notes of an harpsichord has been dissected in this manner by Rameau, and the actual existence of these tones proved beyond a possibility of being controverted.

In the whole theory of sounds, nothing has given greater room for speculation, conjecture, and disappointment, than this amazing property in elastic strings. The whole string is universally acknowledged to be in vibration in all its parts, yet this single vibration returns no less than four different sounds. They who account for the tones of strings by the number of their vibrations, are here at the greatest loss; yet if we allow the difference of tone to proceed from the force, and not the frequency, of the vibrations, this difficulty will admit of an easy solution. These sounds, though they seem to exist together in the string, actually follow each other in succession: while the vibration has greatest force, the fundamental tone is brought forward: the force of the vibration decaying, the octave is produced, but almost only instantaneously; to this succeeds, with diminished force, the twelfth; and, lastly, the seventeenth is heard to vibrate with great distinctness, while the three other tones are always silent. These sounds, thus excited, are all of them the harmonic tones, whose differences from the fundamental tone are, as was said, strong, and distinct. On the other hand, the discordant tones cannot be heard. Their differences being but very small, they are overpowered, and in a manner drowned in the tones of superior difference: yet not always neither; for Daniel Bernoulli has been able, from the same stroke, to make the same string bring out its harmonic and its discordant tones also. So that from hence we may justly infer, that every note whatsoever is only a succession of tones;

tones; and that those are most distinctly heard whose differences are most easily perceivable.

To this theory, however, though it has a plausible appearance, there are strong and indeed insuperable objections. The very fundamental principle of it is false. No body whatever, whether elastic or non-elastic, yields a graver sound by being struck with a larger instrument, unless either the sounding body, or that part of it which emits the sound, is enlarged. In this case, the largest bodies always return the gravest sounds.

In speaking of elastic and non-elastic bodies in a musical sense, we are not to push the distinction so far as when we speak of them philosophically. A body is *musically* elastic, all of whose parts are thrown into vibrations so as to emit a sound when only part of their surface is struck. Of this kind are bells, musical strings, and all bodies whatever that are considerably hollow. Musical non-elastics are such bodies as emit a sound only from that particular place which is struck: thus, a table, a plate of iron nailed on wood, a bell sunk in the earth, are all of them non-elastics in a musical sense, though not philosophically so. When a solid body, such as a log of wood, is struck with a switch, only that part of it emits a sound which comes in contact with the switch; the note is acute and loud, but would be no less so though the adjacent parts of the log were removed. If, instead of the switch, a heavier or larger instrument is made use of, a larger portion of its surface then returns a sound, and the note is consequently more grave; but it would not be so, if the large instrument struck with a sharp edge, or a surface only equal to that of the small one.

In sounds of this kind, where there is only a single thwack, without any repetition, the immediate cause of the gravity or acuteness seems to be the quantity of air displaced by the sounding body; a large quantity of air displaced produces a grave sound, and a smaller quantity a more acute one, the force wherewith the air is displaced signifying very little.—What we here advance is confirmed by some experiments made by Dr. Priestley, concerning the *musical tone* of electrical discharges. These shew how much the gravity or acuteness of sounds depends on the quantity of air put in agitation by the sounding body. We know that the noise of the electric explosion arises from the return of the air into the vacuum produced by the electric flash. The larger the vacuum, the deeper is the note: for the same reason, the discharge of a musket produces a more acute note than that of a cannon; and thunder is deeper than either.

Besides this, however, other circumstances concur to produce different degrees of gravity or acuteness in sounds. The sound of a table struck upon with a piece of wood, will not be the same with that produced from a plate of iron struck by the same piece of wood, even if the blows should be exactly equal, and the iron perfectly kept from vibrating.—Here the sounds are generally said to differ in their degrees of acuteness according to the specific gravities or densities of the substances which emit them. Thus gold, which is the most dense of all metals, returns a much graver sound than silver; and metalline wires, which are more dense than thermes, return a proportionably greater sound.—But neither does this appear to be a general rule in which we can put confidence. Bell-metal is denser than copper, but it by no means appears to yield a graver sound; on the contrary, it seems very probable, that copper will give a graver sound than bell-metal, if both are struck upon in their non-elastic state; and we can by no means think that a bell of pure tin, the least dense of all the metals, will give a more acute sound than one of bell-metal, which is greatly more dense.—In some bodies harshness seems to have a considerable effect. Glass, which is considerably harder than any metal, gives a more acute sound; bell-metal is harder than gold, lead, or tin, and therefore sounds much more acutely; though how far this holds with regard to different substances, there are not a sufficient number of experiments for us to judge.

In bodies musically elastic, the whole substance vibrates with the slightest stroke, and therefore they always give the same note whether they are struck with a large or with a small instrument; so that striking a part of the surface of any body musically elastic is equivalent, in it, to striking the whole surface of a non-elastic one. If the whole surface of a table was struck with another table, the note produced would be neither more nor less acute whatever force was employed; the sound would indeed be louder in proportion to the force employed, but the gravity would remain the same. In like manner, when a bell, or musical string, is struck, the whole substance vibrates, and a greater stroke cannot increase the substance. Hence we see the fallacy of what is said concerning the Pythagorean anvils.

Lastly, The argument for the preceding theory, grounded on the production of what are called *flute-notes* on the violin, is built on a false foundation; for the bow, being lightly drawn on an open string, produces no *flute-notes*, but only the harmonies of the note to which the string is tuned. The *flute-notes* are produced by a particular motion of the bow, quick and near the bridge, and by fingering very gently. By this management, the same sounds are produced, though at certain intervals only, as if the vibrations were transferred to the space between the end of the finger-board and the finger, instead of that between the finger and the bridge.

Though these objections seem sufficiently to overturn the foregoing theory, with regard to acute sounds being the effects of weak strokes, and grave ones of stronger impulses, we cannot admit that longer or shorter vibrations are the occasion of gravity or acuteness in sound. A musical sound, however lengthened, either by string or bell, is only a repetition of a single one, whose duration by itself is but for a moment, and is therefore termed *inappreciable*, like the smack of a whip, or the explosion of an electrical battery. The continuation of the sound is nothing more than a repetition of this instantaneous inappreciable noise after the manner of an echo, and it is only this echo that makes the sound agreeable. For this reason, music is much more agreeable when played in a large hall where the sound is reverberated, than in a small room where there is no such reverberation. For the same reason, the sound of a string is more agreeable when put on a hollow violin than when fastened to a plain board, &c.—In the sound of a bell we cannot avoid observing this echo very distinctly. The sound appears to be made up of distinct pulses, or repetitions of the same note produced by the stroke of the hammer. It can by no means be allowed, that the note would be more acute though these pulses were to succeed one another more rapidly; the sound would indeed become more simple, but would still preserve the same tone.—In musical strings the reverberations are vastly more quick than in bells; and therefore their sound is more uniform or simple, and consequently more agreeable, than that of bells. In musical glasses, the vibrations must be inconceivably quicker than in any bell, or stringed instrument; and hence they are of all others the most simple and the most agreeable, though neither the most acute nor the loudest.—As far as we can judge, quickness of vibration contributes to the uniformity, or simplicity, but not to the acuteness, nor to the loudness, of a musical note.

It may here be objected, that each of the different pulses, of which we observe the sound of a bell to be composed, is of a very perceptible length, and far from being instantaneous; so that it is not fair to infer that the sound of a bell is only a repetition of a single instantaneous stroke, seeing it is evidently the repetition of a lengthened note.—To this it may be replied, that the inappreciable sound which is produced by striking a bell in a non-elastic state, is the very same which, being first propagated round the bell, forms one of these short pulses that is afterwards re-echoed as long as the vibrations of the metal continue, and it is impossible that the quickness of repetition of any sound

found can either increase or diminish its gravity, in any degree whatever.

The subject next to be considered in the order of the present work, is the propagation of sound; but, as the doctrine of Sir Isaac Newton is very generally known and acknowledged, we refer to the clear, explanatory, and able, defence of his 47th proposition, by Mr. Young, of Trinity College, Dublin.

Of the Velocity, &c. of Sound.

Experience has taught us, that sound travels at about the rate of 1142 feet in a second, or near 13 miles in a minute; nor do any obstacles hinder its progress, a contrary wind only a small matter diminishing its velocity. The method of calculating its progress is easily understood. When a gun is discharged at a distance, we see the fire long before we hear the sound. If then we know the distance of the place, and know the time of the interval between our first seeing the fire and hearing the report, it will shew us exactly the time the sound has been in travelling to us. For instance, if the gun is discharged a mile off, the moment the flash is seen, you take a watch and count the seconds till you hear the sound; the number of seconds is the time the sound has been travelling a mile. Again, by the above axiom, we are enabled to find the distance between objects that would be otherwise immeasurable. For example, suppose you see the flash of a gun in the night at sea, and tell seven seconds before you hear the report, it follows therefore, that the distance is seven times 1142 feet, that is, 24 yards more than a mile and a half. In like manner, if you observe the number of seconds between the lightning and the report of the thunder, you know the distance of the cloud from whence it proceeds.

Derham has proved, by experiment, that all sounds whatever travel at the same rate. The sound of a gun, and the striking of a hammer, are equally swift in their motions; the softest whisper flies as swiftly, as far as it goes, as the loudest thunder.

To these axioms we may add the following:—Smooth and clear sounds proceed from bodies that are homogeneous, and of an uniform figure; and harsh or obtuse sounds, from such as are of a mixed matter and irregular figure.

The velocity of sound is to that of a brisk wind as fifty to one.

The strength of sounds is greatest in cold and dense air, and least in that which is warm and rarefied.

Every point against which the pulses of sound strike, becomes a centre from which a new series of pulses are propagated in every direction.

Sound describes equal spaces in equal times.

Of Reverberated Sounds.

Sound, like light, after it has been reflected from several places, may be collected in one point, as into a focus; and it will be there more audible than in any other part, even than at the place from whence it proceeded. On this principle it is that a whispering gallery is constructed.

The form of this gallery must be that of a concave hemisphere, as ABC in the annexed figure; and, if a low sound or whisper be uttered at A, the vibrations expanding themselves every way will impinge on the points DDD, &c. and from thence be reflected to EEE, and from thence to the points F and G, till at last they all meet in C, where, as we have said, the sound will be the most distinctly heard.

The augmentation of sound by means of speaking-trumpets.

pets is accounted for in the following manner: When a person speaks through the trumpet, the whole force of his voice is spent upon the air contained in the tube, which will be agitated through the whole length of the tube; and, by various reflections from the side of the tube to the axis, the air along the middle part of the tube will be greatly condensed, and its *momentum* proportionally increased, so that when it comes to agitate the air at the orifice of the tube, its force will be as much greater than what it would have been without the tube, as the surface of a sphere, whose radius is equal to the length of the tube, is greater than the surface of the segment of such a sphere whose base is the orifice of the tube.

But it is obvious, notwithstanding, that the confinement of the voice can have little effect in increasing the strength of sound, as this strength depends on the velocity with which the particles move. Were this reasoning conclusive, the voice should issue through the smallest possible orifice; cylindrical tubes would be preferable to any that increased in diameter; and the less the diameter, the greater would be the effect of the instrument; because the plate or mass of air to be moved, would, in that case, be less, and consequently the effect of the voice the greater; all which is contradicted by experience.

The cause of the increase of sound in these tubes must therefore be derived from some other principles: amongst these we shall probably find, that what the ingenious Kircher has suggested in his *Phonurgia* is the most deserving of our attention. He tells us, that "the augmentation of the sound depends on its reflection from the tremulous sides of the tube; which reflections, conspiring in propagating the pulses in the same direction, must increase its intensity." Newton also seems to have considered this as the principal cause, in the Scholium of Prop. 50. B. 2. Princip. when he says, "We hence see why sounds are so much increased in stentorophonic tubes, for every reciprocal motion is, in each return, increased by the generating cause."

Farther, when we speak in the open air, the effect on the tympanum of a distant auditor is produced merely by a single pulse. But when we use a tube, all the pulses propagated from the mouth, except those in the direction of the axis, strike against the sides of the tube, and every point of impulse becoming a new centre, from whence the pulses are propagated in all directions, a pulse will arrive at the ear from each of those points: thus, by the use of a tube, a greater number of pulses are propagated to the ear, and consequently the sound increased. The confinement too of the voice may have an effect, though not such as is ascribed to it by some; for the condensed pulses produced by the naked voice freely expand every way; but, in tubes, the lateral expansion being diminished, the direct expansion will be increased, and consequently the velocity of the particles, and the intensity of the sound. The substance also of the tube has its effect; for it is found by experiment, that the more elastic the substance of the tube, and consequently the more susceptible it is of these tremulous motions, the stronger is the sound.

If the tube be laid on any non-elastic substance, it deadens the sound, because it prevents the vibratory motion of the parts. The sound is increased in speaking-trumpets, if the tube be suspended in the air; because the agitations are then carried on without interruption. These tubes should increase in diameter from the mouth-piece, because the parts, vibrating in directions perpendicular to the surface, will conspire in impelling forward the particles of air, and consequently, by increasing their velocity, will increase the intensity of the sound: and the surface also increasing, the number of points of impulse and of new propagations will increase proportionally. The several causes therefore, of the increase of sound in these tubes, Mr. Young concludes to be, 1. The diminution of the lateral, and consequently the increase of the direct, expansion and velocity of the included air. 2. The increase of

the number of pulses, by increasing the points of new propagation. 3. The reflections of the pulses from the tremulous sides of the tube, which impel the particles of air forward, and thus increase their velocity.

An echo is a reflection of sound striking against some object, as an image is reflected in a glass: but it has been disputed what are the proper qualities in a body for thus reflecting sounds. It is in general known, that caverns, grottoes, mountains, and ruined buildings, return this image of sound. We have heard of a very extraordinary echo, at a ruined fortress near Louvain, in Flanders. If a person sang, he only heard his own voice, without any repetition: on the contrary, those who stood at some distance, heard the echo but not the voice; but then they heard it with surprising variations, sometimes louder, sometimes softer, now more near, then more distant. There is an account in the *Memoires of the French Academy*, of a similar echo near Rouen.

As it is plain, that every point against which the pulses of sound strike becomes the centre of a new series of pulses, and sound describes equal distances in equal times, therefore, when any sound is propagated from a centre, and its pulses strike against a variety of obstacles, if the sum of the right lines drawn from that point to each of the obstacles, and from each obstacle to a second point, be equal, then will the latter be a point in which an echo will be heard. All the points of the obstacles which produce an echo, must lie in the surface of the oblong spheroid, generated by the revolution of this ellipse round its major axis; but, as there may be several spheroids of different magnitudes, so there may be several different echoes of the same original sound. And, as there may happen to be a greater number of reflecting points in the surface of an exterior spheroid than in that of an interior, a second or a third echo may be much more powerful than the first, provided that the superior number of reflecting points, that is, the superior number of reflected pulses propagated to the ear, be more than sufficient to compensate for the decay of sound which arises from its being propagated through a greater space. This is finely illustrated in the celebrated echoes at the lake of Killarney in Kerry, where the first return of the sound is much inferior in strength to those which immediately succeed it.

From what has been laid down it appears, that for the most powerful echo, the sounding body should be in one focus of the ellipse which is the section of the echoing spheroid, and the hearer in the other. However, an echo may be heard in other situations, though not so favourably; as such a number of reflected pulses may arrive at the same time at the ear as may be sufficient to excite a distinct perception. Thus a person often hears the echo of his own voice; but for this purpose he should stand at least sixty-three or sixty-four feet from the reflecting obstacle, according to what has been said before. At the common rate of speaking, we pronounce not above three syllables and an half, that is, seven half-syllables in a second; therefore, that the echo may return just as soon as three syllables are expressed, twice the distance of the speaker from the reflecting object must be equal to 1000 feet; for, as sound describes 1142 feet in a second, $\frac{2}{3}$ ths of that space, that is, 1000 feet nearly, will be described while six half or three whole syllables are pronounced: that is, the speaker must stand near 500 feet from the obstacle. And in general, the distance of the speaker from the echoing surface, for any number of syllables, must be equal to the seventh part of the product of 1142 feet multiplied by that number. In churches we never hear a distinct echo of the voice, but a confused sound when the speaker utters his words too rapidly; because the greatest difference of distance between the direct and reflected courses of such a number of pulses as would produce a distinct sound, is never in any church equal to 127 feet, the limit of echoes.

But though the first reflected pulses may produce no

echo, both on account of their being too few in number, and too rapid in their return to the ear; yet it is evident, that the reflecting surface may be so formed, as that the pulses which come to the ear after two reflections or more may, after having described 127 feet or more, arrive at the ear in sufficient numbers, and also so nearly at the same instant, as to produce an echo, though the distance of the reflecting surface from the ear be less than the limit of echoes. This is confirmed by a singular echo in a grotto on the banks of the little brook called the Dinan, about two miles from Castlecomber, in the county of Kilkenny. As you enter the cave, and continue speaking loud, no return of the voice is perceived; but on your arriving at a certain point, which is not above fourteen or fifteen feet from the reflecting surface, a very distinct echo is heard. Now this echo cannot arise from the first course of pulses that are reflected to the ear, because the breadth of the cave is so small, that they would return too quickly to produce a distinct sensation from that of the original sound: it therefore is produced by those pulses, which, after having been reflected several times from one side of the grotto to the other, and having run over a greater space than 127 feet, arrive at the ear in considerable numbers, and not more distant from each other, in point of time, than the ninth part of a second.

Entertaining Experiments and Contrivances.

I. Place a concave mirror of about two feet diameter in a perpendicular direction. The focus of this mirror may be at fifteen or eighteen inches distance from its surface. At the distance of about five or six feet let there be a partition, in which there is an opening equal to the size of the mirror; against this opening must be placed a picture, painted in water-colours, on a thin cloth, that the sound may easily pass through it.

Behind the partition, at the distance of two or three feet, place another mirror, of the same size as the former, and let it be diametrically opposite to it.

At the central point let there be placed the figure of a man seated on a pedestal, and let his ear be placed exactly in the focus of the first mirror: his lower jaw must be made to open by a wire, and shut by a spring; and there may be another wire to move the eyes: these wires must pass through the figure, go under the floor, and come up behind the partition.

Let a person, properly instructed, be placed behind the partition near the mirror. You then propose to any spectator to speak softly to the statue, by putting his mouth to the ear of it; assuring him that it will answer instantly. You then give the signal to the person behind the partition, who, by placing his ear to the focus of the mirror, will hear distinctly what the person said; and, moving the jaw and eyes of the statue by the wires, will return an answer directly, which will in like manner be distinctly heard by the first speaker.

This experiment appears to be taken from the *Century of Inventions* of the Marquis of Worcester; whose designs, at the time they were published, were treated with ridicule and neglect as being impracticable, but are now known to be generally, if not universally, practicable. The words of the marquis are these: "How to make a brazen or stone head in the midst of a great field or garden, so artificial and natural, that though a man speak ever so softly, and even whisper into the ear thereof, it will presently open its mouth, and resolve the question in French, Latin, Welsh, Irish, or English, in good terms, uttering it out of its mouth, and then shut it until the next question be asked."—The two following, of a similar nature, appear to have been the inventions of Kircher, by means of which, (as he informs us) he used to "utter feigned and ludicrous consultations, with a view to shew the fallacy and imposture of ancient oracles."

II. Let there be two heads of plaster of Paris, placed on pedestals, on the opposite sides of a room. There must

be a tin tube of an inch diameter, that must pass from the ear of one head, through the pedestal under the floor, and go up to the mouth of the other. Observe, that the end of the tube which is next the ear of the one head, should be considerably larger than that end which comes to the mouth of the other. Let the whole be so disposed that there may not be the least suspicion of a communication.

Now, when a person speaks, quite low, into the ear of one bust, the sound is reverberated through the length of the tube, and will be distinctly heard by any one who shall place his ear to the mouth of the other. It is not necessary that the tube should come to the lips of the bust. If there be two tubes, one going to the ear, and the other to the mouth, of each head, two persons may converse together, by applying their mouth and ear reciprocally to the mouth and ear of the busts; and at the same time other persons that stand in the middle of the chamber, between the two heads, will not hear any part of their conversation. This contrivance forms one of the most pleasing illusions now exhibited at Merlin's Museum of Mechanical Entertainments, in London.

III. Place a bust on a pedestal in the corner of a room, and let there be two tubes, as in the foregoing amusement, one of which must go from the mouth and the other from the ear of the bust, through the pedestal, and the floor, to an under apartment. There may be likewise wires that go from the under jaw and the eyes of the bust, by which they may be easily moved.

A person being placed in the under room, and at a signal given applying his ear to one of the tubes, will hear any question that is asked, and immediately reply; moving, at the same time, by means of the wires, the mouth and the eyes of the bust, as if the reply came from it.

IV. In a large case, such as is used for dials and spring-clocks, the front of which, or at least the lower part of it, must be of glass, covered on the inside with gauze, let there be placed a barrel-organ, which, when wound up, is prevented from playing, by a catch that takes a toothed wheel at the end of the barrel. To one end of this catch there must be joined a wire, at the end of which there is a flat circle of cork, of the same dimension with the inside of a glass tube, in which it is to rise and fall. This tube must communicate with a reservoir that goes across the front part of the bottom of the case, which is to be filled with spirits, such as is used in thermometers, but not coloured, that it may be the better concealed by the gauze.

This case being placed in the sun, the spirits will be ra-

refied by the heat; and, rising in the tube, will lift up the catch or trigger, and set the organ in play: which it will continue to do as long as it is kept in the sun; for the spirits cannot run out of the tube, that part of the catch to which the circle is fixed being prevented from rising beyond a certain point by a check placed over it.

When the machine is placed against the side of a room on which the sun shines strong, it may constantly remain in the same place, if you inclose it in a second case, made of thick wood, and placed at a little distance from the other. When you want it to perform, it will be only necessary to throw open the door of the outer case, and expose it to the sun.

But if the machine be moveable, it will perform on all seasons by being placed before the fire; and in the winter it will more readily stop when removed into the cold.

A machine of this sort is said to have been invented by Cornelius Dreble, in the last century. What the construction of that was, we know not; it might very likely be more complex, but could scarcely answer the intention more readily.

V. Under the keys of a common harpsichord, let there be fixed a barrel, something like that in a chamber-organ, with stops or pins corresponding to the tunes you would have it play. These stops must be moveable, so that the tunes may be varied at pleasure. From each of the keys let there go a wire perpendicular down: the ends of these wires must be turned up for about a quarter of an inch. Behind these wires let there be an iron bar, to prevent them from going too far back. Now, as the barrel turns round, its pins take the ends of the wires, which pull down the keys, and play the harpsichord. The barrel and wires are to be all inclosed in a case.

In the chimney of the same room where the harpsichord stands, or at least in one adjacent, there must be a smoke jack, from whence comes down a wire, or cord, that, passing behind the wainscot adjoining the chimney, goes under the floor, and up one of the legs of the harpsichord, into the case, and round a small wheel fixed on the axis of that first mentioned. There should be pulleys at different distances, behind the wainscot and under the floor, to facilitate the motion of the cord.

This machinery may be applied to any other keyed instrument, as well as to chimes, and to many other purposes where a regular continued motion is required.

An instrument of this sort may be considered as a perpetual motion, according to the vulgar acceptance of the term; for it will never cease going till the fire be extinguished, or some parts of the machinery be worn out.

A C Q

ACQS, a town at the foot of the Pyrenean mountains, in the government of Foix in France. It takes its name from the hot waters in these parts. Lat. 43. 0. lon. 1. 40. E.

ACQUA, a town in Tuscany, noted for warm baths. Lat. 43. 45. N. lon. 12. 10. E.

ACQUA-CHE-FAVELLA, a celebrated fountain in Calabria. It is near the mouth of the river Crata, and the ruins are called Sibari Rovinata.

To ACQUAINT, *v. a.* [*acquaint*, Fr.] To make familiar with; applied either to persons or things. It has *with* before the object.—*Acquaint* yourselves *with* things ancient and modern, natural, civil, and religious, domestic and rational; things of your own and foreign countries; and, above all, be well *acquainted with* God and yourselves; learn animal nature, and the workings of your own spirits. *Watts.*—To inform. *With* is more in use before the object than *of*.

ACQUAINTANCE, *f.* [*acquaintance*, Fr.] The state of

A C Q

being acquainted with; familiarity, knowledge. It is applied as well to persons as things, with the particle *with*.—Our admiration of a famous man lessens upon our nearer *acquaintance with* him; and we seldom hear of a celebrated person, without a catalogue of some notorious weaknesses and infirmities. *Addison.*—Familiar knowledge, simply without a preposition. A slight or initial knowledge, short of friendship, as applied to persons. The person with whom we are acquainted; him of whom we have some knowledge, without the intimacy of friendship. In this sense, the plural is in some authors, *acquaintance*, in others, *acquaintances*.—That young men travel under some tutor, I allow well, so that he be such a one that may be able to tell them, what *acquaintances* they are to seek, what exercises or discipline the place yieldeth. *Bacon.*

ACQUAINTED, *adj.* Familiar, well known; not new: Now call we our high court of parliament; That war or peace, or both at once, may be As things *acquainted* and familiar to us. *Shakespeare.*

ACQUEPENDENTE,

ACQUEPENDENTE, a pretty large town of Italy, in the territory of the church, and patrimony of St. Peter, with a bishop's see. It is seated on a mountain, near the river Paglia, ten miles W. of Orvieto, and fifty-seven N. by W. of Rome. Lat. 42. 43. lon. 11. 53. E.

ACQUARIA, a small town of Italy, in Frigiana, a district of Modena, which is remarkable for its medicinal waters. It is twelve miles south of the city of Modena. Lat. 44. 24. lon. 11. 17. E.

ACQUEST, *f.* [*acquies*, Fr. from *acquérir*, written by some *acquist*, with a view to the word *acquire*, or *acquista*.] Attachment, acquisition; the thing gained.—Mud, reposed near the ossea of rivers, makes continual additions to the land, thereby excluding the sea, and preserving these shells as trophies and signs of its new *acquists* and encroachments. *Woodward*.

ACQUEST, in law, signifies goods got by purchase or donation. See **CONQUEST**.

ACQUI, a town of Italy, in the duchy of Montferrat, with a bishop's see, and commodious baths. It was taken by the Spaniards in 1745, and re-taken by the Piedmontese in 1746; but after this, it was taken again and dismantled by the French, who afterwards forsook it. It is seated on the river Borno, 25 miles N. W. of Genoa, and 30 S. of Casal. Lat. 44. 40. lon. 8. 30. E.

To ACQUIESCE, *v. n.* [*acquiescer*, Fr. *acquiescere*, Lat.] To rest in, or remain satisfied with, without opposition or discontent. It has *in* before the object.—Others will, upon account of the receivedness of the proposed opinion, think it rather worthy to be examined than *acquiesced in*. *Boyle*.

ACQUIESCENCE, *f.* A silent appearance of content, distinguished on one side from avowed content, on the other from opposition.—Neither from any of the nobility, nor of the clergy, who were thought most averse from it, there appeared any sign of contradiction to that; but an entire *acquiescence* in all the bishops thought fit to do. *Clarendon*.—Satisfaction, rest, content. Submission, confidence.—The greatest part of the world take up their persuasions concerning good and evil, by an implicit faith, and a full *acquiescence* in the word of those, who shall represent things to them under these characters. *South*.

ACQUIRABLE, *adj.* That which may be acquired or obtained; attainable.—Those rational instincts, the connate principles engraven in the human soul, though they are truths *acquirable* and deducible by rational consequence and argumentation, yet seem to be inscribed in the very crasis and texture of the soul, antecedent to any acquisition by industry or the exercise of the discursive faculty in man. *Hale*.

To ACQUIRE, *v. a.* [*acquérir*, Fr. *acquiri*, Lat.] To gain by one's own labour or power; to obtain what is not received from nature, or transmitted by inheritance. To come to; to attain.—Motion cannot be perceived without the perception of its terms, viz. the parts of space which it immediately left, and those which it next *acquires*. *Glanville*.

ACQUIRED, *part. adj.* Gained by one's self, in opposition to those things which are bestowed by nature.

ACQUIRER, *f.* The person that acquires; a gainer.

ACQUIREMENT, *f.* That which is acquired; gain; attainment. The word may be properly used in opposition to the gifts of nature.—These his *acquirements*, by industry, were exceedingly both enriched and enlarged by many excellent endowments of nature. *Hayward*.

ACQUISITION, *f.* [*acquisitio*, Lat.] The act of acquiring or gaining. The thing gained; acquirement.—A state can never arrive to its period in a more deplorable crisis, than when some prince lies hovering like a vulture to dismember its dying carcase; by which means it becomes only an *acquisition* to some mighty monarchy, without hopes of a resurrection. *Swift*.

ACQUISITIVE, *adj.* [*acquisitivus*, Lat.] That which is acquired or gained.—He died not in his *acquisitive*, but in his native, soil; nature herself, as it were, claiming a

final interest in his body, when fortune had done with him. *Wotton*.

ACQUIST, *f.* Acquisition; attainment; gain. Not in use.

To ACQUIT, *v. a.* [*acquiter*, Fr.] To set free. To clear from a charge of guilt; to absolve; opposed to *condemn*, either simply with an accusative, as, *the jury acquitted him*, or with the particles *from* or *of*, which is more common, before the crime.—He that judges, without informing himself to the utmost that he is capable, cannot *acquit* himself of judging amiss. *Locke*.—To clear from any obligation.—Steady to my principles, and not dispirited with my afflictions, I have, by the blessing of God on my endeavours, overcome all difficulties; and, in some measure, *acquitted* myself of the debt which I owed the public, when I undertook this work. *Dryden*.—In a similar sense, it is said, *the man hath acquitted himself well*; that is, he hath discharged his duty.

ACQUITMENT, *f.* The state of being acquitted; or act of acquitting.—The word imports properly an *acquittal* or discharge of a man upon some precedent accusation, and a full trial and cognizance of his cause had thereupon. *South*.

ACQUITTAL, *f.* in law, signifies a discharge or being at rest from the suspicion of a crime; as he that is upon a trial and judgment given thereon discharged of a felony, is said to be acquitted of the felony: and, if he be drawn in question again for the same felony, he may plead *autrefois acquit*. For one shall not be brought into danger of his life upon the same accusation more than once: 1 *Inst.* 100. Acquittal is of two kinds; acquittal *in deed*, and acquittal *in law*. Acquittal in deed is, when a person is cleared by verdict. Acquittal in law is, as if two be indicted of felony, the one as principal, and the other as accessory, and the jury acquits the principal, in this case by law the accessory also is acquitted. 2 *Inst.* 384.

To ACQUITTANCE, *v. a.* To procure an acquittance; to acquit; a word not in present use:

But, if black scandal and foul-fac'd reproach
Attend the sequel of your imposition,
Your mere enforcement shall *acquittance* me
From all the impure blots and stains thereof.

Shakespeare.

ACQUITTANCE, *f.* The act of discharging from a debt.

ACQUITTANCE, in law, is a sort of release, being a discharge in writing of a sum of money or other duty, which ought to be paid or performed. As if one is bound to pay money upon an obligation, or rent reserved upon a lease, and the party to whom it is due, upon receipt thereof, gives a writing under his hand, witnessing that he is paid. This is such a discharge in law, that he cannot demand or recover the sum or duty again, if the acquittance is produced. *T. L.*

The obligor is not bound to pay money upon a single bond, unless the obligee will make him an acquittance. Nor is he bound to pay it before he has the acquittance. And in this case the obligor may compel the obligee to make him an acquittance. But otherwise it is in case of an obligation with a condition; for there one may aver payment. *Wood, b. ii. c. 3.*

But an acquittance is only an evidence of payment, and by the common law was not pleadable, because it is no deed.—But now, by the statute of 4 Anne, c. 16. where an action of debt shall be brought on a single bill or on a judgment, if the defendant hath paid the money due thereupon, such payment may be pleaded in bar of such action: and where an action of debt is brought upon a bond conditioned to be void on payment of a smaller sum, at a day and place certain; if the defendant hath paid, before the action brought, the principal and interest due by the condition of such bond, though not strictly according to the condition, yet it may be pleaded in bar of the action: and on payment into court of principal, interest, and costs, the same shall be a full discharge of the bond. *S. 12, 13.*

An acquittance in full of all *accounts* shall be extended only to accounts. *Wood, b. ii. c. 3.*

An acquittance in full of all *demands* will discharge all debts except such as are upon specialty under seal: for these can only be destroyed by some other specialty of equal force, as a general release. *Cro. Ja. 650.*

If a rent is behind for a number of years, and the landlord makes an acquittance of the last that is due, all the rest are presumed to be paid, and the law will admit no proof against this presumption. *1 Inst. 373.*

ACRA, a town of Africa, on the coast of Guinea, where the English, Dutch, and Danes, have strong forts, and each fort its particular village. Lat. 5. o. lon. o. 2. W.

ACRA was also one of the hills of Jerusalem, on which stood the lower town, which was Old Jerusalem; to which was afterwards added Zion, or the city of David. Probably called Acra, from the fortrefs which Antiochus built there in order to annoy the temple, and which Simon Maccabæus took and razed to the ground.

ACRA JAPYGiA, anciently called Salentia by Ptolemy; now *Capo di San Maria di Leuca*: a promontory in the kingdom of Naples, to the south-east of Otranto, where formerly was a town, now lying in ruins, on the Ionian sea, over against the Montes Acroceraunii of Epirus.

ACRÆ, anciently a town of Sicily, whose inhabitants were called Acrenses. It stood to the south of Syracuse, at the distance of twenty-four miles, near the place now called the monastery of *Santa Maria d'Arcia*.

ACRAGAS, or AGRAGAS, so called by the Greeks, and sometimes by the Romans, but more generally Agrigentum by the latter, was a town of Sicily. It was a place of great strength, standing on the top of a very steep rock, and washed on the south side by the river Acragas, now called *Fiume di Gergenti*, and on the south-west by the Hypsa, with a citadel to the south-east, externally surrounded by a deep gulf, which made it inaccessible but on the side next the town. It was famous for the tyrant Phalaris and his brazen bull. They were a people luxurious in their tables, and magnificent in their dwellings; of whom Empedocles, in Diogenes Laertius, says, that they lived to-day as if they were to die to-morrow, and built as if they were to live for ever. The country round the city was laid out in vine and olive yards, in the produce of which they carried on a great and profitable commerce with Carthage. Lat. 37. 20. lon. 13. 30. E.

ACRASIA, *f.* INTemperance, [from *α*, priv. and *κραννυμι*, to mix.] The ancients mixed one pint of wine with four or five of water. Asclepiades ordered half wine and half water; hence wine unmixd was called acrasia, which we construe intemperance; for the Latin word *tempero* is of the same import as *κραννυμι*, to mix. Hence the word was applied to excess, as in eating, drinking, venery, &c. By Hippocrates, and some others, it signifies imbecility. By physicians, it means the predominancy of one quality above another, either with regard to artificial mixtures, or the humours of the body.

ACRATH, anciently a place in Mauritania Tingitana, now supposed to be *Velez de Gomara*: a fortified town in the kingdom of Fez, with a citadel and commodious harbour on the Mediterranean, scarcely a mile distant from Penon de Velez, a Spanish fort. Lat. 34. 45. lon. 5. o. W.

ACRATISMA, *f.* a BREAKFAST. The derivation of this word is the same as that of acrasia, because the wine used on this occasion was not mixed with water. A breakfast among the old Greeks consisting of a morsel of bread steeped in wine.

Children and weakly people should not omit this meal. Our breakfasts should consist of the harder kinds of aliment, to promote a plentiful discharge of saliva.

ACRE, or ACRA, a sea-port town in Syria. It was formerly called Ptolemais, and is a bishop's see. It was very famous in the time of the crusadoes, and underwent several sieges both by the Christians and Saracens. It is situated at the north angle of a bay, which extends in a semicircle of three leagues, as far as the point of Carmel.

During the crusades, the possession of this town was long disputed by the Christians and Saracens. In 1192 it was taken from the latter by Richard I. of England, and Philip of France; and they gave it to the knights of St. John of Jerusalem, who kept possession of it 100 years, when it was retaken by the Saracens, and almost entirely destroyed. This event is rendered memorable by an act of singular resolution with which it was accompanied. A number of beautiful young nuns, terrified at the prospect of being exposed to the brutal lust of the infidels, determined to avoid the violation of their chastity by rendering themselves objects of aversion. With this view they cut off their noses and mangled their faces. The Saracens, inflamed with resentment at a spectacle which prevented the gratification of their appetites, immediately put them all to the sword. After the expulsion of the crusaders, it remained almost deserted; but in our time has again revived by the industry of Daher; and the works erected by Djezzar, within the last fifteen years, have rendered it one of the principal towns upon the coast. The mosque of this pacha is boasted as a master-piece of eastern taste. The bazar, or covered market, is not inferior even to those of Aleppo; and its public fountain surpasses in elegance those of Damascus, though the water is of a very indifferent quality. The pacha has derived the more honour from these works, as he was himself both the engineer and architect: he formed the plans, drew the designs, and superintended the execution.

Corn and cotton form the basis of the commerce of Acre, which is becoming more flourishing every day. Of late, the pacha, by an abuse common throughout all the Turkish empire, has monopolized all the trade in his own hands; no cotton can be sold but to him, and from him every purchase must be made. In vain have the European merchants claimed the privileges granted them by the sultan: Djezzar replied, that he was the sultan in his country, and continued his monopoly. These merchants in general are French, and have six houses at Acre, with a consul: an imperial agent too is lately settled there; also a resident for Russia.

That part of the bay of Acre in which ships anchor with the greatest security lies to the north of mount Carmel, below the village of Haifa (commonly called Caiffa). The bottom is good holding ground, and does not chafe the cables; but the harbour is open to the north-west wind, which blows violently along all this coast. Mount Carmel, which commands it to the south, is a flattened cone, and very rocky; it is about 2000 feet high. We still find among the brambles wild vines and olive trees, which prove that industry has formerly been employed even in this ungrateful soil. On the summit is a chapel dedicated to the prophet Elias, which affords an extensive prospect over sea and land. It is 20 miles S. of Tyre, and 37 N. of Jerusalem. Lat. 32. 40. lon. 39. 25. E.

ACRE, *f.* in the Mogul's dominions, the same with lack, and signifies the sum of 100,000 rupees; the rupee is of the value of the French crown of three livres, or thirty shillings of Holland; and 100 lacks of rupees make a couaron in Indostan, or 10,000,000 rupees: the pound sterling is about eight rupees; according to which proportion, a lack of rupees amounts to 12,500l. sterling.

ACRE, *f.* [*acre*, Sax.] the universal measure of land in Britain. The word did not originally signify a determined quantity of land, but any open ground, especially a wide champaign; and in this antique sense it seems to be preserved in the names of places, as Cattle-acre, West-acre, &c. An acre in England contains four square rods, a rod 40 perches or poles of 16½ feet each by statute. Yet this measure does not prevail in all parts of England, as the length of the pole varies in different counties, and is called customary measure, the difference running from the 16½ feet to 28. The acre is also divided into 10 square chains, of 22 yards each, that is, 4840 square yards.

The French acre, *arpent*, contains 1½ English acre, or 54,450 square English feet, whereof the English acre contains

tains only 43,560. The Strasburg acre is about half an English acre. The Welsh acre contains commonly two English ones. The Irish acre is equal to 1 acre, 2 roods, and 19 perches $\frac{22}{11}$, English.

Dr. Grew attempts to ascertain the number of acres in England, which, according to him, amounts to 46 millions and 80,000. The United Provinces are said to contain 4,382,000 acres: the province of Holland but one million of acres. The territory of the United States of America, according to calculations lately made by order of congress, contains 589 millions of acres, exclusive of water, which is computed at 51 millions more.

ACRE-FIGHT, an old sort of duel fought by English and Scottish combatants, between the frontiers of their kingdoms, with sword and lance: it was also called camp-fight, and the combatants champions, from the open field being the stage of trial.

ACRE-TAX, a tax laid on land at so much per acre. In some places this is also called acre-shot. Impositions on lands in the great level are to be raised by a proportionable acre-tax, 20 Car. II. cap. 8. An acre-tax of 2s. 6d. per acre, for draining Hadenham-level, 13 Geo. I. cap. 18.

ACREA, *f.* also ACROTHERIA, the extremities, i. e. the legs, arms, nose, and ears. Coldness in the extremities, which do not easily warm, are bad prefaces in fevers.

ACRIBELA, *f.* a term purely Greek, literally denoting an exquisite or delicate accuracy; sometimes used in our language, for want of a word of equal signification.

ACRID, *adj.* [*acer*, Lat.] Of a hot biting taste; bitter; so as to leave a painful heat upon the organs of taste.—Bitter and *acrid* differ only by the sharp particles of the first being involved in a greater quantity of oil than those of the last. *Arbutnot*.

ACRID MEDICINES are substances of a penetrating pungency: applied to the skin, they inflame it; chewed, they promote a discharge of the saliva; and, snuffed up the nose, they provoke sneezing. Considered as the subjects of pharmacy, they may be divided into classes, according as they yield their acrimony; which they do, 1st, by distillation. Thus mustard, horse-radish, scurvy-grass, &c. give out their properties. 2dly, By infusion only, as is the case with the greater celandine, pyrethrum, &c. 3dly, Neither by infusion nor distillation, as happens with the arum, dracunculus, &c. The general effects of acrid medicines are to stimulate the solids, and to dissolve tenacious juices. In leucophlegmatic habits, they are powerful expectorants, deobstruents, diuretics, and emmenagogues; and, if the patient is kept warm, they are good diaphoretics. In constitutions disposed to inflammation, or where there is already a degree of irritation, where the juices are too thin and acrid, or the viscera not found, these medicines are not to be used, for they aggravate these disorders. The trouble which acrid medicines give to the stomach, is that on which their virtue frequently depends.

ACRIDOPHAGI, in the ancient geography, an Ethiopian people, represented as inhabiting near the deserts, and to have fed on locusts. This latter circumstance their name imports; the word being compounded of the Greek *ακρις*, locust, and *φαγω*, to eat. We have the following account of them by Diodorus Siculus. Their stature was lower than that of other men; they were meagre, and extremely black. In the spring, high west winds drove from the desert to their quarter locusts of an extraordinary size, and remarkable for the squalid colour of their wings. So great was the number of these insects, that they were the only sustenance of the barbarians, who took them in the following manner:—At the distance of some stadia from their habitations there was a wide and deep valley. They filled this valley with wood and wild herbs, with which their country abounded. When the cloud of locusts appeared, which were driven on by the wind, they set fire to the fuel which they had collected. The smoke which arose from this immense fire was so thick, that the locusts, in crossing the valley, were stifled by it, and fell

in heaps on the ground. The passage of the locusts being thus intercepted for many days, they made a large provision of those insects. As their country produced great quantities of salt, they salted them, to render them more palatable, and to make them keep till the next season. This peculiar supply was their sole food: they had neither herds nor flocks. They were unacquainted with fishing; for they lived at a distance from the sea. They were very active, and ran with great swiftness. But their life was not of long duration; it exceeded not forty years; and the close of it was extremely miserable; for, in their old age, winged lice of different, but all of ugly, forms, bred in their bodies. This malady, which began in the breast and belly, soon spread through the whole frame. The patient at first felt an itching; and the agreeable sensation produced by his scratching of himself, preceded a most deplorable calamity. For when those lice, which had bred in his body, forced their way out, they caused effusions of corrupt blood, with excruciating pains in the skin. The unhappy man, with lamentable cries, was industrious himself to make passages for them with his nails. In short, these lice issued forth successively from the wounds made by the hands of the patient, as from a vessel full of holes, and in such numbers that it was impossible to exterminate them. Whether this extraordinary and dreadful distemper was occasioned by the food of the inhabitants of this country, or by a pestilential quality of their climate, it is difficult to determine. Indeed, as to the credibility of the whole account, we must leave the reader to judge.

But though the circumstance of these people should be deemed fabulous, yet may the *acridophagia* be true. It is well known, that to this day the inhabitants of Ethiopia, Arabia, &c. frequently use locusts as food. A late traveller, Dr. Sparman, informs us, "That locusts sometimes afford a high treat to the more unpolished and remote hordes of the Hottentots; when, as sometimes happens, after an interval of eight, ten, or twenty, years, they make their appearance in incredible numbers. At these times they come from the north, migrating to the southward, and do not suffer themselves to be impeded by any obstacles, but fly boldly on, and are drowned in the sea whenever they come to it. The females of this race of insects, which are most apt to migrate, and are chiefly eaten, are said not to be able to fly; partly by reason of the shortness of their wings; and partly on account of their being heavy and distended with eggs; and, shortly after they have laid these in the sand, they are said to die. It is particularly of these that the Hottentots make a brown coffee-coloured soup, which, at the same time, acquires from the eggs a fat and greasy appearance. The Hottentots are highly rejoiced at the arrival of these locusts, though they are sure to destroy every bit of verdure on the ground; but the Hottentots make themselves ample amends for this loss, by falling foul on the animals themselves, eating them in such quantities as in the space of a few days to get visibly fatter and in better condition than before."

The Abbé Poiret, also, in his Memoir on the Insects of Barbary and Numidia, informs us, "That the Moors make locusts a part of their food; that they go to hunt them; fry them in oil and butter; and sell them publicly at Tunis, at Bonne," &c.

From these accounts, we may see the folly of that dispute among divines about the nature of St. John's food in the wilderness: some maintaining the original word to signify the fruits of certain trees; others, a kind of birds, &c. but those who adhered to the literal meaning of the text were at least the most orthodox, although their arguments were perhaps not so strong as they might have been, had they had an opportunity of quoting such authors as the above.

ACRIMONIOUS, *adj.* Abounding with acrimony; sharp; corrosive.—If gall cannot be rendered *acrimonious*,
and

ACROCHORDUS, AND ACTINIA.

1. The Javan Acrochord or Warty Snake. 2 to 11. Curious Species of Actinia.

and bitter of itself, then whatever acrimony or amaritude redounds in it, must be from the admixture of melancholy. *Harvey.*

ACRIMONY, *f.* [*acrimonia*, Lat.] Sharpness, corrosiveness.—There be plants that have a milk in them when they are cut; as, figs, old lettuce, fow-thistles, and spurge. The cause may be an inception of putrefaction: for those milks have all an *acrimony*, though one would think they should be lenitive. *Bacon.*—Sharpness of temper, severity, bitterness of thought or language.—John the Baptist set himself, with much *acrimony* and indignation, to baffle this senseless arrogant conceit of theirs, which made them huff at the doctrine of repentance, as a thing below them, and not at all belonging to them. *South.*

ACRIMONY, in medicine, is a term applied to any substances that produce particular sensations from the action of that stimulus which they possess, and which we express by the different terms, sharpness, eagerness, tartness, acid, alkali, &c. and it is also applicable to some states of the humours in the human body, as acrimony of the bile, and other materials, which are, by the laws of the animal economy, constantly thrown out of the machine, in order that the humours may be kept in a sound state; for, except when in a morbid state, they are free from all acrimony. When in a morbid state, we have different species of acrimony; such as acrimony of the gout, rheumatism, scrophula, cancer, &c. which are judged of, and denominated, from the effects they produce on the habit. Hence, we say, complaints of this nature originate from an acrimonious humour, *sui generis*.

ACRISIUS, king of Argos, in fabulous history, being told by the oracle that he should be killed by his grandchild, shut up his only daughter Danaë in a brazen tower: but Jupiter, coming down in a golden shower, begot Perseus upon her: after Perseus had slain the Gorgons, he carried Medusa's head to Argos; which Acrisius seeing, was turned into a statue.

ACRITAS, a promontory of Messenia, running into the sea, and forming the beginning of the bay of Messene. Now called *Capo di Gallo*, between Methone to the west, and Corone to the east, where the Sinus Coronæus begins.

ACRITUDE, *f.* An acrid taste; a biting heat on the palate.—In green vitriol, with its astringent and sweetish tastes, is joined some *acritude*. *Grew.*

ACROAMATICAL, *adj.* [*ακροαματις*, Gr. I hear.] Of or pertaining to deep learning; the opposite of exoteric.

ACROAMATICI, a denomination given the disciples or followers of Aristotle, &c. who were admitted into the secrets of the inner or acroamatic philosophy.

ACROATICS, *f.* [*ακροατικά*, Gr.] Aristotle's lectures to his disciples were of two kinds, *exoteric* and *acroatic*. The *acroatic* were those to which only his own disciples and intimate friends were admitted; whereas the *exoteric* were public, and open to all. But there are other differences. The *acroatic* were set apart for the higher and more abstruse subjects; the *exoteric* were employed in rhetorical and civil speculations.

ACROATHOUM, or **ACROTHOUM**, anciently a town situated on the top of mount Athos, where the inhabitants, according to Mela, were longer lived by half than in any other country: called by the modern Greeks *Αγιος ορος*; by the Italians, *La Cima di Monte Santo*.

ACROBATICA, or **ACROBATICUM**, [from *ακρος*, high, and *βαίνω*, or *βαινω*, I go.] An ancient engine, whereby people were raised aloft, that they might see more conveniently about them. The *acrobatia* among the Greeks amounted to the same with what they call *scanzorium* among the Latins. Authors are divided as to the office of this engine. Turnebus and Barbarus take it to have been of the military kind, raised by besiegers, high enough to overlook the walls, and discover the state of things on the other side. Baldus rather supposes it a kind of moveable scaffold, or cradle, contrived for raising

painters, plasterers; and other workmen, to the tops of houses, trees, &c. Some suspect that it might have been used for both purposes; which is the opinion of Vitruvius and Aquinas.

ACROCERAUNIA, or **MONTES CERAUNII**, mountains running out into the sea (so called from their being often thunder-struck), separating the Ionian Sea from the Adriatic; where Illyria ends and Epirus begins: now called *Monti della Chimera*.

ACROCHORDON, [from *ακρος*, extreme, and *χορδή*, a string.] This is one instance, which, as Galen observes, shews the oddity of the analogies by which the ancients gave name to things. This name they gave to a sort of warts, from their being situated on the skin. Wifeman calls them *peasile warts*. Galen in his *Def. Méd.* says it is a round excrescence on the skin, with a slender base; so that the excrescence seems to hang by a string. Sometimes they suddenly disappear, at others they inflame or suppurate. Celsus observes, that if they are cut out, they leave no root, so do not grow again.

ACROCHORISMUS, [from *ακρος*, extreme, and *χορεύω*, to dance.] An exercise of dancing, with violent motions of the legs and arms. Schulzius says, they joined head to head, and hand to hand, and strove to push one another out of their places.

ACROCORINTHUS, a high and steep hill, hanging over the city of Corinth, which was taken within the walls, as an acropolis, or citadel. On its top stood a temple of Venus; and lower down issued the fountain Pyrene.

ACROMION, *f.* in anatomy, the upper part of the scapula or shoulder-blade. See **ANATOMY**.

ACROMONOGRAMMATICUM, *f.* in poetry, a kind of poem, wherein every subsequent verse begins with the letter wherewith the immediately preceding one terminated.

ACRON, a celebrated physician of Agrigentum, who first thought of lighting large fires, and purifying the air with perfumes, to put a stop to the pestilence that ravaged Athens, and which was attended with success. He lived about 473 years before the Christian æra.

ACRON, a territory on the gold-coast of Guinea, in Africa, bordering on the Fantyneon country. The Dutch have a fort here called Fort Patience; and under it is a village, inhabited only by fishermen. The other inhabitants are addicted to husbandry, and sell their corn to other countries. There is plenty of game, which is very commodious for the Dutch factory. The people are very ignorant, and go naked like the rest of the negroes. This is called Little Acron; for Great Acron is farther inland, and is a kind of republic.

ACRONIUS LACUS (Mela); a small lake formed by the Rhine, soon after its rise out of the Alps, and after passing the greater lake at Constance, called *Venusus*, and now the *Bodensee*, or lake of Constance.

ACRONYCAL, *adj.* [from *ακρος*, *summus*, and *νύξ*, *nox*; importing the beginning of night.] In astronomy, is said of a star or planet, when it is opposite to the sun. It is from the Greek *ακρονυχος*, the point or extremity of night, because the star rose at sun-set, or the beginning of night, and set at sun-rise, or the end of night; and so it shone all the night.

The acronycal is one of the three Greek poetic risings and settings of the stars; and stands distinguished from cosmical and heliacal. And by means of which, for want of accurate instruments, and other observations, they might regulate the length of their year.

ACRONYCALLY, *adv.* [from *acronycal*.] At the acronycal time.—He is tempestuous in the summer, when he rises heliacally, and rainy in the winter, when he rises *acronycally*. *Dryden.*

ACROPATHOS, [from *ακρος*, extreme, and *παθος*, a disease.] It literally signifies a disease at the height, or, a disease which affects any superior part of the body. Hippocrates applies it to the internal orifice of the uterus; when

when affected; to occult cancers, and to cancers on the surface of the body, to distinguish them from those that are inward.

ACROPOLIS, the citadel, and one of the divisions of Athens; called *Polis*, because constituting the first and original city; and the Upper Polis, to distinguish it from the Lower, which was afterwards built round it in a large open plain, the Acropolis standing on a rock or eminence in the heart of this plain: and hence its name: To the north it had a wall, built by the Pelasgi, and therefore called *Pelasgic*; and to the south a wall, by Cymon the son of Miltiades, out of the Persian spoils, many ages after the building of the north wall. It had nine gates, and was therefore called *Enneapylon*; yet but one principal gate or entrance, the ascent to which was by a flight of steps of white marble, built by Pericles with great magnificence.

ACROPOLITA (George), one of the writers in the Byzantine history, was born at Constantinople, in the year 1220, and brought up at the court of the emperor John Ducas at Nice. He was employed in the most important affairs of the empire; being sent ambassador to Larissa, to establish a peace with Michael of Epirus; and was constituted judge to try Michael Comnenus, suspected of engaging in a conspiracy. Theodorus Lascaris, the son of John, whom he had taught logic, appointed him governor of all the western provinces in his empire. In 1255, he was taken prisoner in a war with Michael Angelus: but gaining his liberty in 1260, by means of the emperor Palæologus, he was sent by him ambassador to Constantine prince of Bulgaria; and was employed in several other negotiations. He wrote, *A Continuation of the Greek History*, from the taking of Constantinople by the Latins till it was recovered by Michael Palæologus in 1261, which makes part of the Byzantine history; a *Treatise concerning Faith, Virtue, and the Soul*; an *Exposition of the Sermons of St. Gregory Nazianzen*; and other pieces.

ACROSPIRE, *f.* [from *ακρος* and *σπिरα* Gr.] A shoot or sprout from the end of seeds before they are put into the ground.—Many corns will smilt, or have their pulp turned into a substance like thick cream; and will send forth their substance in an *acrospire*. *Mortimer*.

ACROSPURED, *part. adj.* Having sprouts, or having shot out.—For want of turning, when the malt is spread on the floor, it comes and sprouts at both ends, which is called *acrospired*, and is fit only for swine. *Mortimer*.

ACROSS, *adv.* [from *a* for *at*, or the French *à* as it is used in *à travers*, and *across*.] Athwart, laid over something so as to cross it.—The harp hath the concave not along the strings, but *across* the strings; and no harp hath the sound so melting and prolonged as the Irish harp. *Bacon*.

ACROSTIC, *f.* [from *ακρος* and *στιχος*, Gr.] A poem in which the first letter of every line being taken, makes up the name of the person or thing on which the poem is written.

ACROSTIC, *adj.* That which relates to an acrostic.—That which contains acrostics.

Leave writing plays, and choose for thy command
Some peaceful province in *acrostic* land:
There thou may'st wings display, and altars raise,
And torture one poor word ten thousand ways. *Dryden*.

ACROSTICHUM, *f.* [*ακρος* and *στιχος*, *summus ordo*.] In botany, a genus of the cryptogamia filices class. The generic character is, that the fructifications cover the whole under surface of the frond.

Description. There are forty-four species of ferns, of which two only are natives of Great-Britain, the ninth and twenty-eighth. They both grow on rocks in Wales, and the former is found also in the northern counties, and in Scotland. The twenty-seventh is a native of Europe, but all the rest are the growth of hotter climates, as the East or West Indies, Africa, and the southern provinces of North-America.

Species. I. Frond simple undivided. 1. *Acrostichum lanceolatum*: fronds linear-lanceolate acute, shoot climbing. It is a native of the East Indies and Cochin China; sticking to trees.

2. *Acrostichum citrifolium*: fronds lanceolate-ovate quite entire, shoot climbing. This is a native of America.

3. *Acrostichum heterophyllum*: fronds quite entire smooth petiolate; barren ones roundish, fertile linear. It is a native of the East Indies, Cochin China, and Africa, in woods.

4. *Acrostichum crinitum*: fronds ovate obtuse hirsute, crinite above.

5. *Acrostichum punctatum*: fronds heart-tongued, acuminate, quite entire, dotted above. It is used medicinally in China, where it was first remarked by J. Fothergill.

6. *Acrostichum spicatum*: fronds simple, petiolate, lanceolate, attenuated to both ends, quite entire, spike terminal linear. This was found by Commerfon in the island of Mauritius.

7. *Acrostichum lingua*: fronds oblong obtuse entire petiolate, shoot creeping. 8. *Acrostichum hastatum*: frond simple hastate. Both these are natives of Japan.

II. Frond simple divided. 9. *Acrostichum septentrionale*: fronds naked linear laciniate. It grows on tufts resembling at first sight some rushy grass, on clefts of rocks and old walls, in Yorkshire, Westmoreland, Wales, and Scotland.

10. *Acrostichum australe*: stipes naked, quite smooth, dichotomous at top, with five or six subulate rays, and flowering from the sides. This much resembles the foregoing, but it is silvery, and more regularly divided: and grows in the isles of France and Bourbon.

11. *Acrostichum pectinatum*: naked, perfectly simple, spike crescent-shaped, on one side, ascending, compressed. Hermann, Morison, Ray, and Plukenet, took this plant for a species of grass. Petiver alone suspected it to be a fern, as it proves really to be. It is a native of the Cape of Good Hope.

12. *Acrostichum dichotomum*: naked, dichotomous, spikes on one side, ascending, reflex, compressed. This resembles the pectinatum in stem and spike, but the stem has many more forkings, with spikes to each. It is found in China and the Society Islands.

13. *Acrostichum digitatum*: stipes naked three-sided, frond digitate linear quite entire equal. This is a native of Ceylon.

14. *Acrostichum ferrugineum*: fronds pinnatifid; pinnae linear acute spreading quite entire connate; stipe smooth.

15. *Acrostichum polypodioides*: fronds pinnatifid, pinnae linear obtuse quite entire spreading crowned, stipe scaly. Both these are natives of Jamaica and Virginia.

III. Frond pinnate. 16. *Acrostichum aureum*: pinnae alternate tongue-shaped quite entire smooth. It is a native of Jamaica, Dominica, and the Society Isles.

17. *Acrostichum rufum*: pinnae oblong-ovate quite entire pubescent. This is a native of Jamaica.

18. *Acrostichum punctatum*: leaflets alternate lanceolate quite entire, the lowest eared, the upper ones decurrent, the upper surface dotted smooth. It is a native of the isle of Bourbon.

19. *Acrostichum sorbifolium*: pinnae oblong-ovate entire ferrate acute, stipes scaly. This is a native of Jamaica and Domingo.

20. *Acrostichum areolatum*: pinnae alternate linear ferrate at top. The little floriferous buds in this species are divided into two phalanxes by the longitudinal nerves of the leaf, and are disposed in several parts transversely on each side. It is a native of Virginia and Maryland.

21. *Acrostichum marginatum*: pinnae oblong quite entire waved acuminate, stipe naked. 22. *Acrostichum sanctum*: fronds lanceolate, pinnae linear-lanceolate glaberrate, the lower ferratures largest. The first of these is only a barren frond of *Pteris grandifolia*. The latter is a polypodium.

23. *Acrostichum platyneuron*: pinnas alternate ovate crenate sessile bowed upwards. This species has the air of common polypody. It is a native of Virginia.

24. *Acrostichum trifoliatum*: leaflets ternate lanceolate. This is a native of Jamaica.

IV. Frond subpinnate. 25. *Acrostichum filiquosum*: pinnas alternate, pinnulate upwards, linear, the lower ones two-parted. 26. *Acrostichum thalioides*: pinnas alternate, on each side pinnatifid, the barren ones broader. Natives of Ceylon. These are supposed by Koenig to be one and the same species.

27. *Acrostichum marantæ*: fronds subbipinnate, pinnas oppositely coadunate, very hirsute underneath, a little toothed at the base. It is a native of the southern countries of Europe.

28. *Acrostichum ilvense*: fronds subbipinnate, pinnas oppositely coadunate, obtuse, hirsute underneath, quite entire at the base. This has a great similitude to the foregoing, but it is scarcely longer than the finger, never so high as seven inches. It is allied to the polypodies by having the fructifications in dots, but they are closely crowded.

29. *Acrostichum ebenum*: pinnas sessile oblong sinuate, the uppermost shortest and quite entire. 30. *Acrostichum furcatum*: dichotomous, leaflets pinnate; pinnas parallel lanceolate approximating, quite entire. V. Frond bipinnate. 31. *Acrostichum aculeatum*: fronds superdecompound, pinnas bifid, stipes prickly. These are all three natives of Jamaica.

32. *Acrostichum cruciatum*: leaflets opposite lanceolate, the lowest appendaged crosswise. It is a native of Dominica.

33. *Acrostichum barbarum*: leaflets opposite, pinnas lanceolate obtuse serrate sessile alternate. This is a native of Africa.

34. *Acrostichum calomelanos*: pinnas alternate lanceolate acuminate pinnatifid. This is a native of South America and Jamaica.

35. *Acrostichum viviparum*: fronds viviparous, pinnas in pairs one-sided, pinnules pinnatifid forked subulate, bearing the fructifications on the inner margin. It is a native of the Isles of France and Bourbon.

36. *Acrostichum velleum*, or woolly acrostichum: fronds bipinnate; all the pinnas ovate cordate gashed on the side and very hirsute underneath. This is a native of Madeira. Found there by Mr. Francis Maffon.

37. *Acrostichum simplex*: fronds entire smooth petioled; the barren ones lanceolate acuminate, the fertile ones linear-lanceolate. 38. *Acrostichum petiolatum*: fronds entire smooth petioled; the barren ones linear-lanceolate, the fertile ones linear. 39. *Acrostichum latifolium*: fronds petioled, broad-lanceolate, very smooth, entire, margined; the fruit-bearing ones ovate-lanceolate; shoots creeping. 40. *Acrostichum villosum*: fronds broad-lanceolate, somewhat crenulate, villous on both sides. 41. *Acrostichum muscosum*: fronds petioled entire scaly; the barren ones oblong-lanceolate blunt, the fertile ones linear-lanceolate. 42. *Acrostichum ferrulatum*: fronds linear toothed, fruit-bearing at the tip; shoots very short rooting. 43. *Acrostichum graminoides*: fronds naked linear, subdichotomous and fruit-bearing at the tip. 44. *Acrostichum sulphureum*: fronds bipinnate, pinnas alternate ovate pinnatifid, leaflets retuse serrate.—These are all natives of Jamaica.

Propagation and Culture. Few of the species have been yet introduced into gardens. Those of Europe may be either preserved in pots, filled with gravel and lime rubbish; or planted on walls and artificial rocks. The thirty-sixth species, with some few others, may be preserved in the green-house; but the greater part, being natives of very hot climates, must be planted in pots, and plunged into the bark-pit.

ACROSTOLIUM, in ancient naval architecture, the extreme part of the ornament used on the prows of their
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ships, which was sometimes in the shape of a buckler, helmet, animal, &c. but more frequently circular, or spiral. It was usual to tear them from the prows of vanquished vessels, and fix them to the conquerors, as a signal of victory.

ACROTELEUTIC, *f.* among ecclesiastic writers, an appellation given to any thing added to the end of a psalm; as the Gloria Patri, or Doxology.

ACROTHERIA, *f.* [from *ακρον*, Gr. the extremity of any body.] In architecture, small pedestals, usually without bases, anciently placed at the middle or two extremes of pediments or frontispieces, serving to support the statues, &c. It also signifies the figures placed as ornaments on the tops of churches, and the sharp pinnacles that stand in ranges about flat buildings with rails and ballusters.

Among ancient physicians, it signified the larger extremities of the body, as the head, hands, and feet. It has also been used for the tips of the fingers, and sometimes for the eminences or processes of bones.

ACROTHYMION, *f.* [from *ακρον*, extreme, and *θυμον*, thyme.] A sort of wart described by Celsus as hard, rough, and with a narrow basis and broad top; the top is of the colour of thyme, it easily splits and bleeds. This tumour is also called *thymus*.

To **ACT**, *v. n.* [*ago*, *actum*, Lat.] To be in action, not to rest. To perform the proper functions. To practise arts or duties; to conduct one's self. To produce effects in some passive subject:

Hence 'tis we wait the wond'rous cause to find
How body *acts* upon impassive mind.

Garth.

The stomach, the intestines, the muscles of the lower belly, all *act* upon the aliment; besides, the chyle is not sucked, but squeezed into the mouths of the lacteals, by the action of the fibres of the guts. *Arbutnot.*

To **ACT**, *v. a.* To bear a borrowed character; as, a stage-player. To counterfeit; to feign by action:

Honour and shame from no condition rise;

Act well your part, there all the honour lies.

Pope.

To *actuate*; to put in motion; to regulate the movements. —Perhaps they are as proud as Lucifer, as covetous as Demas, as false as Judas, and, in the whole course of their conversation, *act*, and are *acted*, not by devotion, but design. *South.*

ACT, *f.* [*actum*, Lat.] Something done; a deed; an exploit, whether good or ill:

The conscious wretch must all his *acts* reveal;

Loth to confess, unable to conceal;

From the first moment of his vital breath,

To his last hour of unrepenting death.

Dryden.

Agency; the power of producing an effect. Action; the performance of exploits; production of effects:

Who forth from nothing call'd this comely frame,

His will and *act*, his word and work, the same.

Prior.

The doing of some particular thing; a step taken; a purpose executed. A state of reality; effect.—God alone excepted, who actually and everlastingly is whatsoever he may be, and which cannot hereafter be that which now he is not; all other things besides are somewhat in possibility, which as yet they are not in *act*. *Hooker.*—Incipient agency; tendency to an effort. A decree of a court of justice, or edict of a legislature.—They make edicts for usury to support usurers, repeal daily any wholesome *act* established against the rich, and provide more piercing statutes daily to chain up and restrain the poor. *Shakespeare.*—Record of judicial proceedings.—Judicial *acts* are all those matters which relate to judicial proceedings; and being reduced into writing by a public notary, are recorded by the authority of the judge. *Ascham.*

ACT, in logic, is particularly understood of an operation of the human mind. Thus to discern and examine, are *acts* of the understanding; to judge and affirm are *acts*.

C c

of

of the will. There are voluntary and spontaneous acts; the former are produced by the operation of the soul, the latter without its privity or participation.

ACT, in the universities, signifies a thesis maintained in public by a candidate for a degree; or to shew the capacity and proficiency of a student. The candidates for a degree of bachelor and master of arts are to hold philosophical acts; and those for bachelor of divinity, theological acts, &c. At Oxford, the time when masters or doctors complete their degrees is also called the *act*; which is held with great solemnity. At Cambridge, they call it the commencement.

ACT of FAITH, *Auto da Fe*, in the Romish church, is a solemn day held by the inquisition, for the punishment of heretics, and the absolution of the innocent accused. They usually contrive the *auto* to fall on some great festival, that the execution may pass with the more awe and regard; at least it is always on a Sunday.

The *auto da fe* may be called the last act of the inquisitorial tragedy; it is a kind of gaol-delivery, appointed as oft as a competent number of prisoners in the inquisition are convicted of heresy, either by their own voluntary or extorted confession, or on the evidence of certain witnesses. The process is thus:—In the morning they are brought into a great hall, where they have certain habits put on, which they are to wear in the procession. The procession is led up by Dominican friars; after which come the penitents, some with fan-benitoes, and some without, according to the nature of their crimes; being all in black coats without sleeves, and bare-footed, with a wax candle in their hands. These are followed by the penitents who have narrowly escaped being burnt, who over their black coats have flames painted with their points turned downwards, *Fuego revuelto*. Next come the negative and relapsed, who are to be burnt, having flames on their habits pointing upwards. After these come such as profess doctrines contrary to the faith of Rome, who, besides flames pointing upwards, have their picture painted on their breasts, with dogs, serpents, and devils, all open-mouthed, about it. Each prisoner is attended with a familiar of the inquisition; and those to be burnt have also a Jesuit on each hand, who are continually preaching to them to abjure. After the prisoners, comes a troop of familiars on horseback; and after them the inquisitors, and other officers of the court, on mules; last of all, the inquisitor-general on a white horse, led by two men with black hats and green hat-bands. A scaffold is erected in the Terriero de Paio, big enough for two or three thousand people; at one end of which are the prisoners, at the other the inquisitors. After a sermon made up of encomiums on the inquisition, and invectives against heretics, a priest ascends a desk near the middle of the scaffold, and having taken the abjurations of the penitents, recites the final sentence of those who are to be put to death; and delivers them to the secular arm, earnestly beseeching at the same time the secular power not to touch their blood, or put their lives in danger. The prisoners being thus in the hands of the civil magistrate, are presently loaded with chains, and carried first to the secular gaol, and from thence in an hour or two brought before the civil judge; who, after asking in what religion they intend to die, pronounces sentence, on such as declare they die in the communion of the church of Rome, that they shall be first strangled, and then burnt to ashes; on such as die in any other faith, that they be burnt alive. Both are immediately carried to the Ribera, the place of execution; where there are as many stakes set up as there are prisoners to be burnt, with a quantity of dry furze about them. The stakes of the professed, that is, such as persist in their heresy, are about four yards high, having a small board towards the top for the prisoner to be seated on. The negative and relapsed being first strangled and burnt, the professed mount their stakes by a ladder; and the Jesuits, after several repeated exhortations to be reconciled to the church, part with them, telling them they leave them to

the devil, who is standing at their elbow to receive their souls, and carry them with him into the flames of hell. On this a great shout is raised; and the cry is, "Let the dogs' beards be made;" which is done by thrusting flaming furzes fastened to long poles against their faces, till their faces are burnt to a coal, which is accompanied with the loudest acclamations of joy. At last, fire is set to the furze at the bottom of the stake, over which the professed are chained so high, that the top of the flame seldom reaches higher than the seat they sit on; so that they rather seem roasted than burnt. There cannot be a more lamentable spectacle; the sufferers continually crying out, while they are able, *Misericordia per amor de Dios*, "Pity for the love of God!" yet it is beheld by all sexes, and ages, with transports of joy and satisfaction.

ACT, in dramatic poetry, signifies a certain division or part of a play, designed to give some respite both to the actors and spectators. The Romans were the first who divided their theatrical pieces into acts; for no such divisions appear in the works of the first dramatic poets. Their pieces indeed consisted of several parts or divisions, which they called *protasis*, *epitasis*, *catastasis*, and *catastrophe*; but these divisions were not marked by any real interruptions on the theatre. Nor does Aristotle mention any thing of acts in his Art of Poetry. But, in the time of Horace, all regular and finished pieces were divided into five acts.

ACT of GRACE. See GRACE.

ACT, among lawyers, is an instrument in writing for declaring or justifying the truth of any thing. In which sense, records, decrees, sentences, reports, certificates, &c. are called *acts*.

ACT of PARLIAMENT, is a statute, act, or edict, made by the king with the advice and consent of the lords spiritual and temporal, and commons, in parliament assembled. The oldest of those now extant, and printed in our statute books, is the famous Magna Charta, as confirmed in parliament 9 Hen. III. though doubtless there were many acts before that time, the records of which are now lost, and which possibly at present pass for parts of the ancient common law. 1 *Blackst.* 85.

An act of parliament is the exercise of the highest earthly authority that this kingdom acknowledges. It hath power to bind every subject in the land, and the dominions thereunto belonging; nay even the king himself, if particularly named therein: and it cannot be altered, amended, dispensed with, suspended, or repealed, but by the same authority of parliament; for it is a maxim in law, that it requires the same strength to dissolve as to create an obligation. 1 *Blackst.* 186.

The method of citing acts of parliament is various. Many of the ancient statutes are called after the name of the place where the parliament was held that made them; as the statutes of Merton and Marleberge, of Westminster, Gloucester, and Winchester. Others are denominated entirely from their subject; as the statutes of Wales and Ireland, the *Articuli cleri*, and the *Prerogativa regis*. Some are distinguished by their initial words, as the statute of *Quia emptores terrarum*, and that of *Circumspexisse agatis*. But the most usual way of citing them, especially since the time of Edward II. is by naming the year of the king's reign in which the act was made, together with the chapter or particular act according to its numeral order. *Id.* 85.

Statutes are either *general*, or *special*; *public*, or *private*. A *general* or *public* act is an universal rule that regards the whole community; and of this the courts of law are bound to take notice judicially and *ex officio*; without the statute being particularly pleaded, or formally set forth by the party who claims an advantage under it. *Special* or *private* acts are rather exceptions than rules, being those which only operate upon particular persons, and private concerns; and of these the judges are not bound to take notice, unless they be formally shewn and pleaded. *Ibid.*

There are three points to be considered in the construction of an act of parliament; the old law, the mischief, and

and the remedy: that is, how the common law stood at the making of the act, what the mischief was for which the common law did not provide, and what remedy the parliament hath provided to cure this mischief. *Id.* 87.

Where the common law and a statute differ, the common law gives place to the statute; and an old statute gives place to a new one. *Id.* 89.

If a statute that repeals another is itself repealed afterwards, the first statute is thereby revived, without any formal words for that purpose. *Id.* 90.

A statute made in the affirmative, without any negative expressed or implied, doth not take away the common law; and therefore the party may waive his benefit by such statute, and take his remedy by the common law. *2 Infl.* 200.

Regularly, a statute in the affirmative doth not repeal a precedent affirmative statute; but if the latter is contrary to the former it amounts to a repeal of the former. *L. Raym.* 160.

Penal statutes must be construed strictly: but statutes against frauds are to be construed liberally and beneficially. *1 Blackst.* 88.

One part of a statute must be so construed by another, that the whole, if possible, may stand together: but a saving totally repugnant to the body of the statute is void. *Id.* 89.

Where things of an inferior degree are first mentioned in a statute, those of a higher dignity shall not be included under subsequent general words; as where a statute speaks of indictments to be taken before justices of the peace, or others having power to take indictments, it shall be understood only of other inferior courts, and not of the King's Bench or other courts at Westminster. *2 Co.* 46.

All felonies by the common law have the benefit of clergy; therefore, where a statute enacts a felony, and says, the offender shall suffer death, clergy lies notwithstanding, and is never ousted without express words. *3 Infl.* 73.

Saving of dower in a statute making an offence felony is superfluous; for by 1 Edw. VI. c. 12. dower is not lost by the felony of the husband.

Where no particular penalty is appointed for disobedience to an act of parliament, it is punishable as a contempt, by fine and imprisonment at the discretion of the king's courts of justice. *4 Blackst.* 122.

ACTA CONSISTORII, the edicts or declarations of the council of state of the emperors. These edicts were generally expressed in this manner:—"The august emperors, Dioclesian and Maximilian, in council declared, That the children of decurions should not be exposed to wild beasts in the amphitheatre."

The senate and soldiers often swore, either through abject flattery or by compulsion, upon the Edicts of the Emperor, as we do upon the Bible. And the name of Apidius Merula was erased by Nero out of the Register of Senators, because he refused to swear upon the Edicts of the Emperor Augustus.

ACTA DIURNA, was a sort of Roman gazette, containing an authorized narrative of the transactions worthy of notice which happened at Rome. Petronius has given us a specimen of the *acta diurna* in his account of Trimalchis; and, as it may not perhaps be unentertaining to see how exactly a Roman newspaper runs in the style of an English one, the following is an article or two out of it:

"On the 26th of July, thirty boys and forty girls were born at Trimalchi's estate at Cuma.

"At the same time a slave was put to death for uttering disrespectful words against his lord.

"The same day a fire broke out in Pompey's gardens, which began in the night, in the steward's apartment."

ACTA POPULI, among the Romans, were journals or registers of the daily occurrences; as assemblies, trials, executions, buildings, births, marriages, deaths, &c. These were otherwise called *Acta Publica* and *Acta Diurna*, or simply *Acta*. The *Acta* differed from Annals, in that only the greater and more important matters were in the latter, and those of less note were in the former. Their

origin is attributed to Julius Cæsar, who first ordered the keeping and making public the acts of the people. Some trace them higher, to Servius Tullius; who, to discover the number of persons born, dead, and alive, ordered that the next of kin, upon a birth, should put a certain piece of money into the treasury of Juno Lucina; upon a death, into that of Venus Libitina: the like was also to be done upon assuming the toga virilis, &c. Under Marcus Antoninus, this was carried further: persons were obliged to notify the births of their children, with their names and surnames, the day, consul, and whether legitimate or spurious, to the præfects of the *Ærarium Saturni*, to be entered in the Public Acts; though before this time the births of persons of quality appear thus to have been registered.

ACTA SENATUS, among the Romans, were minutes of what passed and was debated in the senate-house. These were also called *Commentarii*, and by a Greek name *Ἱστορικὰ*. They had their origin in the consulship of Julius Cæsar, who ordered them both to be kept and published.

Public Acts. The knowledge of public acts forms part of a peculiar science, called the **DIPLOMATIC**, of great importance to an historian, statesman, chronologer, and even critic. The preservation of them was the first occasion of erecting libraries. The style of acts is generally barbarous Latin. Authors are divided as to the rules of judging of their genuineness, and even whether there be any certain rules at all. F. Germon will have the greater part of the acts of former ages to be spurious. Fontanini asserts, that the number of forged acts now extant is very small. It is certain there were severe punishments inflicted on the forgers and falsifiers of acts. The chief of the English acts, or public records, are published by Rymer, under the title of *Fœdera*, and continued by Saunderson; an extract whereof has been given in French by Rapin, and translated into English under the title of *Acta Regia*. Great commendations have been given this work: also some exceptions made to it; as that there are many spurious acts, as well as errors, in it; some have even charged it with falsifications. The public acts of France fell into the hands of the English after the battle of Poitiers, and are commonly said to have been carried by them out of the country. But the tradition is not supported by any sufficient testimony.

ACTS OF THE APOSTLES, one of the sacred books of the New Testament, containing the history of the infant church, during the space of twenty-nine or thirty years, from the ascension of our Lord to the year of Christ 63. It was written by St. Luke; and addressed to Theophilus, the person to whom the evangelist had before dedicated his gospel. We find here the accomplishment of several of the promises made by our Saviour; his ascension; the descent of the Holy Ghost; the first preaching of the apostles, and the miracles whereby their doctrines were confirmed; an admirable picture of the manners of the primitive Christians; and, in short, every thing that passed in the church till the dispersion of the apostles, who separated themselves in order to propagate the gospel throughout the world. From the period of that separation, St. Luke quits the history of the other apostles, who were then at too great a distance from him, and confines himself more particularly to that of St. Paul, who had chosen him for the companion of his labours. He follows that apostle in all his missions, and even to Rome itself; for it appears that the Acts were published in the second year of St. Paul's residence in that city, or the 36th year of the Christian æra, and in the ninth or tenth year of Nero's reign. The style of this work, which was originally composed in Greek, is much purer than that of the other canonical writers; and it is observable, that St. Luke, who was much better acquainted with the Greek than with the Hebrew language, always, in his quotations from the Old Testament, makes use of the Septuagint version. The council of Laodicea places the Acts of the Apostles

Apostles among the canonical books, and all the churches have acknowledged it as such without any controversy.

There were several *Spurious Acts of the Apostles*; particularly, I. *Acts*, supposed to be written by Abdias, the pretended bishop of Babylon, who gave out that he was ordained bishop by the apostles themselves when they were upon their journey into Persia. II. *The Acts of St. Peter*: this book came originally from the school of the Ebionites. III. *The Acts of St. Paul*, which is entirely lost. Eusebius, who had seen it, pronounces it of no authority. IV. *The Acts of St. John the Evangelist*; a book made use of by the Encratites, Manichæans, and Priscillianists. V. *The Acts of St. Andrew*; received by the Manichæans, Encratites, and Apotactics. VI. *The Acts of St. Thomas the Apostle*; received particularly by the Manichæans. VII. *The Acts of St. Philip*. This book the Gnostics made use of. VIII. *The Acts of St. Matthias*. Some have imagined that the Jews for a long time had concealed the original acts of the life and death of St. Matthias written in Hebrew; and that a monk of the abbey of St. Matthias at Treves, having got them out of their hands, procured them to be translated into Latin, and published them; but the critics will not allow them to be authentic.

ACTS OF PILATE; a relation sent by Pilate to the emperor Tiberius, concerning Jesus Christ, his death, resurrection, ascension, and the crimes of which he was convicted before him. It was a custom among the Romans, that the proconsuls and governors of provinces should draw up acts, or memoirs, of what happened in the course of their government, and send them to the emperor and senate. The genuine *acts* of Pilate were sent by him to Tiberius, who reported them to the senate; but they were rejected by that assembly, because not immediately addressed to them; as is testified by Tertullian, in his *Apol.* cap. 5. and 20, 21. The heretics forged acts in imitation of them: in the reign of the emperor Maximin, the Gentiles, to throw an odium on the Christian name, spread about spurious Acts of Pilate; which the emperor, by a solemn edict, ordered to be sent into all the provinces of the empire, and enjoined the school-masters to teach and explain them to their scholars, and make them learn them by heart. These acts, both the genuine and the spurious, are lost. There is indeed extant, in the Pseudo-Hegesippus, a letter from Pilate to the emperor Claudius, concerning Jesus Christ; but it discovers itself at first sight not to be authentic.

ACTÆ, were meadows of remarkable verdure and luxuriance near the sea-shore, where the Romans used to indulge themselves to a great degree in softness and delicacy of living. The word is used in this sense by Cicero and Virgil; but Vossius thinks it can only be used in speaking of Sicily, as these two authors did.

ACTÆA, *f.* [*ακταία*, shore-loving.] In botany, a genus of the polyandria monogynia class, of the natural order of multifloræ. The generic characters are—Calyx: perianth four-leaved: leaflets roundish, obtuse, concave, caducous. Corolla: petals four, acuminate to both ends, larger than the calyx, caducous. Stamina: filaments usually about thirty, capillary, broader at top. Antheræ roundish, twin, erect. Pistillum: germ superior, ovate. Stigmas thickish, obliquely depressed. Pericarpium: a berry oval-globose, smooth, one-furrowed, one-celled. Seeds: very many, semiorbicular, lying over each other in two rows.—*Essential Character*. Calyx, four-leaved. Corolla, four-petalled. Berry, one-celled. Seeds, semiorbicular, in two rows.

Species. 1. *Actæa spicata*: raceme ovate, fruits berried. This sort grows naturally in several places in the northern counties of England. It grows two feet and a half high, the footstalks of the leaves arise from the root; these divide into three smaller footstalks, each of which divide again into three, and these have each three lobes, so that each leaf is composed of twenty-seven lobes (or small

leaves). The flower stem which arises from the root, has leaves of the same form, but smaller. On the top of the stalk appear the flowers, which grow in ramose spikes, and are of a pure white; these come out in May, and are succeeded by black shining berries about the size of peas, which ripen in autumn. This plant is a powerful repellent. The root is useful in some nervous cases, but must be administered with caution. The berries are poisonous, the juice of them with alum yields a black dye. Toads allured by the fœtid smell of this plant resort to it. Dr. Withering observes very well, that this may be owing to its fondness for the same damp shady situations with the toad.

2. *Actæa racemosa*, or American black or wild snake-root: racemes very long; fruits dry. This species has large compound leaves, which rise immediately from the root, and are branched after the same manner with the first. The flower-stems frequently rise to the height of four or five feet. The flowers are white, in a long spike, reflex at the top. It flowers in June, or the beginning of July, but does not perfect seeds in England. During the time of flowering it makes a good appearance in a garden, and therefore deserves a place in shady borders, or among shrubs, where, if it be not overhung by them, it thrives very well, and, being hardy, will require no other care than the shrubs themselves. It is a native of North America, where it is called black snake-root, to distinguish it from common snake-root. The root is much used in that country against many disorders, and is supposed to be an antidote against poison, or the bite of the rattle-snake.

3. *Actæa japonica*, or Japanese herb Christopher: spikes very long; leaflets gashed, palmate, undivided. This species differs from the preceding in having simple, not pinnate, leaves; the leaflets are heart-shaped, nearly of the same length and breadth, not oblong; the petioles longer than the leaflets; and the flowers sessile.

4. *Actæa aspera*, or rough-leaved herb Christopher: stem climbing: leaves lanceolate, rough: spikes interrupted. This species is a native of China near Canton. The leaves being extremely rough, the Chinese use them in polishing, particularly tin ware.

Propagation and Culture. These plants may be propagated by seeds, which should be sown on a shady border, soon after they are ripe, where they can be obtained fresh; for, if they are kept out of the ground till spring, the plants will not come up till the year after, so that a whole season will be lost. As the seeds seldom come up all at the same time, the border should not be disturbed till the following autumn, in order to see what plants may appear; when they should be transplanted into another shady border, where they may remain to flower. The seeds of the second sort are annually sent from North America, and should be sown as soon as the season will permit.

ACTÆA CIMICIFUGA. See **CIMICIFUGA**.

ACTÆON, in fabulous history, the son of Aristæus and Autonoe; a great hunter. He was turned by Diana into a stag, for looking on her while bathing; and died by his own dogs.

ACTANIA, an island, according to Pliny, in the North sea. It lies to the west of Holstein and Dithmarsch, not far from the mouth of the Eyder and Elbe, and is now called *Heyligland*.

ACTE. See **SAMBUCUS**.

ACTIAN GAMES, in Roman antiquity, were solemn games instituted by Augustus, in memory of his victory over Marc Anthony at Actium, held every fifth year, and celebrated in honour of Apollo, since called *Actius*. Hence *Actian Years*, an æra commencing from the battle of Actium, called the *Æra of Augustus*.

ACTINIA, in zoology, a genus belonging to the order of vermes mollusca. The body is oblong and smooth, attaching itself firmly by its basis to rocks or other solid substances, having a dilatible apex hooked within. The mouth is furnished with crooked teeth, the rostrum cylindrical

driacal and radiated. There are five species, some of which make a beautiful appearance, and are called animal flowers, sea anemones, and *urtica marina*.

Progressive motion in these creatures is so slow, that it is difficult to perceive any, as they scarce advance the length of one inch in an hour. It would seem they do not all produce, when handled, the painful sensation which had acquired them the name of sea-nettles.—They are viviparous, feed on shell-fish, open their mouth more or less according to the size of the prey they have to deal with, and then reject the shell through the same aperture. When the mouth is open, all the tentacula of the actinia may be seen, resembling in that situation a full-blown flower, which has given it the denomination of the flower fish.

ACTIO, in Roman antiquities, an action at law in a court of justice. The formalities used by the Romans, in judicial actions, were these: If the difference failed to be made up by friends, the injured person proceeded *in jus reum vocare*, to summon the offending party to the court, who was obliged to go, or give bond for his appearance. The offending party might be summoned into court *viva voce*, by the plaintiff himself meeting the defendant, declaring his intention to him, and commanding him to go before the magistrate and make his defence. If he would not go willingly, he might drag and force him along, unless he gave security for his appearance on some appointed day. Both parties being met before the prætor, or other supreme magistrate presiding in the court, the plaintiff proposed the action to the defendant; in which he designed to prosecute him. This they termed *edere actionem*; and was commonly performed by writing it in a tablet, and offering it to the defendant, that he might see whether he had better stand the suit or compound. In the next place came the *postulatio actionis*, or the plaintiff's petition to the prætor, for leave to prosecute the defendant in such an action. And, the petition being granted, the plaintiff obliged him to give sureties for his appearance on such a day in the court; when, upon the non-appearance of either party, the defaulter lost his cause;—if they both appeared, they were said *se stetit*; and then the plaintiff proceeded *litē sive actionem intendere*, i. e. to prefer his suit, which was done in a set form of words, varying according to the difference of the actions. After this the plaintiff desired judgment of the prætor, that is, to be allowed a *judex* or *arbiter*, or else the *recuperatores* or *centumviri*. These he requested for the hearing and deciding the business; but none of them could be desired but by the consent of both parties.

The prætor having assigned them their judges, defined and determined the number of witnesses to be admitted, to hinder the protracting of the suit; and then the parties proceeded to give their caution, that the judgment, whatever it was, should stand and be performed on both sides. The judges took a solemn oath to be impartial; and the parties took the *juramentum calumniæ*. Then the trial began with the assistance of witnesses, writings, &c. which was called *disceptatio causæ*.

ACTION, *f.* [action, Fr. *actio*, Lat.] The quality or state of acting, opposite to *rest*:

O noble English! that could entertain
With half their forces the full power of France;
And let another half stand laughing by,
All out of work, and cold for action. *Shakespeare.*

An act or thing done; a deed. Agency, operation. The series of events represented in a fable. Gesticulation, the accordance of the motions of the body with the words spoken; a part of oratory.—Our orators are observed to make use of less gesture or *action* than those of other countries. *Addison.*

ACTION, in mechanics, implies either the effort which a body or power makes against another body or power, or the effect itself of that effort. As it is necessary in works of this kind to have a particular regard to the common language of mechanics and philosophers, we have given

this double definition: but the proper signification of the term is the motion which a body really produces, or tends to produce, in another; that is, such is the motion it would have produced, had nothing hindered its effect.

All power is nothing more than a body actually in motion, or which tends to move itself; that is, a body which would move itself if nothing opposed it. The action therefore of a body is rendered evident to us by its motion only; and consequently we must not fix any other idea to the word action, than that of actual motion, or a simple tendency to motion. The famous question relating to *vis viva*, and *vis mortua*, owes, in all probability, its existence to an adequate idea of the word action; for, had Leibnitz and his followers observed, that the only precise and distinct idea we can give to the word force or action, reduces it to its effect, that is, to the motion it actually produces or tends to produce, they would never have made that curious distinction.

Quantity of ACTION, a name given by M. de Maupertuis, in the Memoires of the Parisian Academy of Sciences for 1744, and those of Berlin for 1746, to the product of the mass of a body by the space which it runs through and by its celerity. He lays it down as a general law, "that, in the changes made in the state of a body, the quantity of action necessary to produce such change is the least possible." This principle he applies to the investigation of the laws of refraction, of equilibrium, &c. and even to the ways of acting employed by the Supreme Being. In this manner M. de Maupertuis attempts to connect the metaphysics of final causes with the fundamental truths of mechanics, to shew the dependence of the collision of both elastic and hard bodies upon one and the same law, which before had always been referred to separate laws; and to reduce the laws of motion, and those of equilibrium, to one and the same principle.

ACTION, in ethics, denotes the external signs or expressions of the sentiments of a moral agent.

ACTION, in painting and sculpture, is the attitude or position of the several parts of the face, body, and limbs, of such figures as are represented, and whereby they seem to be really actuated by passions. Thus we say, the action of such a figure finely expresses the passions with which it is agitated: we also use the same expression with regard to animals.

ACTION, in physiology, is applied to the functions of the body, whether vital, animal, or natural.—The *vital* functions, or actions, are those which are absolutely necessary to life, and without which there is no life, as the action of the heart, lungs, and arteries. On the action and reaction of the solids and fluids on each other, depend the vital functions. The pulse and respiration are the external signs of life. Vital diseases are all those which hinder the influx of the venous blood into the cavities of the heart, and the expulsion of the arterial blood from the same.—The *natural* functions are those which are instrumental in repairing the several losses which the body sustains; for life is destructive of itself, its very offices occasioning a perpetual waste. The manducation of food, the deglutition and digestion thereof, also the separation and distribution of the chyle and excrementitious parts, &c. are under the head of natural functions, as by these our aliment is converted into our nature. They are necessary to the continuance of our bodies.—The *animal* functions are those which we perform at will, as muscular motion, and all the voluntary actions of the body: they are those which constitute the senses of touch, taste, smell, sight, hearing; perception; reasoning, imagination, memory, judgment, affections of the mind. Without any or all of them, a man may live, but not so comfortably as with them.—The actions *peculiar to the sexes* are those of the organs of generation of either sex.—*Private* actions are such as regard particular parts.—*Public* actions are those which are performed for the sake of the whole body; such is the action of the stomach in digesting the aliment, &c. These are called functions. But each part hath an action peculiar

liar to itself; thus the office performed by the muscles, vessels, glands, and viscera, are called their respective actions.

ACTION, in commerce, is a term used abroad for a certain part or share of a public company's capital stock. Thus, if a company has 400,000 livres capital stock, this may be divided into 400 actions, each consisting of 1000 livres. Hence a man is said to have two, four, &c. actions, according as he has the property of two, four, &c. 1000 livres capital stock. The transferring of actions abroad is performed much in the same manner as stocks are with us.

ACTION, in law, is a demand made before a judge for obtaining what we are legally intitled to demand, and is more commonly known by the name of law-suit or process. Actions are of three kinds; *real, personal, and mixed*:—Action *real* is that which concerns real property only; whereby the plaintiff or demandant claims title to have any lands or tenements, rents, commons, or other hereditaments, in fee simple, fee tail, or for term of life. 3 *Blackst.* 117.

Action *personal* is such as one man brings against another, on any contract for money or goods, or on account of any offence or trespass. *Id.*

Action *mixed* is an action that lieth as well for the thing demanded, as against the person that hath it; on which the thing is recovered, and likewise damages for the wrong sustained. *Id.*

ACTIONABLE, *adj.* That which admits an action in law to be brought against it; punishable.

ACTIONARY, or **ACTIONIST**, *f.* a proprietor of stock in a trading company.

ACTIONS, *f.* among merchants, sometimes signify moveable effects; and we say the merchant's creditors have seized on all his actions, when we mean that they have taken possession of all his active debts.

ACTION-TAKING, *adj.* Accustomed to resent by means of law; litigious.—A knave, a rascal, a filthy worsted-stocking knave; a lily-liver'd *action-taking* knave. *Shakespeare.*

ACTITATION, *f.* [from *actito*, Lat.] Action quick and frequent.

To **ACTIVATE**, *v. a.* To make active. This word is perhaps used only by the author alleged.—As snow and ice, especially being holpen, and their cold *activated*, by nitre or salt, will turn water into ice, and that in a few hours; so it may be it will turn wood or stiff clay into stone, in longer time. *Bacon.*

ACTIVE, *adj.* [*activus*, Lat.] That which has the power or quality of acting. That which acts, opposed to *passive*, or that which suffers. Busy, engaged in action; opposed to *idle* or *sedentary*, or any state of which the duties are performed only by the mental powers. Practical; not merely theoretical. Nimble; agile; quick:

Some bend the stubborn bow for victory;
And some with darts their *active* sinews try. *Dryden.*

ACTIVE, in grammar, is applied to such words as express action; and is therefore opposite to passive. The active performs the action, as the passive receives it. Thus we say a verb *active*, a conjugation *active*, &c. or an *active* participle.

ACTIVE VERBS, are such as do not only signify doing, or acting, but have also nouns following them, to be the subject of the action or impression: Thus, *To love, to teach*, are verbs *active*; because we can say, *To love a thing, to teach a man*. Neuter verbs also denote an action, but are distinguished from active verbs, in that they cannot have a noun following them: such are, *To sleep, to go, &c.* Some grammarians, however, make three kinds of active verbs: the *transitive*, where the action passes into a subject different from the agent; *reflected*, where the action returns upon the agent; and *reciprocal*, where the action turns mutually upon the two agents who produced it.

ACTIVE POWER, in metaphysics, the power of executing any work or labour; in contradistinction to *speculative*

powers, or the powers of seeing, hearing, remembering, judging, reasoning, &c.

ACTIVE PRINCIPLES, in chemistry, such as are supposed to act without any assistance from others; as mercury, sulphur, &c.

ACTIVELY, *adv.* In an active manner; busily; nimbly. In an active signification; as, the word is used *actively*.

ACTIVENESS, *f.* The quality of being active; quickness; nimbleness. This is a word more rarely used than *activity*.—What strange agility and *activeness* do our common tumblers and dancers on the rope attain to, by continual exercise. *Wilkins.*

ACTIVITY, *f.* The quality of being active, applied either to things or persons.—Salt put to ice, as in the producing of the artificial ice, increaseth the *activity* of cold. *Bacon.*

ACTIUM, anciently a town situated on the coast of Acarnia, in itself inconsiderable, but famous for a temple of Apollo, a safe harbour, and an adjoining promontory of the name, in the mouth of the Sinus Ambracius, over against Nicopolis, on the other side of the bay: it afterwards became more famous on account of Augustus's victory over Anthony and Cleopatra; and for quinquennial games instituted there, called Actia or Ludi Actiaci. The promontory is now called Capo di Figalo.

ACTIUS, in mythology, a surname of Apollo, from Actium, where he was worshipped.

ACTON, a town near London, where is a well that affords a purging water, which is noted for the pungency of its salt. This water is whitish, to the taste it is sweetish, with a mixture of the same bitter which is in the Epsom water. The salt of this water is not quite so soft as that of Epsom; and is more calcareous than it, being more of the nature of salt of lime: for a quantity of the Acton water being boiled high, on being mixed with a solution of sublimate in pure water, threw down a yellow sediment. The salt of the Acton water is more nitrous than that of Epsom; it strikes a deep red, or purple, with the tincture of logwood in brandy, as is usual with nitrous salts; it does not precipitate silver out of the spirit of nitre, as common salt does.

From a gallon of this water Dr. Rutty got 340 grains, or five drachms two scruples, of sediment, by evaporation; of this five drachms and twenty-one grains were vitriolated magnesia, or vitriolated absorbent earth, called formerly nitrum calcarium; which took forty-eight times its own weight of water to dissolve it; and nineteen grains of earth, which did not calcine to lime, but dissolved in the vitriolic acid. This is esteemed one of the strongest purging waters near London. It is drank from one to three pints in a morning.

ACTON BURNEL, *f.* a statute so called, made 13 Edw. I. ordaining the *statute-merchant*: it was so termed from a place named Acton Burnel, where it was made; being a castle sometime belonging to the family of Burnel, and afterwards of Lovel, in Shropshire.

ACTOR, *f.* [*actor*, Lat.] He that acts, or performs any thing. He that personates a character; in the drama, a stage-player, or person who represents some character upon the theatre. The drama consisted originally of nothing more than a simple chorus, who sang hymns in honour of Bacchus; so that the primitive actors were only singers and musicians. Æschylus, finding a single person tiresome, attempted to introduce a second, and changed the ancient recitals into dialogues. Sophocles added a third, in order to represent the various incidents in a more natural manner: and here the Greeks stopped, at least we do not find in any of their tragedies above three persons in the same scene. This, however, did not prevent their increasing the number of actors in comedy. Before the opening of a play, they named their actors in full theatre, together with the parts they were to perform. The ancient actors were masked, and obliged to raise their voice extremely, in order to make themselves heard by the innumerable

numerable crowd of people who filled the amphitheatres: they were accompanied with a player on the flute, who played a prelude, gave them the tone, and played while they declaimed.

The moderns have introduced an infinite number of actors upon the stage. This heightens the trouble and distress that should reign there, and makes a diversity, in which the spectator is sure to be interested.

Actors were highly honoured at Athens. At Rome they were despised, and not only denied all rank among the citizens, but even, when any citizen appeared upon the stage, he was expelled his tribe and deprived of the right of suffrage by censors. Cicero, indeed, esteems the talents of Roscius; but he values his virtues still more; virtues which distinguished him so remarkably above all others of his profession, that they seemed to have excluded him from the theatre. The French, in this respect, adopted the ideas of the Romans; and the English those of the Greeks.

ACTRESS, f. [*actrice*, Fr.] She that performs any thing. A woman that plays on the stage. Women actors were unknown to the ancients, among whom men always performed the female character; and hence one reason for the use of masks among them.

Actresses are said not to have been introduced on the English stage till after the restoration of king Charles II. who has been charged with contributing to the corruption of our manners by importing this usage from abroad. But this can be but partly true: the queen of James I. acted a part in a pastoral; and Prynne, in his *Histriomastix*, speaks of women actors in his time as whores; which was one occasion of the severe prosecution brought against him for that book.

There are some very agreeable and beautiful talents, of which the possession commands a certain sort of admiration; but of which the exercise for the sake of gain is considered, whether from reason or prejudice, as a sort of public prostitution. The pecuniary recompence, therefore, of those who exercise them in this manner, must be sufficient, not only to pay for the time, labour, and expence, of acquiring the talents, but for the discredit which attends the employment of them as the means of subsistence. The exorbitant rewards of players, opera-singers, opera-dancers, &c. are founded upon those two principles; the rarity and beauty of the talents, and the great discredit of employing them in this manner. It seems absurd at first sight that we should despise their persons, and yet reward their talents with the most profuse liberality. While we do the one, however, we must of necessity do the other. Should the public opinion or prejudice ever alter with regard to such occupations, their pecuniary recompence would quickly diminish. More people would apply to them, and the competition would quickly reduce the price of their labour. Such talents, though far from being common, are by no means so rare as it is imagined.

ACTUAL, adj. [*actuel*, Fr.] That which comprises action. Really in act; not merely potential. In act; not purely in speculation:

For he that but conceives a crime in thought,
Contracts the danger of an *actual* fault:
Then what must he expect, that still proceeds
To finish sin, and work up thoughts to deeds? *Dryden.*

Philosophers use the terms *actual* heat, *actual* cold, &c. in opposition to *virtual* or *potential*. Hence, among physicians, a red-hot iron, or fire, is called an *actual* cautery; in distinction from cauteries, or caustics, that have the power of producing the same effect upon the animal solids as actual fire, and are called *potential* cauteries. Boiling water is actually hot; brandy, producing heat in the body, is potentially hot, though of itself cold.

ACTUAL SIN, that which is committed by the person himself; in opposition to *original* sin, or that which he contracted from being a child of Adam.

ACTUALITY, f. The state of being actual.—The *actuality* of the spiritual qualities is thus imprisoned, tho' their potentiality be not quite destroyed; and thus a crass, extended, impenetrable, passive, divisible, unintelligent, substance, is generated, which we call matter. *Cheyne.*

ACTUALLY, adv. In act; in effect; really.—Though our temporal prospects should be full of danger, or though the days of sorrow should *actually* overtake us, yet still we must repose ourselves on God. *Rogers.*

ACTUALNESS, f. The quality of being actual.

ACTUARIÆ NAVES, f. a kind of ships among the Romans, chiefly designed for swift sailing.

ACTUARIUS, a celebrated Greek physician of the 13th century, and the first Greek author who has treated of mild purgatives, such as cassia, manna, fenna, &c. His works were printed in one volume folio, by Henry Stephens, in 1567.

ACTUARIUS, or ACTUARY, a notary or officer appointed to write the acts or proceedings of a court; or the like. In the eastern empire, the actuarii were properly officers who kept the military accounts, received the corn from the *suscptores*, or storekeepers, and delivered it to the soldiers.

ACTUATE, adj. Put into action; animated; brought into effect.—The active informations of the intellect, filling the passive reception of the will, like form closing with matter, grow *actuate* into a third and distinct perfection of practice. *South.*

To ACTUATE, v. a. [from *ago*, *actum*, Lat.] To put into action; to invigorate or increase the powers of motion; and thus the mind may be said to *actuate* the body.—Men of the greatest abilities are most fired with ambition; and, on the contrary, mean and narrow minds are the least *actuated* by it. *Addison.*

ACTUOSE, adj. That which hath strong powers of action: a word little used.

ACTUS, f. in ancient architecture, a measure in length equal to 120 Roman feet. In ancient agriculture, the word signified the length of one furrow, or the distance a plough goes before it turns.

ACTUS MINIMUS, was a quantity of land 120 feet in length, and four in breadth.

ACTUS MAJOR, or ACTUS QUADRATUS, a piece of ground in a square form, whose side was equal to 120 feet, equal to half the jugerum.

ACTUS INTERVICENALIS, a space of ground four feet in breadth, left between the lands as a path or way.

ACUANITES, f. in ecclesiastical history, the same with those called more frequently **MANICHEES**. They took the name from Acua, a disciple of Thomas, one of the twelve apostles.

To ACUATE, v. a. [*acuo*, Lat.] To sharpen, to invigorate with any powers of sharpness.—Immoderate feeding upon powdered beef, pickled meats, and debauching with strong wines, do inflame and *acuate* the blood, whereby it is capacitated to corrode the lungs. *Harvey.*

ACULEATE, adj. [*aculeatus*, Lat.] That which has a point or sting; prickly; that which terminates in a sharp point.

ACULEI, f. the prickles of animals or plants.

ACULEOSA, f. in botany. See **GORTERIA**.

ACULER, f. in the manege, is used for the motion of a horse, when, in working upon volts, he does not go far enough forward at every time or motion, so that his shoulders embrace or take in too little ground, and his croupe comes too near the centre of the volt. Horses are naturally inclined to this fault in making demi-volts.

ACUMEN, f. [Lat.] A sharp point; figuratively, quickness of intellects.—The word was much affected by the learned Aristarchus in common conversation, to signify genius or natural *acumen*. *Pope.*

The term *acumen* was introduced into anatomy by Daventer, in his *Ars Obstetricandi*; he calls the protuberances of the ossa innom. on which we sit, the *ossa sedentaria*, which he says are the *acumina* of the ossa pubis; and he

he calls the os coccygis the *sacri acumen ossis*, the pointed part of the sacrum.

ACUMINA, *f.* in antiquity, a kind of military omen, most generally supposed to have been taken from the points or edges of darts, swords, or other weapons.

ACUMINATED, *part. adj.* Ending in a point; sharp-pointed.—I appropriate this word, *Noli me tangere*, to a small found *acuminated* tubercle, which hath not much pain, unless touched or rubbed, or exasperated by topics. *Wifeman*.

ACUNA (Christopher de), a Spanish Jesuit, born at Burgos. He was admitted into the society in 1612, being then but fifteen years of age. After having devoted some years to study, he went to America, where he assisted in making converts in Chili and Peru. In 1640, he returned to Spain, and gave the king an account how far he had succeeded in the commission he had received to make discoveries on the river of the Amazons; and the year following he published a description of this river at Madrid. Acuna was sent to Rome, as procurator of his province. He returned to Spain with the title of Qualificator of the Inquisition; but soon embarked again for the West Indies, and was at Lima in 1675, when Father Southwell published at Rome the *Bibliothèque* of the Jesuit Writers. Acuna's work is intitled, *Nuevo Descubrimiento del gran Rio de las Amazonas*; i. e. "A new Discovery of the great River of the Amazons." The copies of this work became extremely scarce, so that the publishers of the French translation at Paris asserted, that there was not one copy of the original extant, excepting one in the possession of the translator, and perhaps that in the Vatican library. M. de Gomberville was the author of this translation: it was published after his death, with a long dissertation. An account of the original may be seen in the *Paris Journal*, in that of *Leipsic*, and in *Chevreau's History of the World*.

ACUPUNCTURE, *f.* [from *acus*, a needle, and *pungo*, to prick.] Bleeding performed by making many small punctures with a silver needle on the part affected. This method is practised in Siam, Japan, and other oriental nations, on all parts of the body; and employed in headaches, lethargies, convulsions, cholics, &c. In some parts of America this practice is also in use, according to the accounts given in *Dampier's Voyages*.

ACUS, *f.* in ichthyology, the trivial name of a species of syngnathus. See *SYNGNATHUS*.

ACUSIO COLONIA, now Ancone, according to Holstenius, between Orange and Valence, near Montelimart, on the banks of the Rhone.

ACUSTICUS, *f.* [from *ακουω*, to hear.] Belonging to hearing. It is applied to the auditory nerve, and to medicines or instruments used to assist, preserve, or recover, hearing.

ACUTE, *adj.* [*acutus*, Lat.] Sharp, ending in a point; opposed to *obtuse* or *blunt*. In a figurative sense applied to men; ingenious; penetrating; opposed to *dull* or *stupid*.—The *acute* and ingenious author, among many very fine thoughts, and uncommon reflections, has started the notion of seeing all things in God. *Locke*.—Spoken of the senses, vigorous; powerful in operation.—Were our senses altered, and made much quicker and *acuter*, the appearance and outward scheme of things would have quite another face to us. *Locke*.

ACUTE, in music, is applied to a sound or tone that is sharp or high, in comparison of some other tone. In this sense, *acute* stands opposed to *grave*.

ACUTE ANGLE, in geometry, is that which is less than a right angle, or which does not subtend ninety degrees.

ACUTE-ANGLED TRIANGLE, is a triangle whose three angles are all acute.

ACUTE-ANGLED CONE is, according to the ancients, a right cone, whose axis makes an acute angle with its side.

ACUTE DISEASES, such as come suddenly to a crisis, and are always attended with danger. Though there are diseases without danger, of a short duration, so are dif-

fect from the acute, as an *ephemeris*, &c. *Acute* diseases are the opposite to *chronic*, which are slow in their progress, and not so generally dangerous.

ACUTELY, *adv.* After an acute manner; sharply: it is used as well in the figurative as primitive sense.—He that will look into many parts of Asia and America, will find men reason there, perhaps, as *acutely* as himself, who yet never heard of a syllogism. *Locke*.

ACUTENESS, *f.* Sharpness. Force of intellects. Quickness and vigour of senses. Violence and speedy crisis of a malady. Sharpness of sound.—This *acuteness* of sound will shew, that whilst, to the eye, the bell seems to be at rest, yet the minute parts of it continue in a very brisk motion, without which they could not strike the air. *Boyle*.

ACUTIATOR, *f.* in writers of the barbarous ages, denotes a person that whets or grinds cutting instruments; called also in ancient glossaries, *acutor*, *ακουτης*, *jamarius*, *coharius*, &c. In the ancient armies there were acutiatores, a kind of smiths, retained for whetting or keeping the arms sharp.

ACYISIS, *f.* in Vogel's Nofology, is a defect of conception, or barrenness in women.

AD, a Latin preposition, originally signifying *to*, and frequently used in composition both with and without the *d*, to express the relation of one thing to another.

AD BESTIAS, in antiquity, is the punishment of criminals condemned to be thrown to wild beasts.

AD HOMINEM, in logic, a kind of argument drawn from the principles or prejudices of those with whom we argue.

AD LUDOS, in antiquity, a sentence upon criminals among the Romans, whereby they were condemned to entertain the people by fighting either with wild beasts, or with one another, and thus executing justice upon themselves.

AD METALLA, in antiquity, the punishment of such criminals as were condemned to the mines, among the Romans; and therefore called *Metallici*.

AD VALOREM, a term chiefly used in speaking of the duties or customs paid for certain goods. The duties on some articles are paid by the number, weight, measure, tale, &c. and others are paid *ad valorem*, that is, according to their value.

ADACTED, *part. adj.* [*adactus*, Lat.] Driven by force; a word little used. The verb *adacl* is not used.

ADAGE, *f.* [*adagium*, Lat.] A maxim handed down from antiquity; a proverb:

Fine fruits of learning! old ambitious fool,
Dar'st thou apply the *adage* of the school,
As if 'tis nothing worth that lies conceal'd,
And science is not science till reveal'd?

Dryden.

Erasmus has made a very large and valuable collection of the Greek and Roman adages; and Mr. Ray has done the same with regard to the English. We have also Kelly's *Collection of Scots Proverbs*.

ADAGIO, *f.* [Ital. at leisure.] A term used by musicians, to mark a slow time.

ADAIR, an ancient little town, eight miles from Limerick, and 102 from Dublin; having a good bridge over the river Maige, which is navigable for large boats. From its extensive ruins of convents, &c. it appears to have once been a place of considerable importance.

ADALIDES, in the Spanish policy, are officers of justice for matters touching the military forces. In the laws of king Alphonfus, the adalides are spoken of as officers appointed to guide and direct the marching of the forces in time of war. Lopez represents them as a sort of judges, who take cognizance of the differences arising upon excursions, the distribution of plunder, &c.

ADAM, the first of the human race, was formed by the Almighty on the sixth day of the creation. His body was made of the dust of the earth; after which, God animated or gave it life, and Adam then became a rational creature.

creature.—His heavenly parent did not leave his offspring in a destitute state to shift for himself; but planted a garden, in which he caused to grow not only every tree that was proper for producing food, but likewise such as were agreeable to the eye, or merely ornamental. In this garden were assembled all the brute creation; and, by their Maker, caused to pass before Adam, who gave all of them names, which were judged proper by the Deity himself.—In this review, Adam found none for a companion to himself. This solitary state was seen by the Deity to be attended with some degree of unhappiness; and therefore he threw Adam into a deep sleep, in which condition he took a rib from his side, and healing up the wound formed a woman of the rib he had taken out. On Adam's awaking, the woman was brought to him; and he immediately knew her to be one of his own species, called her his bone and his flesh, giving her the name of *woman* because she was taken out of man.

The first pair being thus created, God gave them authority over the inferior creation, commanding them to subdue the earth, also to increase and multiply and fill it. They were informed of the proper food for the beasts and for them; the grass, or green herbs, being appointed for beasts; and fruits, or seeds, for man. Their proper employment also was assigned them; namely, *to dress the garden and to keep it*.

Though Adam was thus highly favoured and instructed by his Maker, there was a single tree, which grew in the middle of the garden, of the fruit of which they were not allowed to eat; being told, that they should surely die in the day they ate of it. This tree was named, *the Tree of the Knowledge of Good and Evil*. This prohibition, however, they soon broke through. The woman having entered into conversation with the *Serpent*, was by him persuaded, that by eating of the tree she should become as wise as God himself; and accordingly, being invited by the beauty of the fruit, and its desirable property of imparting wisdom, she plucked and ate; giving her husband of it at the same time, who did likewise eat.

Before this transgression of the divine command, Adam and his wife had no occasion for clothes, neither had they any sense of shame; but, immediately on eating the forbidden fruit, they were ashamed of being naked, and made aprons of fig-leaves for themselves. On hearing the voice of God in the garden, they were terrified, and hid themselves: but, being questioned by the Deity, they confessed what they had done, and received sentence accordingly; the man being condemned to labour; the woman to subjection to her husband, and to pain in child-bearing. They were now driven out of the garden, and their access to it prevented by a terrible apparition. They had clothes given them by the Deity made of the skins of beasts. In this state Adam had several children; viz. Cain, Abel, and Seth. He died at the age of 930 years.

These are all the particulars concerning Adam's life, that we have on divine authority: but a vast multitude of others are added by the Jews, Mahometans, and others; all of which must be at best conjectural; most of them, indeed, appear downright falsehoods or absurdities. The curiosity of our readers, it is presumed, will be sufficiently gratified by the few which are here subjoined.

According to the Talmudists, when Adam was created, his body was of immense magnitude. When he sinned, his stature was reduced to an hundred ells, according to some; to nine hundred cubits, according to others; who think this was done at the request of the angels, who were afraid of so gigantic a creature. In the island of Ceylon is a mountain, called the *Peak* or mountain of Adam, from its being, according to the tradition of the country, the residence of our first parent. Here the print of his footsteps, above two palms in length, are still pointed out.

Many reveries have been formed concerning the personal beauty of Adam. That he was a handsome well-shaped man is probable; but some writers, not content with this,

affirm, that God, intending to create man, clothed Himself with a perfectly beautiful human body, making this his model in the formation of the body of Adam.

Nor has the imagination been less indulged concerning the formation of the human species male and female.—It would be endless to recount all the whimsical writings on this subject; but as Mad. Bourignon has made a considerable figure in the *religious*, or rather *superstitious*, world, we cannot help inserting some of her opinions concerning the first man, which are peculiarly marvellous. According to the *revelations* of this lady, Adam before his fall possessed in himself the principles of both sexes, and the virtue or power of producing his like, without the concurrent assistance of woman. The division into two sexes, she imagined, was a consequence of man's sin; and now, she observes, mankind are become so many *monsters in nature*, being much less perfect in this respect than plants or trees, who are capable of producing their like alone, and without pain or misery. She even imagined, that, being in an ecstasy, she saw the figure of Adam before he fell, with the manner how, by himself, he was capable of procreating other men. "God," says she, "represented to my mind the beauty of the first world, and the manner how he had drawn it from the chaos: every thing was bright, transparent, and darted forth light and ineffable glory. The body of Adam was purer and more transparent than crystal, and vastly finer; through his body were seen vessels and rivulets of light, which penetrated from the inward to the outward parts, through all his pores. In some vessels ran fluids of all kinds and colours, vastly bright, and quite diaphanous. The most ravishing harmony arose from every motion; and nothing resisted, or could annoy, him. His stature was taller than the present race of men; his hair was short, curled, and of a colour inclining to black; his upper lip covered with short hair: and, instead of the parts which modesty will not allow us to name, he was fashioned as our bodies will be in the life eternal, which I know not whether I dare reveal. In that region was diffused the most delicious fragrancy and perfumes; whence also men were to issue, all whose principles were inherent in him; there being in the genital system a vessel, where little eggs were formed; and a second vessel filled with a fluid, which impregnated those eggs: and, when man heated himself in the love of God, the desire he had that other creatures should exist besides himself caused the fluid above mentioned to drop on one or more of these eggs, with inexpressible delight; which being thus impregnated, issued, some time after, out of man, by this canal, in the shape of an egg, whence a perfect man emerged by insensible degrees. Woman was formed by taking out of Adam's sides the vessels that contained the eggs; which she still possesses, as is discovered by anatomists."

Many others have believed, that Adam at his first creation was both male and female: others, that he had two bodies joining together at the shoulders, and their faces looking opposite ways like those of Janus. Hence, say these, when God created Eve, he had no more to do than to separate the two bodies from one another.

Various conjectures have been formed concerning the place where man was first created, and where the garden of Eden was situated; but none of these have any solid foundation. The Jews tell us, that Eden was separated from the rest of the world by the ocean; and that Adam, being banished therefrom, walked across the sea, which he found every way fordable, by reason of his enormous stature. The Arabians imagined paradise to have been in the air; and that our first parents were thrown down from it on their transgression, as Vulcan is said to have been thrown down headlong from heaven by Jupiter.

Strange stories are told concerning Adam's children. That he had none in the state of innocence, is certain from scripture; but that his marriage with Eve was not consummated till after the fall, cannot be proved from thence. Some imagine, that, for many years after the

fall, Adam denied himself the connubial joys by way of penance; others, that he cohabited with another woman, whose name was LILITH. The Mahometans tell us, that our first parents having been thrown headlong from the celestial paradise, Adam fell upon the isle of Serendib, or Ceylon, in the East Indies; and Eve on Iodda, a port of the Red Sea, not far from Mecca. After a separation of upwards of two hundred years, they met in Ceylon, where they multiplied: according to some Eve had twenty, according to others only eight, deliveries; bringing forth at each time twins, a male and a female, who afterwards married. The rabbins imagine that eve brought forth Cain and Abel at a birth; that Adam wept for Abel an hundred years in the valley of tears near Hebron, during which time he did not cohabit with his wife; and that this separation would probably have continued longer, had it not been forbidden by the angel Gabriel. The inhabitants of Ceylon affirm, that the salt lake on the mountain of Colombo consists wholly of the tears which Eve for one hundred years together shed because of Abel's death.

Some of the Arabians tell us, that Adam was buried near Mecca on Mount Abukobeis; others, that Noah, having laid his body in the ark, caused it to be carried after the deluge to Jerusalem by Melchisedek the son of Shem: of this opinion are the eastern Christians; but the Persians affirm that he was interred in the Isle of Serendib, where his corpse was guarded by lions at the time the giants warred upon one another.—St. Jerome imagined that Adam was buried at Hebron; others, on Mount Calvary. Some are of opinion that he died on the very spot where Jerusalem was afterwards built; and was buried on the place where Christ suffered, that so his bones might be sprinkled with the Saviour's blood!!!

ADAM (Melchior) lived in the 17th century. He was born in the territory of Grotkaw in Silesia, and educated in the college of Brieg, where the dukes of that name, to the utmost of their power, encouraged learning and the reformed religion as professed by Calvin. Here he became a firm protestant; and was enabled to pursue his studies by the liberality of a person of quality, who had left several exhibitions for young students. He was appointed rector of a college at Heidelberg, where he published his *Lives of illustrious Men*. He wrote other works besides his *Lives*, and died in 1622.

ADAM'S APPLE, *f.* in botany, a name given to a species of CRITUS.

ADAM'S NEEDLE, *f.* in botany. See YUCCA.

ADAM'S PEAK, a high mountain of the East Indies, in the island of Ceylon, on the top of which they believe the first man was created.

ADAM, or ADOM, a town in the Peræa, or on the other side the Jordan, over against Jericho, where the Jordan began to be dried up on the passage of the Israelites.

ADAMA, or ADMAH, one of the towns that were involved in the destruction of Sodom.

ADAMANT, *f.* [*adamas*, Lat. from α and $\delta\alpha\mu\omega$, Gr. that is *insuperable, infrangible*.] A stone, imagined by writers, of impenetrable hardness. The diamond. Adamant is also taken for the loadstone.

ADAMANTEAN, *adj.* Hard as adamant.

ADAMANTINE, *adj.* [*adamantinus*, Lat.] Made of adamant.—Having the qualities of adamant; as hardness, indissolubility:

Him the Almighty Power
Hurl'd headlong flaming from th' ethereal sky,
With hideous ruin and combustion, down
To bottomless perdition, there to dwell
In adamant chains and penal fire.

Milton.

ADAMIC EARTH, a name given to common red clay, alluding to that species of earth of which the first man is supposed to have been made.

ADAMI POMUM, in anatomy, a protuberance in the fore-part of the throat, formed by the os hyoides. It is thought to be so called upon a strange conceit, that a piece

of the forbidden apple, which Adam ate, stuck by the way and occasioned it.

ADAMITES, in ecclesiastical history, the name of a sect of ancient heretics, supposed to have been a branch of the Basilidians and Carpocratians.

Epiphanius tells us, that they were called Adamites from their pretending to be re-established in the state of innocence, and to be such as Adam was at the moment of his creation, whence they ought to imitate him in his nakedness. They detested marriage; maintaining, that the conjugal union would never have taken place upon earth had sin been unknown.

ADAMUS, the philosopher's stone, so called by alchemists, who say that it is an animal; and that it has carried its invisible Eve in its body from the moment they were first united by the Creator. It is also called *Aquila*, *Philosophorum Lapis*, *Basiliscus*, *Benedictus*, *Boritis*, *Gryphus*; by way of eminence, *Antidotus*. This stone, the greatest object of alchemy, is a long-sought-for preparation, which, when found, is to transmute, or exalt, impurer metals, as tin, lead, and copper, into gold, and silver. Authors who have written on this stone, call sulphur the *maritus*, or husband; and mercury, the *uxor*, or wife.

ADAMSHIDE, a district of the circle of Rastenburg, belonging to the king of Prussia, which, with Dombrosken, was bought, in 1737, for 42,000 dollars.

ADAMSON (Patrick), a Scottish prelate, archbishop of St. Andrew's. He was born in the year 1543 in the town of Perth, and afterwards studied philosophy, and took his degree of master of arts, at the university of St. Andrew's. In the year 1566, he set out for France, as tutor to a young gentleman. He resided at Bourges during the massacre at Paris; and the same persecuting spirit prevailing among the catholics at Bourges as at the metropolis, he lived concealed for seven months in a public-house, the master of which, upwards of seventy years of age, was thrown from the top thereof, and had his brains dashed out, for his charity to heretics. Whilst Mr. Adamson lay thus in his sepulchre, as he called it, he wrote his Latin poetical version of the Book of Job, and his Tragedy of Herod. In the year 1573, he returned to Scotland; and became minister of Paisley. In the year 1575, he was appointed one of the commissioners, by the general assembly, to settle the jurisdiction and policy of the church; and the following year he was named, with Mr. David Lindsay, to report their proceedings to the earl of Mortoun, then regent. About this time the earl made him one of his chaplains; and, on the death of bishop Douglas, promoted him to the archiepiscopal see of St. Andrew's, a dignity which brought upon him great trouble and uneasiness: for now the clamour of the Presbyterian party rose very high against him, and many inconsistent stories were propagated concerning him. Soon after his promotion, he published his Catechism in Latin verse, a work highly approved even by his enemies; but, nevertheless, they still continued to persecute him with great violence. In the year 1582, being attacked with a grievous disease, in which the physicians could give him no relief, he happened to take a simple medicine from an old woman, which did him service. The woman, whose name was Alison Pearson, was thereupon charged with witchcraft, and committed to prison, but escaped out of her confinement; however, about four years afterwards, she was again found, and burnt for a witch. A provincial synod being held at St. Andrew's in April 1586, the archbishop was here accused and excommunicated: he appealed to the king and the states, but this availed him little; for, the mob being excited against him, he durst scarcely appear in public. At the next general assembly, a paper being produced, containing the archbishop's submission, he was absolved from the excommunication. In 1588, fresh accusations were brought against him. The year following, he published the Lamentations of the Prophet Jeremiah in Latin verse; which he dedicated to the king, complaining of his hard usage. The king, however,

ver, was so far from giving him assistance, that he granted the revenue of his fee to the duke of Lennox; so that the remaining part of his life was very wretched, having hardly subsistence for his family. He died in 1591.

ADANA, a town of Asia, in Natolia, and in the province of Carmania. It is seated on the river Choquen; on the banks of which stands a strong castle built on a rock. It has a great number of beautiful fountains brought from the river by means of water-works. Over the river there is a stately bridge of fifteen arches, which leads to the water-works. The climate is pleasant and healthy, and the winter mild and serene: but the summer is so hot as to oblige the principal inhabitants to retire into the neighbouring mountains, where they spend six months among shady trees and grottoes, in a most delicious manner. The adjacent country is rich and fertile, and produces melons, cucumbers, pomegranates, pulse, and herbs of all sorts, all the year round; besides corn, wine, and fruits, in their proper season. It is thirty miles east of Tarsus, on the road to Aleppo. E. lon. 35. 42. N. lat. 38. 10.

ADANSONIA, [named from M. Adanson, a French surgeon, who resided many years in Senegal, brought home a curious collection of seeds and plants, published his travels, and a new arrangement of vegetables, entitled *Familles des Plantes*.] In botany, a genus of the monadelphia polyandria class, of the natural order of columniferæ. The generic characters are—Calyx: perianth one-leaved, femiinquifid, cyathiform; divisions revolute, deciduous. Corolla: petals five, roundish, nerved, revolute, connected by the claws with each other and the stamens. Stamina: filaments united at bottom into a tube, which they crown, expanding horizontally. Antheræ kidney-shaped. Pistillum: germ ovate. Style very long, tubulous, variously intorted. Stigmas many (ten) prismatic, villous, radiate-expanded. Pericarpium: capsule ovate, woody, not gaping, ten-celled, (ten to fourteen *g.*) with farinaceous pulp, the partitions membranaceous. Seeds: numerous, kidney-shaped, rather bony, involved in a friable pulp.—*Essential Character.* Calyx, simple, deciduous. Style, very long. Stigmas, many. Capsule, woody, ten-celled, with farinaceous pulp, and many seeds.

There is only one species, which is called *Adansonia digitata*, or Ethiopian four-gourd, or monkey's-bread.—The young plants, and also most of the new branches, have single spear-shaped leaves towards their lower part, but at their extremities the leaves have some three, and others five lobes, of the same size and form as the lower, which are disposed like a hand; these are entire, ending in a point, and fall off in winter. The stems are large and woody, but of a soft texture, and have generally a large swelling near the root. The account which Monsieur Adanson gives of the trees he saw at Senegal and other parts of Africa, in regard to the size of them, is amazing; he measured several from sixty-five to seventy-eight feet in circumference; but their height was not extraordinary. The trunks were from twelve to fifteen feet high, before they divided into many horizontal branches which touched the ground at their extremities; these were from forty-five to fifty-five feet long, and were so large, that each branch was equal to a monstrous tree: and where the water of a neighbouring river had washed away the earth, so as to leave the roots of one of these trees bare and open to sight, they measured one hundred and ten feet long, without including those parts of the roots which remained covered. Prosper Alpinus, in his history of Egyptian plants, describes this tree, to which he gives the title of *baobab*, so that it also grows in that country; but he does not mention any of them to be near the size of those described by Monsieur Adanson. The fresh fruit is very pleasant, of an acid flavour, and is eaten with sugar. The pulp or juice mixed with sugar, or a syrup made of it, is used in putrid and pestilential fevers. At Cairo they reduce the pulp to a powder, and use it in these disorders, in the lenteries, dysentery, and all sorts of fluxes.

Propagation and Culture. It is propagated by seeds, which must be procured from the country where it grows naturally, for it does not produce any in Europe; these must be sown in pots, and plunged into a hot-bed, where, in about six weeks, the plants will come up, and in a short time after be fit to transplant, when they should be each planted into a separate pot, filled with light sandy earth, and plunged into a fresh hot-bed, observing to shade them until they have taken new root; after which time they should have free air admitted to them every day in warm weather, but must be sparingly watered; for as their stems are soft, especially when young, too much wet will cause them to rot. As the plants advance in their growth, they are to be shifted into larger pots, but must constantly be plunged into the bark-bed, being too tender to thrive in this country without this artificial heat, therefore they must constantly remain in the stove with other tender exotic plants: the plants when young make great progress in their growth, where they are properly treated; for in three years many of them have been more than six feet high, and have put out several lateral branches; their stems are also proportionable; but after four or five years growth, they are almost at a stand, their annual shoots rarely exceeding two or three inches. There were some plants of this sort in several gardens, which were raised from seeds obtained from Grand Cairo in the year 1724, by the late Dr. William Sherard, some of which were grown to the height of eighteen feet; but in the severe winter 1740, they were all lost, and since that time there had not been any of the seeds brought to England, till the return of M. Adanson to Paris in 1754, who sent some of the seeds over here, which have succeeded, and many of the plants grew upwards of twelve or fifteen feet high.

To ADAPT, *v. a.* [*adapto*, Lat.] To fit one thing to another; to suit; to proportion.—It is not enough that nothing offends the ear, but a good poet will adapt the very sounds, as well as words, to the things he treats of. *Pope.*

ADAPTATION, *f.* The act of fitting one thing to another; the fitness of one thing to another.—Some species there be of middle natures, that is, of bird and beast, as bats; yet are their parts so set together, that we cannot define the beginning or end of either, there being a commixture of both, rather than adaptation or cement of the one unto the other. *Brown.*

ADAPTION, *f.* The act of fitting.—It were alone a sufficient work to shew all the necessities, the wife contrivances, and prudent adaptations, of these admirable machines, for the benefit of the whole. *Cheyne.*

ADAPTNESS, *f.* [for *adaptedness*, from *adapt*.]—Some notes are to display the adaptness of the sound to the sense. *Newton.*

ADAR, *f.* the name of a Hebrew month, answering to the end of February and beginning of March, the 12th of their sacred, and 6th of their civil, year. On the seventh day of it, the Jews keep a feast for the death of Moses; on the thirteenth they have the feast of Esther; and, on the 14th, they celebrate the feast of Purim, for their deliverance from Haman's conspiracy. As the lunar years, which the Jews followed in their calculation, is shorter than the solar by about eleven days, which at the end of three years make a month, they then intercalate a thirteenth month, which they call *Veadar*, or the second Adar.

ADARCE, *f.* a saltish concretion found about the reeds and grafs in marshy grounds in Galatia; it is also called *calomochanus*, or *calomochinus*. It is lax and porous, like bastard sponge, and is used to clear the skin with in leprosy, tetter, freckles, &c. Dr. Plott gives an account of this production in his Natural History of Oxfordshire.

ADARCON, *f.* in Jewish antiquity, a gold coin, mentioned in scripture, worth about 15s. sterling.

ADARETON, an island in the lake Van Turcomania, having on it several villages, and a monastery of Armenian monks.

ADARME, *f.* in commerce, a small weight in Spain, which is also used at Buenos-Aires, and in all Spanish America. It is the sixteenth part of an ounce, which at Paris is called the demi-gros. But the Spanish ounce is seven per cent. lighter than that of Paris. Stephens renders it in English by a drachm.

ADASA, a city of Judea, where Judas Maccabæus overthrew and killed Nicanor.

ADATAIS, **ADATSI**, or **ADATYS**, *f.* in commerce, a muslin or cotton cloth, very fine and clear, of which the piece is ten French ells long, and $\frac{3}{4}$ broad. It comes from the East Indies; and the finest is made at Bengal.

ADCORDABILIS DENARI, *f.* in old law books, signifies money paid by the vassal to his lord, upon the selling or exchanging of a feud.

To ADCORPORATE, *v. a.* [from *ad* and *corpus*.] To unite one body with another; more usually wrote *accorporate*.

ADCRESCENTES, *f.* among the Romans, denoted a kind of soldiery, entered in the army, but not yet put on duty; from these the standing forces were recruited.

To ADD, *v. a.* [*addo*, Lat.] To join something to that which was before. To perform the mental operation of adding one number or conception to another. To *add* is proper, but to *add together* seems a solecism.—Whatever positive ideas a man has in his mind, of any quantity, he can repeat it, and *add* it to the former, as easily as he can *add together* the ideas of two days, or two years. *Locke*.

ADDA, a river of Switzerland and Italy, which rises in mount Braulio, in the country of the Grisons, and, passing through the Valteline, traverses the lake Como and the Milanese, and falls into the Po, near Cremona.

ADDALE, *adj.* That to which something may be added. *Addible* is more proper. It signifies more properly that which may be added.

To ADDECIMATE, *v. a.* [*addecimo*, Lat.] To take or ascertain tithes.

To ADDEEM, *v. a.* [from *deem*.] To esteem; to account. This word is now out of use.

ADDEPHAGIA, *f.* in medicine, a term used by some physicians for gluttony, or a voracious appetite.

ADDER, *f.* [*atter*, *attor*, *naddre*, as it seems from *eiller*, Sax. poison.] In zoology, a name for the **VIPER**. See **COLUBER**.

ADDER-BOLTS, or **ADDER-FLIES**. See **LIBELLULA**.
Sea ADDER, *f.* the English name of a species of **SYNGNATHUS**.

Water ADDER, *f.* a name given to the **COLUBER NATRIX**.

ADDER'S-TONGUE, *f.* in botany. See **OPHIOGLOSSUM**.

ADDER-STUNG, *part.* is used in respect of cattle, when stung with any kind of venomous reptiles, as adders, scorpions, &c. or bit by a hedge-hog or threw. For the cure of such bites, some use an ointment made of dragon's blood, with a little barley-meal, and the whites of eggs.

ADDER-WORT, or **SNAKEWOOD**, *f.* See **POLYGONUM**.

ADDEXTRATOIRES, *f.* in the court of Rome, the pope's mitre-bearers, so called, according to Ducange, because they walk at the pope's right hand when he rides to visit the churches.

ADDIBLE, *adj.* Possible to be added.—The clearest idea it can get of infinity, is the confused incomprehensible remainder of endless *addible* numbers, which affords no prospect of stop or boundary. *Locke*.

ADDIBILITY, *f.* The possibility of being added.—This endless addition or *addibility* of numbers, so apparent to the mind, is that which gives us the clearest and most distinct idea of infinity. *Locke*.

ADDICE, *f.* [for which we corruptly speak and write *adz*, from *adese*, Sax. an axe.]—The *addice* hath its blade made thin and somewhat arching. As the axe hath its edge parallel to its handle, so the *addice* hath its edge athwart the handle, and is ground to a basil on its inside to its outer edge. *Moxon*.

To ADDICT, *v. a.* [*addico*, Lat.] To devote, to dedicate, in a good sense; which is rarely used. It is commonly taken in a bad sense; as, *he addicted himself to vice*. To devote one's self to any person, party, or persuasion.

ADDICTEDNESS, *f.* The quality or state of being addicted.

ADDICTI, *f.* in antiquity, a kind of slaves, among the Romans, adjudged to serve some creditor whom they could not otherwise satisfy, and whose slaves they became till they could pay or work out the debt.

ADDICTION, *f.* [*addictio*, Lat.] The act of devoting, or giving up. The state of being devoted:

It is a wonder how his grace should glean it,
Since his *addiction* was to courtes vain;
His companies unletter'd, rude, and shallow;
His hours fill'd up with riots, banquets, sports.

Shakespeare.

ADDICTION, among the Romans, was the making over goods to another, either by sale or by legal sentence; the goods so delivered were called *bona addicta*. Debtors were sometimes delivered over in the same manner; and thence called *servi addicti*.

ADDICTIO IN DIEM, *f.* among the Romans, the adjudging a thing to a person for a certain price, unless by such a day the owner, or some other, give more for it.

ADDINGTON, Surrey, three miles from Croydon. The lord of this manor, in the reign of Henry III. held it by this service, viz. to make the king a mess of pottage at his coronation; and so lately as the restoration of Charles II. this service was ordered by the court of claims, and accepted of by the king at his table.

ADDISON (Lancelot), son of Lancelot Addison a clergyman, was born at Mouldisneaburne, in the parish of Crosby Ravensworth, in Westmoreland, in the year 1632. He was educated at Queen's College, Oxford; and, at the restoration of Charles II. accepted of the chaplainship of the garrison of Dunkirk: but that fortress being delivered up to the French in 1662, he returned to England, and was soon after made chaplain to the garrison of Tangier; where he continued seven years, and was greatly esteemed. In 1670 he again returned to England, and was soon after made chaplain in ordinary to the king; but his chaplainship of Tangier being taken from him on account of his absence, he found himself straitened in his circumstances, when he seasonably obtained the rectory of Milton in Wiltshire, worth about 120*l.* per annum. He afterwards became a prebendary of Sarum; took his degree of doctor of divinity at Oxford; and in 1683 was made dean of Litchfield, and next year archdeacon of Coventry. His life was exemplary; his conversation pleasing; and greatly instructive; and his behaviour, as a gentleman, a clergyman, and a neighbour, did honour to the place of his residence. He wrote, 1. A Short Narrative of the Revolutions of the Kingdoms of Fez and Morocco. 2. The present History of the Jews. 3. A Discourse on Catechising. 4. A Modest Plea for the Clergy. 5. An Introduction to the Sacrament. 6. The first State of Mahometanism; and several other pieces. This worthy divine died on the 20th of April 1703, and left three sons: Joseph, the subject of the next article; Gullston, who died while governor of Fort St. George; Lancelot, master of arts, and fellow of Magdalene College in Oxford; and one daughter, first married to Dr. Saxe, prebendary of Westminster, and afterwards to Daniel Coombes, Esq.

ADDISON (Joseph), son of Dean Addison, the subject of the last article. He was born at Milton, near Amesbury, in Wiltshire, on the 11th of May 1672; and, not being thought likely to live, was baptized the same day. He received the first rudiments of his education at the place of his nativity, under the Rev. Mr. Naith; but was soon removed to Salisbury, under the care of Mr. Taylor; and from thence to the Charter-house, where he commenced his acquaintance with Sir Richard Steele. About fif-

teen,

J. Chapman sculp.

JOSEPH ADDISON.

London Published as the Act directs, Novr 1796, by J. Wilkie.

teen, he was entered at Queen's College, Oxford, where he applied very closely to the study of classical learning, in which he made a surprising proficiency.

In the year 1687, Dr. Lancaster, dean of Magdalen College, having, by chance, seen a Latin poem of Mr. Addison's, was so pleased with it, that he immediately got him elected into that house, where he took up his degrees of bachelor and master of arts. His Latin pieces, in the course of a few years, were exceedingly admired in both universities; nor were they less esteemed abroad, particularly by the celebrated Boileau, who is reported to have said, that he would not have written against Perrault, had he before seen such excellent pieces by a modern hand. He published nothing in English before the 22d year of his age; when there appeared a short copy of verses written by him, and addressed to Mr. Dryden, which procured him great reputation from the best judges. This was soon followed by a translation of the Fourth Georgic of Virgil (omitting the story of Aristeus), much commended by Mr. Dryden. He wrote also the Essay on the Georgics, prefixed to Mr. Dryden's translation. There are several other pieces written by him about this time; amongst the rest, one dated the third of April 1694, addressed to H. S. that is, Dr. Sacheverel, who became afterwards so famous, and with whom Mr. Addison once lived in the greatest friendship; but their intimacy was some time after broken off by their disagreement in political principles. In the year 1695, he wrote a poem to King William on one of his campaigns, addressed to Sir John Somers lord keeper of the great seal. This gentleman received it with much pleasure, took the author into the number of his friends, and bestowed on him many marks of his favour.

Mr. Addison had been closely pressed, while at the university, to enter into holy orders; and had once resolved upon it: but, having expressed an inclination to travel, he was encouraged thereto by his patron above-mentioned, who by his interest procured him from the crown a pension of 300*l.* per annum to support him in his travels. He accordingly made a tour to Italy in the year 1699; and, in 1701, he wrote a poetical epistle from Italy to the Earl of Halifax, which has been universally esteemed as a most excellent performance. It was translated into Italian verse by the Abbot Antonio Maria Salvini, Greek professor at Florence. In the year 1705, he published an account of his travels, dedicated to Lord Somers; which, though at first but indifferently received, yet in a little time met with its deserved applause.

In the year 1702, he was about to return to England, when he received advice of his being appointed to attend prince Eugene, who then commanded for the emperor in Italy: but the death of king William, happening soon after, put an end to this affair as well as his pension; and he remained for a considerable time unemployed. But an unexpected incident at once raised him, and gave him an opportunity of exerting his talents to advantage: for, in the year 1704, the lord treasurer Godolphin happened to complain to lord Halifax, that the duke of Marlborough's victory at Blenheim had not been celebrated in verse in the manner it deserved; and intimated, that he would take it kindly if his lordship, who was the known patron of the poets, would name a gentleman capable of doing justice to so elevated a subject. Lord Halifax replied, somewhat hastily, that he did know such a person, but would not mention him; adding, that long had he seen, with indignation, men of no merit maintained in luxury at the public expence, whilst those of real worth and modesty were suffered to languish in obscurity. The treasurer answered very coolly, that he was sorry there should be occasion for such an observation, but that he would do his endeavour to wipe off such reproaches for the future; and he engaged his honour, that whoever his lordship named as a person capable of celebrating this victory, should meet with a suitable recompence. Lord Halifax thereupon named Mr. Addison; insisting, however, that the

treasurer himself should send to him; which he promised. Accordingly he prevailed on Mr. Boyle (afterwards Lord Carlton) then chancellor of the Exchequer, to make the proposal to Mr. Addison; which he did in so polite a manner, that our author readily undertook the task. The lord treasurer had a sight of the piece, when it was carried no farther than the celebrated simile of the angel; and was so pleased with it, that he immediately appointed Mr. Addison a commissioner of appeals, vacant by the promotion of Mr. Locke, chosen one of the lords commissioners for trade. The Campaign is addressed to the duke of Marlborough: it gives a short view of the military transactions in 1704, and contains a noble description of the two great actions of Schellenberg and Blenheim. In 1705, he attended lord Halifax to Hanover; and the ensuing year was appointed under-secretary to Sir Charles Hedges, secretary of state; in which office he acquitted himself so well, that the earl of Sunderland, who succeeded Sir Charles in December, continued Mr. Addison in his employment.

A taste for operas beginning at this time to prevail in England, and many persons having solicited Mr. Addison to write one, he complied with their request, and composed his *Rosamond*. This, however, whether from the defect of the music, or from the prejudices in favour of the Italian taste, did not succeed upon the stage; but the poetry of it has, and always will be, justly admired. About this time, Sir Richard Steele composed his comedy of the *Tender Husband*, to which Mr. Addison wrote a prologue. Sir Richard surprised him with a dedication of this play, and acquainted the public, that he was indebted to him for some of the most excellent strokes in the performance. The marquis of Wharton, being appointed lord-lieutenant of Ireland in 1709, took Mr. Addison with him as his secretary. Her majesty also made him keeper of the records of Ireland, and, as a farther mark of her favour, considerably augmented the salary annexed to that place. Whilst he was in this kingdom, the *Tatler* was first published; and he discovered his friend Sir Richard Steele to be the author, by an observation on Virgil, which he had communicated to him. He afterwards assisted considerably in carrying on this paper, which the author acknowledges. The *Tatler* being laid down, the *Spectator* was set on foot, and Mr. Addison furnished great part of the most admired papers. The *Spectator* made its appearance in March 1711, and was brought to a conclusion in September 1712.

His celebrated *Cato* appeared in 1713. He formed the design of a tragedy upon this subject when he was very young, and wrote it when on his travels: he retouched it in England, without any intention of bringing it on the stage; but, his friends being persuaded it would serve the cause of liberty, he was prevailed on by their solicitations, and it was accordingly exhibited on the theatre, with a prologue by Mr. Pope, and an epilogue by Dr. Garth. It was received with the most uncommon applause, having run thirty-five nights without interruption. The Whigs applauded every line in which liberty was mentioned, as a satire on the Tories; and the Tories echoed every clap, to shew that the satire was unfelt. When it was printed, notice was given that the queen would be pleased if it was dedicated to her; "but, as he had designed that compliment elsewhere, he found himself obliged (says Tickell) by his duty on the one hand, and his honour on the other, to send it into the world without any dedication." It was no less esteemed abroad, having been translated into French, Italian, and German; and it was acted at Leghorn, and several other places, with vast applause. The Jesuits of St. Omers made a Latin version of it, and the students acted it with great magnificence.

About this time, another paper called the *Guardian* was published by Steele, to which Addison was a principal contributor. It was a continuation of the *Spectator*, and was distinguished by the same elegance and the same variety; but, in consequence of Steele's propensity to politics,

was abruptly discontinued in order to write the Englishman.

The papers of Addison are marked in the Spectator by one of the letters in the name of *Clio*, and in the Guardian by a *hand*. Many of these papers were written with powers truly comic, with nice discrimination of characters, and accurate observation of natural or accidental deviations from propriety: but it was not supposed that he had tried a comedy on the stage, till Steele, after his death, declared him the author of "The Drummer." This, however, he did not know to be true by any cogent testimony: for, when Addison put the play into his hands, he only told him it was the work of a gentleman in the company; and when it was received, as is confessed, with cold disapprobation, he was probably less willing to claim it. Tickell omitted it in his collection; but the testimony of Steele, and the total silence of any other claimant, has determined the public to assign it to Addison, and it is now printed with his other poetry. Steele carried "The Drummer" to the playhouse, and afterwards to the press, and sold the copy for fifty guineas. To Steele's opinion may be added the proof supplied by the play itself, of which the characters are such as Addison would have delineated, and the tendency such as Addison would have promoted.

It is said that Mr. Addison intended to have composed an English dictionary upon the plan of the Italian (*Della Crusca*); but, upon the death of the queen, being appointed secretary to the lords justices, he had not leisure to carry on such a work. When the earl of Sunderland was appointed lord-lieutenant of Ireland, Mr. Addison was again made secretary for the affairs of that kingdom; and, upon the earl's being removed from the lieutenancy, he was chosen one of the lords of trade.

Not long afterwards an attempt was made to revive the Spectator, at a time indeed by no means favourable to literature, when the succession of a new family to the throne filled the nation with anxiety, discord, and confusion; and either the turbulence of the times or the satiety of readers put a stop to the publication, after an experiment of eighty numbers, which were afterwards collected into an eighth volume, perhaps more valuable than any of those that went before it: Addison produced more than a fourth part.

In 1715, he began the Freeholder, a political paper, which was much admired, and proved of great use at that juncture. He published also, about this time, verses to Sir Godfrey Kneller upon the king's picture, and some to the Princess of Wales, with the tragedy of Cato.

Before the arrival of king George he was made secretary to the regency, and was required by his office to send notice to Hanover that the queen was dead, and that the throne was vacant. To do this would not have been difficult to any man but Addison, who was so overwhelmed with the greatness of the event, and so distracted by choice of expression, that the lords, who could not wait for the niceties of criticism, called Mr. Southwell, a clerk in the house, and ordered him to dispatch the message. Southwell readily told what was necessary, in the common stile of business, and valued himself upon having done what was too hard for Addison.

In 1716, he married the countess dowager of Warwick, whom he had solicited by a very long and anxious courtship. He is said to have first known her by becoming tutor to her son. The marriage, if uncontradicted report can be credited, made no addition to his happiness; it neither found them nor made them equal. She always remembered her own rank, and thought herself intitled to treat with very little ceremony the tutor of her son. It is certain that Addison has left behind him no encouragement for ambitious love. The year after, 1717, he rose to his highest elevation, being made secretary of state; but is represented as having proved unequal to the duties of his place. In the house of commons he could not speak, and therefore was useless to the defence of the government. In

the office he could not issue an order without losing his time in quest of fine expressions. At last, finding by experience his own inability for public business, he was forced to solicit his dismissal, with a pension of 1500*l.* a year. Such was the account of those who were inclined to detract from his abilities; but by others his relinquishment was attributed to declining health, and the necessity of recess and quiet.

In his retirement, he applied himself to a religious work, which he had begun long before; part of which, scarcely finished, has been printed in his works. He intended also to have given an English paraphrase of some of David's Psalms. But his ailments increased, and cut short his designs. He had for some time been oppressed by an asthmatic disorder, which was now aggravated by a dropsy, and he prepared to die conformably to his precepts and professions. He sent, as Pope relates, a message by the earl of Warwick to Mr. Gay, desiring to see him: Gay, who had not visited him for some time before, obeyed the summons, and found himself received with great kindness. The purpose for which the interview had been solicited was then discovered: Addison told him that he had injured him; but that, if he recovered, he would recompence him. What the injury was he did not explain, nor did Gay ever know; but supposed that some preferment designed for him had by Addison's intervention been withheld. Another death-bed interview, of a more solemn nature, is recorded: Lord Warwick was a young man of very irregular life, and perhaps of loose opinions. Addison, for whom he did not want respect, had very diligently endeavoured to reclaim him; but his arguments and expostulations had no effect: one experiment, however, remained to be tried. When he found his life near its end, he directed the young lord to be called: and when he desired, with great tenderness, to hear his last injunctions, told him, "I have sent for you that you may see how a Christian can die." What effect this awful scene had on the earl's behaviour is not known: he died himself in a short time. Having given directions to Mr. Tickell for the publication of his works, and dedicated them on his death-bed to his friend Mr. Craggs, he died June 17, 1719, at Holland-house.

Addison's course of life before his marriage has been detailed by Pope. He had in the house with him Budgell, and perhaps Philips. His chief companions were Steele, Budgell, Philips, Carey, Davenant, and Colonel Brett. With one or other of these he always breakfasted. He studied all the morning; then dined at a tavern, and went afterwards to Button's. From the coffee-house he went again to the tavern, where he often sat late, and drank too much wine.

Dr. Johnson, in delineating the character of Addison, observes, with Tickell, that he employed wit on the side of virtue and religion. He not only made the proper use of wit himself, but taught it to others; and from his time it has been generally subservient to the cause of reason and truth. He has dissipated the prejudice that had long connected gaiety with vice, and easiness of manners with laxity of principles. He has restored virtue to its dignity, and taught innocence not to be ashamed. This is an elevation of literary character, "above all Greek above all Roman fame." No greater felicity can genius attain than that of having purified intellectual pleasure, separated mirth from indcency, and wit from licentiousness; of having taught a succession of writers to bring elegance and gaiety to the aid of goodness; and, to use expressions yet more awful, of having "turned many to righteousness." As a describer of life and manners, he must be allowed to stand perhaps the first of the first rank. His humour, which, as Steele observes, is peculiar to himself, is so happily diffused as to give the grace of novelty to domestic scenes and daily occurrences. He never "outsteps the modesty of nature," nor raises merriment or wonder by the violation of truth. His figures neither divert by distortion, nor amaze by aggravation. He copies life with so much

much fidelity, that he can be hardly said to invent; yet his exhibitions have an air so much original, that it is difficult to suppose them not merely the product of imagination. As a teacher of wisdom he may be confidently followed. His religion has nothing in it enthusiastic or superstitious; he appears neither weakly credulous nor wantonly sceptical; his morality is neither dangerously-lax nor impracticably rigid. All the enchantment of fancy and all the cogency of argument are employed to recommend to the reader his real interest, the care of pleasing the Author of his being. Truth is shewn sometimes as the phantom of a vision, sometimes appears half veiled in an allegory; sometimes attracts regard in the robes of fancy, and sometimes steps forth in the confidence of reason. She wears a thousand dresses, and in all is pleasing.

In Tickell's edition of Mr. Addison's Works there are several pieces hitherto unmentioned, viz. The Dissertation on Medals; which, though not published till after his death, yet he had collected the materials, and began to put them in order, at Vienna, in 1702. A pamphlet, intitled, The present State of the War, and the Necessity of an Augmentation, considered. The late Trial and Conviction of Count Tariff, &c. &c.

ADDITAMENT, f. [*additamentum*, Lat.] Something added to another. Thus physicians call the ingredients added to a medicine already compounded, *additaments*.

ADDITION, f. The act of adding one thing to another; opposed to *diminution*.—The infinite distance between the Creator and the noblest of all creatures, can never be measured, nor exhausted by endless *addition* of finite degrees. *Bentley*.—Additament, or the thing added. In arithmetic, *addition* is the reduction of two or more numbers of the like kind together into one sum or total.

ADDITION, in music, a dot marked on the right side of a note, signifying that it is to be sounded or lengthened half as much more as it would have been without such mark.

ADDITION, in law, signifies a title given to a man, besides his Christian-name and surname, setting forth his estate or degree, his trade, and the place where he inhabits; and this is, to prevent the inconvenience of mistaking one person for another. Additions of *estate or degree* are, yeoman, gentlemen, esquire, knight, and the like. Additions of *trade or occupation* are those of merchant, clothier, carpenter, taylor, husbandman, labourer, and all other lawful occupations. Additions of *place* are, of such a town or hamlet, and of such a county. Where a man hath household in two places, he shall be said to dwell in both; so that his addition in either may suffice. Knave was anciently a regular addition. By stat. 1 Hen. V. cap. 5. it was ordained, that in such suits or actions where process of outlawry lies, such addition should be made to the name of the defendant, to shew his estate, mystery, and place where he dwells; and that the writs not having such additions shall abide if the defendant take exception thereto; but not by the office of the court. The reason of this ordinance was, that one man might not be troubled by the outlawry of another; but, by reason of the certain addition, every person might bear his own burden. If there be a corporation of one sole person, he may be named by the common law by his Christian name without any surname, as Thomas bishop of Exeter. So a duke, marquis, earl, viscount, or baron, might by the common law be named by his Christian name, and by the name of his dignity, as John duke of Marlborough. An addition after an *alias dictus* is ill; for, if the party is not sufficiently named in the first part, the *alias dictus* will not help it. 3 *Salk.* 20. Where there are several persons of different names, and the same addition, it is safest to repeat the addition after each of their names, applying it particularly to every one of them. 2 *Haw.* 187. If a man hath divers trades or occupations, he may be named by any of them; but if a gentleman by birth be a tradesman, he shall not be named by his trade, but by the degree of a gentleman; because it is worthier than the addition of any

trade or mystery: and, in general, a man shall be named by his worthiest title of addition. 2 *Inst.* 668, 9. Where a son hath the same name and the same addition with his father, the addition of *the younger* is necessary to be made to the other additions of the son; but it is not necessary to add *the elder* to the additions of the father. 2 *Haw.* 187. The eldest sons of peers, in the life-time of their fathers, though frequently titular lords, yet are only esquires; and foreign noblemen in England have only the legal title of esquire. 2 *Haw.* 187. Clerk is a good addition of a clergyman; and, if a man hath taken any degree in either of the universities, he may be named by that degree. 1 *Blackst.* 405. Widow, single-woman, spinster, and (as some say) wife of such a one, are good additions; and the place of the habitation of a wife is sufficiently shewn, by shewing that of her husband. 2 *Haw.* 190. If a man lives in a hamlet of a town, he may be named either of the hamlet or of the town. But the addition of parish, if there be two or more towns in it, is not good; but, if there be but one town, the addition of parish is good. 2 *Inst.* 669.

ADDITIONS, in distilling, a name given to such things as are added to the wash, or liquor, while in a state of fermentation, in order to improve the vinosity of the spirit, procure a larger quantity of it, or give it a particular flavour. All things, of whatever kind, thus added in the time of fermentation, are called by those of the business who speak most intelligently *additions*; but many confound them with things of a very different nature, under the name of *ferments*. See **DISTILLING**.

ADDITIONS, in heraldry, some things added to a coat of arms, as marks of honour; and therefore directly opposite to abatements. Among additions we reckon **BORDURE, QUARTER, CANTON, GYRON, PILE, &c.** See these articles.

ADDITIONAL, adj. That which is added.—Our calendar being once reformed and set right, it may be kept so, without any considerable variation, for many ages, by omitting one leap-year; i. e. the *additional* day, at the end of every 134 years. *Holder*.

ADDITIONAL, f. Additament; something added. Not now in use.

ADDITORY, adj. [from *add.*] That which has the power or quality of adding.—The *additory* fiction gives to a great man a larger share of reputation than belongs to him, to enable him to serve some good end or purpose. *Arbutnot*.

ADDLE, adj. [from *adel*, Sax. a disease, according to Skinner and Junius; perhaps from *ydel*, idle, barren, unfruitful.] Originally applied to eggs, and signifying such as have not received an impregnation from the semen of the cock, but grow rotten under the hen: thence transferred to brains that produce nothing.

To ADDLE, v. a. To make addle; to corrupt; to make barren.—This is also evidenced in eggs, whereof the sound ones sink, and such as are *addled* swim; as do also those that are termed hypanemix, or wind-eggs. *Brown*.

To ADDLE, v. n. To grow; to increase. Now obsolete:

Where ivy embraceth the tree very fore,
Kill ivy, else tree will *addle* no more.

Tusser.

ADDLE-PATED, adj. Having addled brains:

Poor slaves in metre, dull and *addle-pated*,
Who rhyme below even David's psalms translated.

Dryden.

To ADDRESS, v. a. [*addresser*, Fr. from *dereçar*, Span. from *dirigo*, *directum*, Lat.] To prepare one's self to enter upon any action; as, *he addressed himself to the work*. It has to before the thing:

With him the palmer eke, in habit sad,
Himself *address* to the adventure hard.

Spencer.

To get ready; to put in a state for immediate use:

To-night in Harfleur we will be your guest,
To-morrow for the march we are *address*.

Shakespeare.

To

To apply to another by words, with various forms of construction. Sometimes without a preposition. Sometimes with *to*. Sometimes with the reciprocal pronoun; as, *he addressed himself to the general*. Sometimes with the accusative of the matter of the address, which may be nominative to the passive:

The prince himself, with awful dread possess'd,
His vows to great Apollo thus *address'd*. *Dryden.*

To address, in law, is to apply to the king in form.—The representatives of the nation in parliament, and the privy-council, *addressed* the king to have it recalled. *Swift.*

ADDRESS, *f.* [*adresse*, Fr.] Verbal application to any one, by way of persuasion; petition; courtship:

Henry, in knots involving Emma's name,
Had half confess'd and half conceal'd his flame
Upon this tree; and as the tender mark
Grew with the year, and widen'd with the bark,
Venus had heard the virgin's soft *addresses*,
That, as the wound, the passion might increase. *Prior.*

Manner of addressing another; as, we say, *a man of an happy or a pleasing address*; *a man of an awkward address*. Skill, dexterity. Manner of directing a letter; a sense chiefly mercantile.

ADDRESSER, *f.* The person that addresses or petitions.

ADDUCENT, *adj.* [*adducens*, Lat.] A word applied to those muscles that bring forward, close, or draw together, the parts of the body to which they are annexed.

To ADDULCE, *v. a.* [*addoucir*, Fr. *dulcis*, Lat.] To sweeten: a word not now in use.—Thus did the French embassadors, with great shew of their king's affection, and many figured words, seek to *addulce* all matters between the two kings. *Bacon.*

ADEA, a province of Upper Ethiopia, bordering on the Red Sea, once subject to Abyssinia, but now principally to the Turks and Portuguese.

ADEB, *f.* in commerce, the name of a large Egyptian weight, used principally for rice, and consisting of 210 okes, each of three rotolos, a weight of about two drachms less than an English pound. But this is no certain weight, for at Rosetto the adeb is only 150 okes.

ADEBETH, an island in the Nile, in Lower Egypt, containing many villages and stately palaces, which yet can hardly be seen from the river, on account of the luxuriant foliage of the surrounding lofty trees.

ADECTOS, *f.* [from α , priv. and *δακνω*, to bite.] An epithet given to medicines that relieve from the biting sense of pain, by removing the uneasiness caused by stimulants; whence Celsus calls them *lenia*.

ADEL, a kingdom on the eastern coast of Africa, which reaches as far as the straits of Babelmandel, which unite the Red Sea to the sea of Arabia. This country produces corn, and feeds a great number of cattle. The inhabitants carry on a trade in gold, silver, ivory, oil, frankincense, a sort of pepper, and other merchandises of Arabia and the Indies.

ADELIA, *f.* [*αδελος*, *incertus, obscurus*, obscure.] In botany, a genus of the dioecia monadelphia class, ranking in the natural order of tricocceæ. The generic characters are—I. Male. Calyx: perianthium one-leaved, three-parted; leaflets oblong, curved back. Stamina: filaments many, capillary, the length of the calyx, united into a cylinder at the base; antheræ roundish. II. Female. Calyx: perianthium five-parted; parts oblong, permanent. Pistillum: germ roundish; styles three, very short, divaricate; stigmas torn. Pericarpium: capsule tricocous, roundish, three-celled. Seeds: solitary, roundish.—*Essential Character.* Male. Calyx, three-parted; stamina many, united at the base. Female. Calyx, five-parted; styles three, torn; capsule tricocous.

Species. 1. *Adelia bernardia*, or villous-leaved bernardia: leaves oblong, tomentose, serrate. These shrubs grow naturally in the island of Jamaica, and are near of

kin to the *croton*. Dr. Housfoun constituted a genus of the two first by the title of bernardia, in honour of Dr. Bernard de Jussieu.

2. *Adelia ricinella*, or smooth-leaved bernardia: leaves obovate, quite entire. Grows to the height of eight or ten feet, and has slender flower-stalks.

3. *Adelia acidoton*, or box-leaved adelia: branches flexuose, spines gemmaceous. This seldom rises above four feet in height. The branches very slender and flexible; the leaves small, delicate, crowded, and associated with one or two flowers. It has much the appearance of a young ebony. It flowers in June with us; but, in Jamaica, early in April and May.

Propagation and Culture. These plants are propagated by seeds, when they can be procured from the countries where they grow; for they do not produce good seeds in England. They must be sown upon a hot-bed in the spring, and, when the plants are fit to remove, they should be each transplanted into a separate small pot, filled with light earth, and plunged into a hot-bed of tan, treating them in the same manner as is hereafter directed for *CROTON*. In the autumn the pots should be plunged into the tan-bed in the stove, where, if they are kept in a temperate heat in winter, and not over-watered during that season, the plants may be preserved, and the summer following will produce flowers; but as these have little beauty, the plants are seldom propagated except in botanic gardens.

ADELING, *f.* [from *adel*, Sax. illustrious.] A word of honour among the Angles, properly appertaining to the king's children. King Edward the Confessor, being without issue, and intending to make Edgar his heir, called him *adeling*.

ADELME, or ALDHELM, son to Kenred, nephew to Ina king of the West Saxons; after having been educated abroad, was abbot of Malmesbury thirty years. He was the first Englishman who wrote in Latin, the first who brought poetry into England, and the first bishop of Sherbourne. He lived in great esteem till his death, which happened in 709. He was canonized, and many miracles were told of him. He is mentioned with great honour by Camden and Bayle, and his life was written by William of Malmesbury.

ADELPHIANI, *f.* in church-history, a sect of ancient heretics, who fasted always on Sundays.

ADELPHIXIS, *f.* the analogy, relation, or similitude, of one thing with another; or the communication, consent, or sympathy, of a part with another.

ADELSCALC, *f.* in ancient customs, denotes a servant of the king. The word is also written *adelschalche* and *adelscalcus*. It is compounded of the German *anel*, or *edel*, "noble," and *scalch*, "servant." Among the Bavarians, *adelscales* appear to have been the same with royal *thanes* among the Saxons, and those called *ministri regis* in ancient charters.

ADEMONIA, *f.* [of α , priv. and *δαμων*, a genius or divinity or fortune.] Hippocrates uses this word for uneasiness, restlessness, or anxiety, felt in acute diseases, and some hysseric fits.

ADEPTION, *f.* in law, implies the taking away of a legacy, and arises from a supposed alteration of the testator's intention; as where a man bequeaths money due upon a certain bond, and afterwards calls it in; or bequeaths to the legatee such a horse, and afterwards sells the horse.

ADEN, formerly a rich and considerable town of Arabia the Happy. It is seated by the sea-side, a little eastward of the straits of Babelmandel.

ADENANTHERA, *f.* [*αδενος*, glandulous, and *ανθηρα*, an anther.] In botany, a genus of the decandria monogynia class, of the natural order of lomentaceæ. The generic characters are—Calyx: perianthium one-leaved, five-toothed, very small. Corolla: five-petalled, bell-shaped; petals lanceolate, sessile, convex inwards, concave underneath. Stamina: filaments subulate, erect, a little shorter than the corolla; antheræ roundish, incumbent, bearing a globose

globose gland at the outer tip. Pistillum: germ oblong, gibbous downwards. Style subulate, the length of the stamens. Stigma simple. Pericarpium: a legume long, compressed, membranaceous. Seeds: very many, roundish, remote.—*Essential Character.* Calyx, five-toothed. Petals, five. Globose glands, affixed to the outer tip of the antheræ. Legume, membranaceous.

Species. 1. *Adenanthera pavonina*: leaves smooth on both sides. This is one of the largest trees in the East Indies, and the timber is in common use on account of its solidity. It flowers in September, bears fruit at the beginning and end of the year, and is never without leaves. The duration is two hundred years. The natives use the powder of the leaf in their ceremonies. The seeds, besides being eaten by the common people, are of great use to the jewellers and goldsmiths, on account of their equality, for weights, each of them weighing four grains; they also make a cement, by beating them up with water and borax. Of the bruised leaves they make a drink which they esteem good against pains in the loins.

2. *Adenanthera falcata*: leaves tomentose underneath. It is a native of the East Indies.

3. *Adenanthera scandens*: leaves pinnate, two-paired; leaflets ovate, oblique, smooth: claspers terminal, bifid. This is a native of Mallicollo, an island in the South Seas.

Propagation and Culture. This tree must be raised on a hot-bed from the seeds, which are of a shining black colour, and somewhat larger than those of the great lentil, but nearly of the same shape. Afterwards it must be placed in the bark stove, where the fine branching leaves will make a very handsome appearance. It has not yet flowered in England. Of the second and third species we know very little, nor have they yet been cultivated in England.

ADENBURG, or ALDENBURG, a town of Westphalia, and in the duchy of Burg, subject to the Elector Palatine. It is twelve miles N. E. of Cologne, and seventeen W. of Bonn; E. lon. 7. 25. lat. 51. 2.

ADENOGRAPHY, *f.* [from *ἀδύων* and *γραφω*, Gr.] that part of anatomy which treats of the glandular parts. See ANATOMY.

ADENOIDES, glandulous, or of a glandular form; an epithet applied to the PROSTATE.

ADENOLOGY, the same with ADENOGRAPHY.

ADENOS, a kind of cotton, otherwise called *marine cotton*. It comes from Aleppo by the way of Marseilles, where it pays 20 per cent. duty.

ADEONA, in mythology, the name of a goddess invoked by the Romans when they set out upon a journey.

ADEPHAGIA, in mythology, the goddess of gluttony, to whom the Sicilians paid religious worship.

ADEPS, in anatomy, the fat found in the abdomen. It also signifies animal fat of any kind.

ADEPT, [from *adeptus*, Lat. that is, *adeptus artem*.] He that is completely skilled in all the secrets of his art. It is, in its original signification, appropriated to the chymists, but is now extended to other artists.—The preservation of chastity is easy to true adepts. *Pope*.

ADEPT, *adj.* Skilful; thoroughly versed.—If there be really such adept philosophers as we are told of, I am apt to think, that among their arcana, they are masters of extremely potent menstruums. *Boyle*.

ADEPT PHILOSOPHY, is that philosophy, whose end is the transmutation of metals, and an universal remedy. The professors of this philosophy are called ADEPTI, adepts. Paracelsus calls that, *medicina adepta*, which treats of the diseases that are contracted by celestial operations, or communicated from heaven.

ADERBIJAN, a province of Persia, bounded on the N. by Armenia Proper, on the S. by Irac-Agemi, on the E. by Ghilan, and on the W. by Curdistan. The principal town is Tauris; from 42. to 48. lon. from 36. to 39. lat.

ADERNO, a small place in the Val di Demona in the Vol. I. No. 8.

kingdom of Sicily: E. lon. 15. 25. lat. 28. 5. The ancient ADARANUM.

ADES, or HADES, denotes the invisible state. In the heathen mythology, it comprehends all those regions that lie beyond the river Styx, viz. Erebus, Tartarus, and Elysium. See HELL.

ADESPOTIC, *adj.* Not absolute; not despotic.

ADESSENARIANS, ADESSENARI, in church history, a sect of Christians who hold the real presence of Christ's body in the eucharist, though not like the Romanists, by way of transubstantiation.

ADFILIATION, a Gothic custom, whereby the children of a former marriage are put upon the same footing with those of the second. This is also called *unio prolium*, and still retained in some parts of Germany.

AD FINES (Antonine), a town of Switzerland, supposed to be the modern *Pfin*, in the north of the district of Turgow, on the rivulet Thur, not far from the borders of Suabia, about half-way between Constance and Frauenfeld. So called, because when Cecinna, general of the emperor Vitellius, with the auxiliary Rhetians, defeated the Helvetii, the former extended their borders thus far, their territory ending here; and, in time of the Romans, it was the last town in this quarter, and of some repute.

ADHA, a festival which the Mahometans celebrate on the 10th day of the month *Dhoulhegiat*, which is the 12th and last of their year. This month being particularly destined for the ceremonies which the pilgrims observe at Mecca, it takes its name from thence, for the word signifies the month of Pilgrimage. On that day they sacrifice with great solemnity, at Mecca, and no where else, a sheep, which is called by the same name as the festival itself. The Turks commonly call this festival the *Great Beiram*, to distinguish it from the less, which ends their fast, and which the Christians of the Levant call the *Easter of the Turks*.

ADHATODA, *f.* in botany. See JUSTICIA.

To ADHERE, *v. n.* [*adhæreo*, Lat.] To stick to; as, wax to the finger; with *to* before the thing. To stick, in a figurative sense; to be consistent; to hold together. To remain firmly fixed to a party, person, or opinion.—Every man of sense will agree with me, that singularity is laudable, when, in contradiction to a multitude, it adheres to the dictates of conscience, morality, and honour. *Boyle*.

ADHERENCE, *f.* the quality of adhering, or sticking; tenacity. In a figurative sense, fixedness of mind; steadiness; fidelity.—Plain good sense, and a firm adherence to the point, have proved more effectual than those arts, which are contemptuously called the spirit of negotiating. *Swift*.

ADHERENCY, *f.* the same with ADHERENCE. Steady attachment. That which adheres.—Vices have a native adherency of vexation.

ADHERENT, *adj.* sticking to. United with.—Modes are said to be inherent or *adherent*, that is, proper or improper. *Adherent* or improper modes arise from the joining of some accidental substance to the chief subject, which yet may be separated from it; so when a bowl is wet, or a boy is clothed, these are *adherent* modes; for the water and the clothes are distinct substances which adhere to the bowl, or to the boy. *Watts*.

ADHERENT, *f.* the person that adheres: one that supports the cause, or follows the fortune, of another; a follower, a partisan.—A new war must be undertaken upon the advice of those, who, with their partisans and adherents, were to be the sole gainers by it. *Swift*.

ADHERER, *f.* He that adheres.—He ought to be indulgent to tender consciences; but, at the same time, a firm adherer to the established church. *Swift*.

ADHESION, *f.* [*adhæsiō*, Lat.] The act or state of sticking to something. *Adhesion* is generally used in the natural, and *adherence* in the metaphorical, sense: as, the adhesion of iron to the magnet; and adherence of a client to his patron. It is sometimes taken, like *adherence*, figuratively.

ly, for firmness in an opinion, or steadiness in a practice.—The same want of sincerity, the same *adhesion* to vice, and aversion from goodness, will be equally a reason for their rejecting any proof whatsoever. *Atterbury*.

ADHESION, in medicine, a term used for two parts sticking together, which are naturally separate. If any of those parts in the thorax or belly lie in contact, and in flame, they commonly grow together. The lungs very frequently adhere to the pleura. On this subject see Dr. Fleming's Treatise on Adhæsiions, or Accretions of the Lungs; or an abstract from it in the Med. Mus. vol. i.

ADHESIVE, *adj.* Sticking; tenacious.

To **ADHIBIT**, *v. a.* [*adhibeo*, Lat.] To apply; to make use of.—Salt, a necessary ingredient in all sacrifices, was *adhibited* and required in this view only as an emblem of purification. *Forbes*.

ADHIBITION, *f.* Application; use.

ADHIL, in astronomy, a star of the sixth magnitude, upon the garment of Andromeda, under the last star in her foot.

ADHOA, in ancient customs, denotes what we otherwise call *relief*. In which sense we sometimes also find the word written *adola*, *adamentum*, and *adhogamentum*.

ADJACENCY, *f.* [from *adjaceo*, Lat.] The state of lying close to another thing. That which is adjacent.

ADJACENT, *adj.* [*adjacens*, Lat.] Lying near or close; bordering upon something.—Uniform pellucid mediums, such as water, have no sensible reflection but in their external superficies, where they are *adjacent* to other mediums of a different density. *Newton*.

ADJACENT, *f.* That which lies next another.

ADIACHYTOS, *f.* [from α negative, and *διαχυω*, to diffuse, scatter, or be profuse.] Decent in point of dress. Hippocrates thinks the dregs of a sop derogatory from the physician: he says, that many in his days hid their ignorance under ornaments of dress, and strove to get the good liking of the people by their appearance at the public games.

ADIANTUM, *f.* [*adiarvon*, because it repels water when plunged into it; others from α and *διασειν*, from its not withering.] In botany, a genus of the cryptogamia filices class. The generic characters are—Fructifications assembled in oval spots, at the end of the fronds, which are turned back, or at the reflex tip of the frond underneath.

Description. In this large genus of ferns one only (the fourteenth) is native of Great-Britain, and that in a single place or two of Scotland and Wales. The rest are chiefly the growth of hotter climates, particularly the West Indies.

Species. 1. Frond simple. 1. *Adiantum reniforme*, or kidney-leaved maiden-hair: fronds kidney-shaped, stalked, many-flowered. It is a native of the island of Madeira.

2. *Adiantum philippense*, or Philippine maiden-hair: fronds kidney-shaped, alternate, petiolate, lobate, many-flowered. This is a native of the Philippine islands.

3. *Adiantum repens*, or creeping maiden-hair: fronds trapezium-shaped, cordate, pinnatifid; divisions lance-shaped, ferrate at the tip, the lower ones gashed. It is a native of the Isle of France.

II. Frond compound. 4. *Adiantum radiatum*, or rayed maiden-hair: frond digitate; leaflets pinnate: pinnae one-flowered. This elegant little plant rises by a simple stalk to the height of six or eight inches, and then divides into five or more simple branches disposed in a radiated expanded form; these are sustained by a few simple leaves placed in the manner of an umbrella, under their inflexions. It is a native of Jamaica and Domingo.

5. *Adiantum pedatum*, or Canadian maiden-hair: fronds pedate: leaflets pinnate; pinnae gibbous before, gashed, fruit-bearing. John Tradescant, jun. brought this species into England from Virginia before the year 1640. It is also a native of Canada, Japan, and the Society Isles. It flowers in August and September.

6. *Adiantum lanceum*, or Surinam maiden-hair: fronds

pinnate: pinnae opposite oblong, the end ones triangularly hastate. This is a native of Surinam.

7. *Adiantum hastatum*, or hastate-leaved maiden-hair: fronds pinnate: pinnae hastate-trilobate straight. This is a native of the Cape of Good Hope.

8. *Adiantum trilobum*, or three-lobed maiden-hair: pinnae three-parted, obtuse, gashed, many-flowered. It is a native of America.

9. *Adiantum ferrulatum*, or ferrate-leaved maiden-hair: fronds bipinnate; pinnules deltoid-oblong ferrate; fructifications solitary superior. This is a native of Jamaica.

10. *Adiantum caudatum*, or tail-leaved maiden-hair: fronds pinnate sickled tailed at the tip. This is a native of the East Indies and Japan.

III. Fronds decomposed. 11. *Adiantum flabellulatum*, or fan-leaved maiden-hair: fronds decomposed: pinnae alternate rhombed rounded many-flowered, stipes pubescent above. It is a native of China.

12. *Adiantum trifoliatum*, or ternate-leaved maiden-hair: frond decomposed; leaflets alternate ternate linear one-flowered. This is a native of America.

13. *Adiantum chusanum*, or Chinese maiden-hair: fronds decomposed: pinnae alternate pinnatifid: lobes unequal. It is a native of China.

14. *Adiantum capillus Veneris*, or true maiden-hair: fronds decomposed: leaflets alternate; pinnae wedge-shaped, lobed, pedicelled. Maiden-hair is a very succulent plant, yielding almost its whole weight of juice; but neither taste nor smell promise any efficacy. Hallen says, that, if the syrup of capillaire, which they make from it, be good for any thing, it is from the orange-flower water which they put into it. It is a native of the south of Europe, and the Levant. Wales and Scotland, but rare.

15. *Adiantum villosum*, or hairy-stalked maiden-hair: fronds bipinnate: pinnae rhombed fructifying before and without, stipe villous. This is a native of Jamaica.

16. *Adiantum pulverulentum*, or dusty maiden-hair: fronds bipinnate: pinnae oval truncate, before one-flowered, stipe shaggy. 17. *Adiantum cristatum*, or crested maiden-hair: fronds bipinnate: lowest leaflets two-parted: pinnae crescent-shaped, many-flowered above. These are natives of South America.

18. *Adiantum furcatum*, or forked maiden-hair: frond bipinnate: pinnae generally two-parted, linear: line of fructification single.

19. *Adiantum cafferorum*, or Caffrarian maiden-hair: fronds bipinnate: pinnae ovate gash-toothletted chaisty underneath.

20. *Adiantum fragrans*, or sweet-scented maiden-hair: fronds bipinnate: pinnae ovate sublobed obtuse, naked underneath. A native of Madeira; and was introduced into England 1758 by Mr. Francis Maffon.

21. *Adiantum truncatum*, or truncate-leaved maiden-hair: fronds decomposed, with pinnate leaflets: pinnae alternate wedge-shaped rather sickle-shaped truncate entire.

IV. Frond superdecomposed. 22. *Adiantum clavatum*, or clubbed maiden-hair: leaflets alternate: pinnae wedge-shaped, quite entire, alternate, one-flowered. It is a native of Dominica.

23. *Adiantum aculeatum*, or prickly-stiped maiden-hair: pinnae palmate many-flowered, stipe prickly. This is a native of Jamaica and Dominica.

24. *Adiantum trapeziforme*, or rhomb-leaved maiden-hair: leaflets alternate; pinnae rhombed, gashed, fruit-bearing on each side. A native of New Zealand and between the tropics.

25. *Adiantum hexagonum*, or hexagon-leaved maiden-hair: pinnae hexangular, emarginate, quite entire, one-flowered on both sides.

26. *Adiantum pteroides*, or heart-leaved maiden-hair: pinnae ovate entire crenulate, stipe polished. A native of the Cape of Good Hope; introduced by Mr. Fr. Maffon.

27. *Adiantum aethiopicum*, or Cape maiden-hair: pinnae rounded entire crenulate, petioles capillary. A native of the Cape of Good Hope and Japan.

New Species. II. Frond compound. 28. *Adiantum triphyllum*, or three-leaved maiden-hair: frond three-leaved: leaflets sessile lanceolate pinnatifid crenate. This is a very beautiful little fern, tender, entirely smooth, a span high. It was found by Commerfon in Buenos Ayres.

29. *Adiantum cuneatum*, or wedge-leaved maiden-hair: fronds pinnate, leaflets opposite subpinnate, pinnae wedge-shaped retuse alternate.

30. *Adiantum pumilum*, or dwarf maiden-hair: frond pinnate, stipe capillary, pinnae alternate roundish ferrulate, the uppermost larger trapezium-shaped, fructifications interrupted. This little plant seldom rises above two or three inches from the root; its leaves and stalk are very delicate; and the fructifications but few. It is a native of Jamaica, in dry and rocky places.

31. *Adiantum deltoideum*, or deltoid-leaved maiden-hair: frond pinnate, pinnae alternate deltoid obtuse, the uppermost triangular; fructifications continued above and in front. A native of Jamaica.

32. *Adiantum macrophyllum*, or large-leaved maiden-hair: frond pinnate, pinnae opposite rhomboid acute, the lower larger, the lowest subhastate reflex; fructifications continued in front and below. This is a native of Jamaica, in moist and shady places.

III. Frond decomposed. 33. *Adiantum scandens*, or climbing maiden-hair: fronds decomposed: leaflets wedge-shaped, equally gashed: stem climbing. It is a native of Cochín China.

34. *Adiantum striatum*, or striated maiden-hair: frond bipinnate, pinnules rigid sickled-ovate, fructifications superior interrupted, stipe round rough. 35. *Adiantum strictum*, or stiff maiden-hair: frond bipinnate, pinnae four-cornered fastigiate erect, pinnules alternate polished entire, fructifications superior continued. These are natives of Jamaica.

36. *Adiantum microphyllum*, or small-leaved maiden-hair: frond bipinnate, leaflets alternate oblong obtuse crenate, the lowest pinnatifid. Height nine inches. It is a native of Jamaica, among rocks near St. Jago de la Vega, by the river.

37. *Adiantum denticulatum*, or tooth-leaved maiden-hair: fronds decomposed, pinnae alternate trapezoid acuminate crenate, notches toothletted, fructifications superior interrupted. IV. Frond superdecomposed. 38. *Adiantum fragile*, or brittle maiden-hair: frond superdecomposed bipinnate at top, pinnae obovate wedge-shaped entire, fructifications interrupted. These are natives of Jamaica.

39. *Adiantum tenerum*, or tender maiden-hair: frond superdecomposed, pinnules alternate rhomb wedge-shaped blunted gashed, fructifications interrupted. Height from fourteen to eighteen inches. A native of Jamaica, in shady places.

Propagation and Culture. The only species that have been cultivated with us are the first, fifth, fourteenth, fifteenth, twentieth, twenty-fourth, and twenty-sixth. The fourteenth may be preserved in pots filled with gravel and lime-rubbish, in which it will thrive much better than in good earth. Although the fifth or American maiden-hair will live through the winter in the open air in moderate seasons, yet in severe frosts it is sometimes destroyed, and therefore it will be prudent to keep a plant or two under shelter. This grows naturally in Canada in such quantities, that, when the French were in possession of that country, they sent it to France as package for goods, and the apothecaries at Paris used it instead of the true maiden-hair. The fifteenth and twenty-fourth, growing naturally in hot countries, must be preserved in a stove, where their shining black stalks and odd-shaped leaves will afford an agreeable variety among other exotic plants. The first, twentieth, and twenty-sixth, may be kept in the green-house.

ADIANTUM NIGRUM. See ASPLENIUM.

ADIAPHORISTS, in church-history, a name importing lukewarmness, given, in the 16th century, to the mo-

derate Lutherans, who embraced the opinions of Melancthon, whose disposition was vastly more pacific than that of Luther.

ADIAPHOROUS, *adj.* [*αδιαφορος*, Gr.] Neutral; particularly used of some spirits and salts, which are neither of an acid or alkaline nature.—Our *adiaphorous* spirit may be obtained, by distilling the liquor that is afforded by woods and divers other bodies. *Boyle.*

ADIAPHORY, *f.* [*αδιαφορια*, Gr.] Neutrality, indifference.

ADIAPNEUSTIA, [*α*, negative, and *διαπνεω*, to perspire, or *πνέω*, neg. *δια*, per, and *πνεω*, to breathe.] IMPEDED PERSPIRATION, which was considered by the ancient as the primary cause of fevers, from what they termed *vaporosa & fuliginosa effluvia* not being permitted to pass through the habits and cutaneous pores, hence productive of febrile affections.

ADIAPTOTOS, from *α*, negative, and *δανπτω*, to stumble, or slide. The word signifies firm; but in medicine it is the name of a remedy against the cholick, made of stone-parley, henbane-seed, white pepper, &c. formed into an electuary.

ADJAZZO, ADRAZZO, or AJACCIO, in geography, a handsome town and castle of Corsica in the Mediterranean, with a bishop's see, and a good harbour. It is populous, and fertile in wine. It is 27 miles S. W. of Corte. E. lon. 41. 54. lat. 38. 5.

TO ADJECT, *v. a.* [*adjicio*, *adjectum*, Lat.] To add to; to put to another thing.

ADJECTION, *f.* [*adjectio*, Lat.] The act of adjecting, or adding. The thing adjected, or added.

ADJECTITIOUS, *adj.* Added; thrown in upon the rest.

ADJECTIVE, *f.* [*adjectivum*, Lat.] A word added to a noun, to signify the addition or separation of some quality, circumstance, or manner of being; as, *good*, *bad*, are *adjectives*, because, in speech, they are applied to nouns, to modify their significations, or intimate the manner of existence in the things signified thereby.

ADJECTIVELY, *adv.* After the manner of an adjective; a term of grammar.

ADIEU, *adv.* [from *à Dieu*, used elliptically for *à Dieu je vous commende*, used at the departure of friends.] The form of parting, originally importing a commendation to the Divine care, but now used, in a popular sense, sometimes to things inanimate; farewell.

ADIGE, a river in Italy, which taking its rise south of the lake Glace among the Alps, runs south by Trent, then east by Verona in the territory of Venice, and falls into the gulph of Venice, north of the mouth of the Po.

TO ADJOIN, *v. a.* [*adjoindre*, Fr. *adjungo*, Lat.] To join to; to unite to; to put to. To fasten by a joint or juncture.

As a maffy wheel
Fixt on the fummit of the higheft mount,
To whose huge spoke ten thousand leffer things
Are mortis'd and *adjoined*. *Shakespeare.*

TO ADJOIN, *v. n.* To be contiguous to; to lie next, so as to have nothing between.—In learning any thing, as little should be proposed to the mind at once as is possible; and, that being understood and fully mastered, proceed to the next *adjoining*, yet unknown, simple, unperplexed, proposition, belonging to the matter in hand, and tending to the clearing what is principally designed. *Locke.*

TO ADJOURN, *v. a.* [*adjourner*, Fr.] To put off to another day, naming the time; a term used in juridical proceedings; as, of parliaments, or courts of justice. To put off; to defer; to let stay to a future time.

ADJOURNMENT, *f.* [*adjournement*, Fr.] An assignment of a day, or a putting off till another day. Delay; procrastination; dismissal to a future time.—We will and we will not, and then we will not again, and we will. At this rate we run our lives out in *adjournments* from time to

to time, out of a fantastical levity that holds us off and on; betwixt hawk and buzzard. *L'Estrange*.

ADIPOUS, *adj.* [*adiposus*, Lat.] Fat. It is also a term used by anatomists for any cell, membrane, &c. that is remarkable for its fatness.

ADIRBEITSTAN, a province of Persia, in Asia, and part of the ancient Media. It is bounded on the north by the province of Shirvan, on the south by Irac-Agemi and Curdistan, on the east by Gilan and the Caspian Sea, and on the west by Turcomania.

ADIT, *f.* [*aditus*, Lat.] A passage for the conveyance of water under ground; a passage under ground in general; a term among the minemen.

ADIT of a **MINE**, the hole, or aperture, whereby it is entered and dug, and by which the water and ores are carried away. The term amounts to the same with *cuniculus* or *drift*, and is distinguished from *air-shaft*. The *adit* is usually made on the side of a hill, towards the bottom thereof, about four, five, or six, feet high, and eight wide, in form of an arch; sometimes cut in the rock, and sometimes supported with timber, so conducted as that the sole or bottom of the *adit* may answer to the bottom of the shaft, only somewhat lower, that the water may have a sufficient current to pass away without the use of the pump. Damps and the impurity of the air are great impediments against driving *adits* above twenty or thirty fathoms, by reason of the necessity, in this case, of letting down *air-shafts* from the day to meet the *adit*, which are often very expensive, both on account of the great depth of mines, and the hardness of the mineral strata to be cut through. The best remedy against this is that practised in the coal-mines near Liege, where they work their *adits* without *air-shafts*: the manner of which is described by Sir Robert Moray. Vid. Phil. Trans. No. 5.

ADIT of a **MINE** is sometimes used for the *air-shaft* itself, being a hole driven perpendicularly from the surface of the earth into some part of a mine, to give entrance to the air. To draw off standing water in winter, in deep mines, they drive up an *adit* or *air-shaft*, upon which the *air* disengages itself from the water, when it begins to run with such violence as produces a noise equal to the bursting of a cannon, dashes every thing in the way against the sides of the mine, and loosens the very rocks at a distance. Ibid, No. 26.

ADDITION, *f.* [from *adeo*, *aditum*, Lat.] The act of going to one another.

TO ADJUDGE, *v. a.* [*adjudico*, Lat.] To give the thing controverted to one of the parties by a judicial sentence; with the particle *to* before the person:

The great competitors for Rome, Caesar and Pompey, on Pharalain plains, Where stern Bellona, with one final stroke, *Adjug'd* the empire of this globe to one. *Phillips*.

To sentence, or condemn to a punishment; with *to* before the thing. Simply, to judge; to decree; to determine.—He *adjudged* him unworthy of his friendship, purposing sharply to revenge the wrong he had received. *Knolles*.

TO ADJUDICATE, *v. a.* [*adjudico*, Lat.] To adjudge; to give something controverted to one of the litigants, by a sentence or decision.

ADJUDICATION, *f.* [*adjudicatio*, Lat.] The act of judging, or of granting something to a litigant, by a judicial sentence.

ADJUDICATION, in the Scots law, the name of that action by which a creditor attaches the heritable estate of his debtor, or his debtor's heir, in order to appropriate it to himself, either in payment or security of his debt; or that action by which the holder of an heritable right, labouring under any defect in point of form, may supply that defect.

TO ADJUGATE, *v. a.* [*adjugo*, Lat.] To yoke to; to join to another by a yoke.

ADJUMENT, *f.* [*adjumentum*, Lat.] Help; support.

ADJUNCT, *f.* [*adjunctum*, Lat.] Something adherent

or united to another, though not essentially part of it. Thus water absorbed by a cloth or a sponge, is an *adjunct*, but no necessary part of either of these substances.

ADJUNCT, in metaphysics, some quality belonging to either the body or mind, whether natural or acquired. Thus thinking is an adjunct of the mind, and growth an adjunct of the body.

ADJUNCT, in music, a word which is employed to denote the connection or relation between the principal mode and the modes of its two-fifths, which, from the intervals that constitute the relation between them and it, are called its adjuncts.

ADJUNCT is also used to signify a colleague, or some person associated with another as an assistant.

ADJUNCT GODS, or **ADJUNCTS** of the **GODS**, among the Romans, were a kind of inferior deities, added as assistants to the principal ones, to ease them in their functions. Thus, to Mars was adjoined Bellona and Nemesis; to Neptune, Salacia; to Vulcan, the Cabiri; to the Good Genius, the Lares; to the Evil, the Lemures, &c.

ADJUNCTION, *f.* [*adjunctio*, Lat.] The act of adjoining, or coupling together. The thing joined.

ADJUNCTIVE, *f.* [*adjunctivus*, Lat.] He that joins, That which is joined.

ADJUNCTS, *f.* in rhetoric and grammar, signify certain words or things added to others, to amplify or augment the force of the discourse.

ADJURATION, *f.* [*adjuratio*, Lat.] The act of adjuring, or proposing an oath to another. The form of oath proposed to another.—When these learned men saw sickness and frenzy cured, the dead raised, the oracles put to silence, the dæmons and evil spirits forced to confess themselves no gods, by persons who only made use of prayer and *adjurations* in the name of their crucified Saviour; how could they doubt of their Saviour's power on the like occasions? *Addison*.

TO ADJURE, *v. a.* [*adjuro*, Lat.] To impose an oath upon another, prescribing the form in which he shall swear.

TO ADJUST, *v. a.* [*ajuster*, Fr.] To regulate; to put in order; to settle in the right form. To reduce to the true state or standard; to make accurate. To make conformable. It requires the particle *to* before the thing to which the conformity is made.—As to the accomplishment of this remarkable prophecy, whoever reads the account given by Josephus, without knowing his character, and compares it with what our Saviour foretold, would think the historian had been a Christian, and that he had nothing else in view, but to *adjust* the event to the prediction. *Addison*.

ADJUSTMENT, *f.* [*adjustement*, Fr.] Regulation; the act of putting in method; settlement. The state of being put in method, or regulated.—It is a vulgar idea we have of a watch or clock, when we conceive of it as an instrument made to shew the hour: but it is a learned idea which the watchmaker has of it, who knows all the several parts of it, together with the various connections and *adjustments* of each part. *Watts*.

ADJUTANT, *f.* in the military art, is an officer whose business it is to assist the major. Each battalion of foot and regiment of horse has an adjutant, who receives the orders every night from the brigade-major; which, after carrying them to the colonel, he delivers out to the sergeants. When detachments are to be made, he gives the number to be furnished by each company or troop, and assigns the hour and place of rendezvous. He also places the guards; receives and distributes the ammunition to the companies, &c. and, by the major's orders, regulates the prices of bread, beer, and other provisions. The word is sometimes used by the French for an *aid-du-camp*.

ADJUTANTS-GENERAL, among the Jesuits, a select number of fathers, who resided with the general of the order, each of whom had a province or country assigned him, as England, Holland, &c. and their business was to inform the father-general of state-occurrences in such countries.

countries. To this end they had their correspondents delegated, emissaries, visitors, regents, provincials, &c.

To ADJUTE, *v. a.* [*adjuvo, adjutum*, Lat.] To help; to concur: a word not now in use.

ADJUTOR, *f.* [*adjutor*, Lat.] A helper.

ADJUTORIUM, *f.* a term used by physicians for any medicine in a prescription but the capital one.

ADJUTORY, *adj.* [*adjutorius*, Lat.] That which helps.

ADJUTRIX, *f.* [Lat.] She who helps.

ADJUVANT, *adj.* [*adjuvans*, Lat.] Helpful; useful.

To ADJUVATE, *v. a.* [*adjuvo*, Lat.] To help; to further; to put forward.

ADLEGATION, *f.* in the public law of the German empire, a right claimed by the states of the empire of adjoining plenipotentiaries, in public treaties and negotiations, to those of the emperor, for the transacting of matters which relate to the empire in general. In which sense *adlegation* differs from *legation*, which is the right of sending ambassadors upon a person's own account. Several princes and states of the empire enjoy the right of *legation*, who have not that of *adlegation*, and *vice versa*. The bishops, for instance, have the right of *adlegation* in the treaties which concern the common interest, but no right of *legation* for their own private affairs. The like had the duke of Mantua. The emperor allows the princes of Germany the privilege of *legation*, but disputes that of *adlegation*. They challenge it as belonging to them *jure regni*, which they enjoy in common with the emperor himself.

ADLESBURG, an extraordinary cavern in Carniola; the passages in it are of some miles extent; from the top, sparricles, and along the sides, a sort of pillars, with various grotesque figures, have been formed by the exudations of the lapideous or petrifying fluid.

ADLOCUTION, *f.* [*adlocutio*, Lat.] In antiquity, chiefly understood of speeches made by Roman generals to their armies, to encourage them before a battle. We frequently find these *adlocutions* expressed on medals by the abbreviation ADLOCUT. CON. The general is sometimes represented as seated on a tribunal, often on a bank or mount of turf, with the cohorts ranged orderly round him.

ADMANUENSES, *f.* in ancient law-books, denote persons who swore by laying their hands on the book. In which sense, *admanuenses* amount to the same with laymen, and stand opposed to clerks, who were forbidden to swear on the book, their word being to be reputed as their oath; whence they were also denominated *fide digni*.

ADMEASUREMENT, *f.* [*admensuratio*, Lat.] In law, is a writ brought for remedy against such persons as usurp more than their share, to bring them to reason. It lies in two cases; one is, *admeasurement of dower*, where a man's widow after his decease holds from the heir more land as dower than of right belongs to her: in which case, the heir shall have this writ against the widow, whereby the shall be *admeasured*, and the heir restored to the overplus. The other is, *admeasurement of pasture*, where a man has common appendant or appurtenant to his land, or common in gross, the quantity of which common hath never yet been ascertained: in which case, as well the lord as any of the commoners is intitled to the writ of *admeasurement*; which is one of those writs that are called *vicontiel*, being directed to the sheriff (*vicecomiti*), and not to be returned to any superior court, till finally executed by him. It recites a complaint, that the defendant had *furcharged* the common; and therefore commands the sheriff to *admeasure* and apportion it, that the defendant may not have more than belongs to him, and that the plaintiff may have his rightful share. And upon this suit the commoners shall be *admeasured*, as well those who have not as those who have *furcharged* the common, as well the plaintiff as the defendant. The execution of this writ must be by a jury of twelve men, who are upon their oaths to ascertain, under the superintendence of the sheriff, what and how many cattle each commoner is intitled to put upon the common. And the rule for this *admeasurement* is generally understood to be, that the commoner shall not turn more cattle upon the common than are sufficient to manure and stock the land to which his right of common is annexed; or, as our ancient law expressed it, such cattle only as are *levant and couchant* upon his tenement; which being a thing uncertain before *admeasurement*, has frequently, though erroneously, occasioned this unmeasured right of common to be called a common without stint or without number; a thing which, though possible in law, doth in fact very rarely exist. If, after the *admeasurement* has thus ascertained the right, the same defendant *furcharges* the common again, the plaintiff may have a writ of second *furcharge*, *de secunda superoneracione*, which is given by statute 13 Edw. I. c. 8. and thereby the sheriff is directed to enquire by a jury, whether the defendant has in fact again *furcharged* the common, contrary to the tenor of the last *admeasurement*; and if he has, he shall then forfeit to the king the supernumerary cattle put in, and shall also pay damages to the plaintiff. 3 Blackf. 238.

ADMENSURATION, *f.* [*ad* and *mensura*, Lat.] The act, or practice, of measuring out to each his part.

ADMINICLE, *f.* [*adminiculum*, Lat.] Help; support; furtherance.

ADMINICULAR, *adj.* [from *adminiculum*, Lat.] That which gives help.

ADMINICULATOR, *f.* an ancient officer of the church, whose business it was to attend to and defend the cause of the widows, orphans, and others, destitute of help.

To ADMINISTER, *v. a.* [*administro*, Lat.] To give; to afford; to supply. To act as the minister or agent in any employment or office; generally, but not always, with some hint of subordination: as, to *administer* the government. To *administer* justice; to distribute right. To *administer* the sacraments, to dispense them. To *administer* an oath; to propose or require an oath authoritatively; to tender an oath. To *administer* physic; to give physic as it is wanted. To *administer* to; to contribute; to bring supplies. To perform the office of an administrator, in law.

To ADMINISTRATE, *v. a.* [*administro*, Lat.] To exhibit; to give as physic. Not now in use.

ADMINISTRATION, *f.* [*administratio*, Lat.] The act of administering or conducting any employment; as, the conducting the public affairs; dispensing the laws. The active or executive part of government.—It may pass for a maxim in state, that the *administration* cannot be placed in too few hands, nor the legislature in too many. *Swift*.—Collectively, those to whom the care of public affairs is committed; as, the *administration* has been opposed in parliament. Distribution; exhibition; dispensation.—By the universal *administration* of grace, begun by our blessed Saviour, enlarged by his apostles, carried on by their immediate successors, and to be completed by the rest to the world's end, all types that darkened this faith are enlightened. *Sprat*.

ADMINISTRATION, in law, is the management of the goods and chattels of one that died intestate, committed unto him by the ordinary. He or she to whom the administration is committed, is called the administrator or administratrix.

Administration of the goods and chattels of the wife shall be granted to the husband or his representatives; and of the husband's effects, to the widow, or next of kin, or to both. Among the kindred, those are to be preferred that are the nearest in degree to the intestate; but, of persons in equal degree, the ordinary may take which he pleases. This nearness of degree shall be reckoned according to the computation of the civilians, and not of the canonists, which the law of England adopts in the descent of real estates; because in the civil computation the intestate himself is the *terminus* from which the several degrees are numbered; and not the common ancestor, according to the rule of the canonists. And therefore, in the first place, the children, or (on failure of the children) the parents, of the deceased, are intitled to the administration: both

both which are indeed in the first degree, but with us the children are allowed the preference. Then follow brothers, grandfathers, uncles or nephews (and the females of each class respectively), and lastly, cousins. 2 *Blackst.* 504.

The *half blood* is admitted to the administration equally with the *whole blood*; but not so in the descent of lands, for in that case the half blood can never inherit.

If none of the kindred will administer, the ordinary may grant administration to a creditor, or he may grant letters *ad colligendum bona defuncti*, and thereby take the goods of the deceased into his own hands, and therewith pay the debts of the deceased; in which respect the ordinary becomes liable in law as other administrators.

If a *bastard*, or any other, who has no kindred, dies intestate; the goods belong to the king, and administration shall be committed to the king's grantee.

There are also several other kinds of administration, which do not strictly follow the rule of the next of kin. As, administration *durante minori etate*; which is, where an infant is made executor (for so he may be, how young soever): in which case, administration with the will annexed is granted to another, until the executor shall attain the age of seventeen years; at which age of the executor the administration *durante minori etate* ceaseth.

So also, administration *durante absentia*, during absence out of the kingdom: which is, where the next of kindred is beyond sea, in which case administration is grantable, lest the goods perish or the debts be lost: and this stands upon the same reason as an administration during the minority of an executor; namely, that there should be one to manage the estate of the testator, till the person appointed by him is able.

Administration *pendente lite*, pending a suit, is, where a suit is commenced in the ecclesiastical court concerning the validity of a will; in which case the ordinary grants administration until the suit shall be determined: otherwise there would be no person to take care of the estate of the deceased.

Also, if the testator makes his will, without naming any executor, or if he names a person incapable, or if the executor named refuses to act; in all these cases, the ordinary must grant administration with the will annexed.

The duty of an administrator is, to make an inventory, and to pay the debts of the deceased: and, if there be a deficiency of assets, the general order of preference or priority in payment is, first, debts of record, as judgments, statutes, and recognizances; next, specialties, as bonds or other writings under seal; and lastly, debts on simple contract, as notes unsealed, and verbal promises.

If there is a surplus, the administrator must distribute it amongst the kindred of the deceased, according to the statutes of distribution, and in some particular places according to the local customs. The general rules upon the statutes of distribution are, that one third shall go to the widow of the intestate, and the residue in equal proportions to his children, or, if dead, to their representatives, that is, their lineal descendants: if there are no children or legal representatives, then a moiety shall go to the widow, and a moiety to the next of kindred in equal degree and their representatives: if no widow, the whole shall go to the children: if neither widow nor child, the whole shall be distributed amongst the next of kindred in equal degree and their representatives; but no representatives are admitted among collaterals, farther than the children of the intestate's brothers and sisters. The father succeeds to the whole personal effects of his children, if they die intestate and without issue; but, if the father be dead, and the mother survives, she shall only come in for a share equally with each of the remaining children.

If an administrator die, his executor or administrator doth not represent the first intestate, but a new administration shall be granted *de bonis non*, that is, of the goods of the deceased not administered by the former executor or administrator. And this administrator *de bonis non* is the

only legal representative of the deceased in matters of personal property.

ADMINISTRATION, is also the name given by the Spaniards in Peru to the staple magazine, or warehouse, established at Callao, a small town on the South Sea, which is the port of Lima, the capital of that part of South America, and particularly of Peru. The foreign ships, which have leave to trade along that coast, are obliged to unload here, paying 13 per cent. of the price they sell for, if the cargo be entire, and even 16 per cent. if otherwise.

ADMINISTRATIVE, *adj.* That which administers; that by which any one administers.

ADMINISTRATOR, *f.* [*administrator*, Lat.] He that has the goods of a man dying intestate. He that officiates in divine rites. He that conducts the government.

ADMINISTRATOR, in law, he to whom the ordinary commits the administration of the goods of a person deceased, in default of an executor. An action lies for, or against, an administrator, as for, or against, an executor; and he shall be accountable to the value of the goods of the deceased, and no farther: unless there be waste, or other abuse chargeable on him. If the administrator die, his executors are not administrators; but the court is to grant a new administration. If a stranger, who is neither administrator nor executor, takes the goods of the deceased, and administers, he shall be charged and sued as an executor, not as an administrator. The origin of administrators is derived from the civil law. Their establishment in England is owing to a statute made in the 31st year of Edw. III. Till then, no office of this kind was known beside that of executor; in case of a want of which, the ordinary had the disposal of goods of persons intestate, &c.

ADMINISTRATOR is sometimes used for the president of a province; for a person appointed to receive, manage, and distribute, the revenues of an hospital or religious house; for a prince who enjoys the revenues of a secularized bishopric; and for the regent of a kingdom during a minority of the prince, or a vacancy of the throne.

ADMINISTRATRIX, *f.* [Lat.] She who administers in consequence of a will.

ADMINISTRATORSHIP, *f.* The office of administrator.

ADMIRABILIS SAL, *f.* The same with GLAUBER'S SALT.

ADMIRABILITY, *f.* [*admirabilis*, Lat.] The quality or state of being admirable.

ADMIRABLE, *adj.* [*admirabilis*, Lat.] To be admired; worthy of admiration; of power to excite wonder: always taken in a good sense, and applied either to persons or things.—The more power he hath to hurt, the more *admirable* is his praise, that he will not hurt. *Sidney*.

AMIRABLENESS, *f.* The quality of being admirable; the power of raising wonder.

ADMIRABLY, *adv.* So as to raise wonder; in an admirable manner.

ADMIRAL, *f.* [*amiral*, Fr.] An officer or magistrate that has the government of the king's navy, and the hearing and determining all causes, as well civil as criminal; belonging to the sea. The chief commander of a fleet; also the ship which carries the admiral or commander of the fleet.

Authors are much divided with regard to the origin and denomination of this important officer, whom we find established in most kingdoms that border on the sea. According to Lord Coke, it comes from the Saxon *aen mere al*, (over all the sea,) the *praefectus maris*. But the most probable opinion is that of Sir Henry Spelman, who thinks, that both the name and dignity were derived from the Sarcenus, and, by reason of the holy wars, brought amongst us; for *admiral*, in the Arabian language, signifies a prince or chief ruler, and was the ordinary title of the governors of cities, provinces, &c. and therefore they called the commander of the navy by that name, as a name of dignity and honour. And indeed there are no instances of admirals in this part of Europe before the year 1284, when

Philip of France, who had attended St. Louis in the wars against the Saracens, created an admiral. Du Cange assures us, that the Sicilians were the first, and the Genoese the next, who gave denomination of admiral to the commanders of their naval armaments; and that they took it from the Saracen or Arabic *emir*, a general name for every commanding officer. As for the exact time when the word was introduced among us, it is uncertain; some think it was in the reign of Edward I. Sir Henry Spelman is of opinion that it was first used in the reign of Henry III. because neither the laws of Oleron made in 1266, nor Bracton who wrote about that time, make any mention of it; and that the term admiral was not used in a charter in the eighth of Henry III. wherein he granted this office to Richard de Lacey, by these words, *Maritimam Angliam*; but, in the 56th year of the same reign, not only the historians, but the charters themselves, very frequently use the word admiral.—Before the use of the word admiral was known, the title of *custos maris* was made use of.

Lord High ADMIRAL OF ENGLAND, in some ancient records called *capitanus maritimarum*, an officer of great antiquity and trust, as appears by the laws of Oleron, so denominated from the place they were made at by Richard I. The first title of admiral of England, expressly conferred upon a subject, was given by patent of Richard II. to Richard Fitz-Allen, jun. earl of Arundel and Surrey; for those who before enjoyed this office were simply termed admirals, though their jurisdiction seems at large, especially in the reign of Edward III. when the court of admiralty was first erected.

This great officer has the management of all maritime affairs, and the government of the royal navy, with power of decision in all maritime cases both civil and criminal: he judges of all things done upon or beyond the sea, in any part of the world; upon the sea-coasts, in all ports and havens, and upon all rivers below the first bridge from the sea. By him, vice-admirals, rear-admirals, and all sea-captains, are commissioned; all deputies for particular coasts, and coroners to view dead bodies found on the sea-coasts, or at sea: he also appoints the judges for his court of admiralty, and may imprison, release, &c. All ports and havens are *infra corpus comitatus*, and the admiral hath no jurisdiction of any thing done in them.

The lord high admiral has power, not only over the seamen serving in his ships of war, but over all other seamen, to arrest them for the service of the state; and, if any of them run away, without leave of the admiral, he hath power to make a record thereof, and certify the same to the sheriffs, mayors, bailiffs, &c. who shall cause them to be apprehended and imprisoned.

To the lord high admiral belong all penalties and amercements of all transgressions at sea, on the sea-shore, in ports and havens, and all rivers below the first bridge from the sea; the goods of pirates and felons condemned or enslaved, sea-wrecks, goods floating on the sea, or cast on the shore (not granted to lords of manors adjoining to the sea), and a share of lawful prizes; also all great fishes, commonly called *royal fishes*, except whales and sturgeons: with a salary of 7000*l.* a-year.

In short, this is so great an office, in point of trust, honour, and profit, that it has been usually given to princes of the blood, or the most eminent persons among the nobility. We have had no lord high admiral for some years; the office being put in commission, or under the administration of the lords commissioners of the admiralty, who by statute have the same power and authority as the lord high admiral.

ADMIRAL, also implies in general, any flag-officer whatever. The commander of a fleet carries his flag at the main-top-mast head.

Vice ADMIRAL, is the commander of the second squadron, and carries his flag at the fore-top-mast head.

Rear ADMIRAL, is the commander of the third squadron, and carries his flag at the mizen-top-mast head.

Vice ADMIRAL, is also an officer appointed by the lords

commissioners of the admiralty. There are several of these officers established in different parts of Great Britain, with judges and marshals under them, for executing jurisdiction within their respective limits. Their decrees, however, are not final, an appeal lying to the court of admiralty in London.

ADMIRAL is also an appellation given to the most considerable ship of a fleet of merchantmen, or of the vessels employed in the cod-fishery of Newfoundland. This last has the privilege of choosing what place he pleases on the shore to dry his fish; gives proper orders, and appoints the fishing-places to those who come after him; and, as long as the fishing-season continues, he carries a flag on his main-mast.

ADMIRAL, in zoology, the English name of a species of the voluta, a shell-fish belonging to the order of vermes testacea.

ADMIRALSHIP, *f.* The office or power of an admiral.

ADMIRALTY, *f.* [*amirauté*, Fr.] The power, or officers, appointed for the administration of naval affairs, called *lords of the admiralty*.

Court of ADMIRALTY, is a sovereign court, held by the lord high admiral, or lords of the admiralty, where cognizance is taken in all maritime affairs, whether civil or criminal. It was first of all erected by king Edw. III. Its proceedings are according to the method of the civil law, and is usually held at Doctors' Commons. 3 *Blackst.* 69.

This court hath power to try and determine all maritime causes, or such injuries which, though they are in their nature of common-law cognizance, yet being committed on the high seas, out of the reach of the ordinary courts of justice, are therefore to be remedied in a peculiar court of their own. *Id.* 106.

Beneath the low-water mark, the admiral hath sole and absolute jurisdiction: but between the high-water mark and the low-water mark, the common law and the admiral have jurisdiction by turns; one upon the water, the other upon the land. But, if the water is within a county, the common law hath the jurisdiction. 5 *Co.* 107.

Wreck of the sea shall be tried and determined by the laws of the land; but this cannot be extended to flotsam, jetsam, or lagan, for they are in or upon the sea, and therefore cannot be tried and determined by the common law, but are to be determined before the admiral. *Id.* 106.

For convenience of seamen, the admiralty hath been allowed to hold plea for mariners' wages; but yet with this limitation, that if there be any special agreement, by which the mariners are to receive their wages in any other manner than is usual, or if the agreement be under seal, so as to be more than a parole agreement, in such case they will be prohibited. This indulgence was permitted them, because the remedy in the admiralty is easier and better: easier, because they must sever at the common law, whereas here they may join; and better, because the ship itself is answerable. 1 *Salk.* 33.

But although pure maritime acquisitions, which are earned and become due on the high seas, are one proper object of the admiralty jurisdiction, even though the contract be made upon land; yet, in general, if there be a contract made in England, and to be executed upon the seas, as a charter-party, or covenant, that a ship shall sail to Jamaica, or shall be in such a latitude, by such a day; or a contract made upon the sea to be performed in England, as a bond made on ship-board to pay money in London, or the like; these kinds of mixed contracts belong not to the admiralty jurisdiction, but to the courts of common law. And it is not unfrequent for the plaintiff to feign that a contract, really made at sea, was made at some inland place, and thereby draw the cognizance of the suit from the courts of admiralty to those of Westminster-hall. 3 *Blackst.* 107.

From the sentence of an inferior court of admiralty, an appeal lies to the court of the lord high admiral. And from the sentence of the admiralty judge, an appeal lies

to the delegates. But in case of prize-vessels taken in time of war, in any part of the world, and condemned in any courts of admiralty as lawful prize, the appeal lies to certain commissioners of appeals, consisting chiefly of the privy council, and not to judges delegates; and this, by virtue of divers treaties with foreign nations; by which, particular courts are established in all the maritime countries of Europe, for the decision of this question, whether lawful prize or not. For, this being a question between subjects of different states, it belongs intirely to the law of nations, and not to the municipal laws of either country, to determine it. 3 *Blackst.* 69.

And sentence in a foreign court of admiralty is to be credited here, as ours is to be credited there; and the party may libel here for the execution of a sentence in a foreign court of admiralty.

The high court of admiralty is also a court not only of civil, but of criminal, jurisdiction. It hath cognizance of all crimes and offences committed either upon the sea, or on the coasts out of the body or extent of any English county. And heretofore they were determinable by the sole sentence of the judge of the admiralty; but by the 28 Henry VIII. c. 15. all felonies committed on the sea shall be tried by commissioners nominated by the lord chancellor, viz. the judge of the admiralty, and three or four more (among whom two common-law judges are constantly appointed, who in effect try all the prisoners), the indictment being first found by a grand jury of twelve men, and afterwards tried by another jury, as at common law. 4 *Blackst.* 268.

ADMIRALTY ISLANDS, lie in about 2° 18' S. lat. and 146° 44' E. lon. There are between twenty and thirty islands said to be scattered about here, one of which alone would make a large kingdom. Captain Carteret, who first discovered them, was prevented touching at them, although their appearance was very inviting, on account of the condition of his ship, and of his being entirely unprovided with the articles of barter which suit an Indian trade. He describes them as clothed with a beautiful verdure of woods, lofty and luxuriant, interspersed with spots that have been cleared for plantations, groves of cocoa-nut trees, and houses of the natives, who seem to be very numerous. The largest of these islands is eighteen leagues long; in the direction of east and west. The discoverer thinks it highly probable that these islands produce several valuable articles of trade, particularly spices, as they lie in the same climate and latitude as the Moluccas.

ADMIRATION, *f.* [*admiratio*, Lat.] Wonder; the act of admiring or wondering. It is taken sometimes in a bad sense, though generally in a good.

To ADMIRE, *v. a.* [*admiro*, Lat. *admirer*, Fr.] To regard with wonder: generally in a good sense. It is sometimes used, in more familiar speech, for *to regard with love*. It is used, but rarely, in an ill sense.

To ADMIRE, *v. n.* To wonder; sometimes with the particle *at*.—The eye is already so perfect, that I believe the reason of a man would easily have rested here, and *admired at* his own contrivance. *Ray*.

ADMIRER, *f.* The person that wonders, or regards with admiration. In common speech, a lover.

ADMIRINGLY, *adv.* With admiration; in the manner of an admirer.—We may yet further *admiringly* observe, that men usually give freest where they have not given before. *Boyle*.

ADMISSIBLE, *adj.* [*admitto*, *admissum*, Lat.] That which may be admitted.—Suppose that this supposition were *admissible*, yet this would not any way be inconsistent with the eternity of the divine nature and essence. *Hale*.

ADMISSION, *f.* [*admissio*, Lat.] The act or practice of admitting. The state of being admitted. Admittance; the power of entering, or being admitted.—All springs have some degree of heat, none ever freezing, no not in the longest and severest frosts; especially those, where there is such a site and disposition of the strata as gives free and

easy *admission* to this heat. *Woodward*.—In the ecclesiastical law, it is, when the patron presents a clerk to a church that is vacant, and the bishop, upon examination, admits and allows of such clerk to be fitly qualified, by saying, *Admitto te habilem*. The allowance of an argument; the grant of a position not fully proved.

To ADMIT, *v. a.* [*admitto*, Lat.] To suffer to enter; to grant entrance. To suffer to enter upon an office; in which sense the phrase of *admission into a college*, &c. is used. To allow an argument or position. To allow, or grant in general; sometimes with the particle *of*.—If you once *admit* of a latitude, that thoughts may be exalted, and images raised above the life, that leads you insensibly from your own principles to mine. *Dryden*.

ADMITTABLE, *adj.* The person or thing which may be admitted.—Because they have not a bladder like those we observe in others, they have no gall at all, is a paradoxism not *admittable*, a fallacy that needs not the fun to scatter it. *Brown*.

ADMITTANCE, *f.* The act of admitting; allowance or permission to enter. The power or right of entering. Custom, or prerogative, of being admitted to great persons: a sense now out of use. Concession of a position.—Nor could the Pythagoreans give easy *admittance* thereto; for, holding that separate souls successively supplied other bodies, they could hardly allow the raising of souls from other worlds. *Brown*.

ADMITTANCE, in law, is the giving possession of a copyhold estate, as livery of seisin of a freehold. And it is of three kinds:—1. Upon a *voluntary grant by the lord*, where the land hath escheated or reverted to him. In this case, though he might keep the land in his own hand, or might grant the same in fee, and so infranchise it, yet, if he will dispose of it as copyhold, he is bound to grant the usual estate, and reserve the usual rent, and observe the ancient custom precisely in every point; otherwise it would be to create a new copyhold. 2. Upon *surrender by the former tenant*. In this case, the lord is not proprietor, but only a necessary instrument of conveyance; the party claiming his estate under him that made the surrender. But, until his admittance, the tenant hath no estate, and therefore cannot surrender it again to a stranger before admittance. 3. *Admittance by descent*; which is, where an heir is tenant immediately on the death of his ancestor. The lord here is a mere instrument; for the heir may enter upon the land, take the profits, bring actions of trespass, and surrender to whose use he pleases, before admittance; though, before admittance, he cannot be sworn of the homage. This admittance of the heir is not to strengthen his estate, but to entitle the lord to his fine. And, if the heir will not come in and take his admittance, he shall forfeit his estate, or be subject to a penalty, according as the custom of the manor may be. *Wood*, b. ii. c. 1.

To ADMIX, *v. a.* [*admixco*, Lat.] To mingle with something else.

ADMIXTION, *f.* The union of one body with another, by mingling them.—The elements are no where pure in these lower regions; and, if there is any free from the admixtion of another, sure it is above the concave of the moon. *Glanville*.

ADMIXTURE, *f.* The body mingled with another; perhaps sometimes the act of mingling.—A mass which to the eye appears to be nothing but mere simple earth, shall, to the smell or taste, discover a plentiful admixture of sulphur, alum, or some other mineral. *Woodward*.

To ADMONISH, *v. a.* [*admoneo*, Lat.] To warn of a fault; to reprove gently; to counsel against wrong practices; to put in mind of a fault or a duty; with the particle *of*, or *against*, which is more rare; or the infinitive mood of a verb.

ADMONISHER, *f.* The person that admonishes, or puts another in mind of his faults or duty.—Horace was a mild *admonisher*; a court-satirist fit for the gentle times of Augustus. *Dryden*.

ADMONISHMENT,

ADMONISHMENT, *f.* Admonition; the notice by which one is put in mind of faults or duties: a word not often used:

To th' infinitely Good we owe
Immortal thanks, and his *admonishment*
Receive, with solemn purpose to observe
Immutably his sovereign will, the end
Of what we are.

Milton.

ADMONITIO FUSTIUM, *f.* among the Romans, a military punishment, not unlike our whipping, only it was performed with vine-branches.

ADMONITION, *f.* [*admonitio*, Lat.] The hint of a fault or duty; counsel; gentle reproof.

ADMONITIONER, *f.* A liberal dispenser of admonition; a general adviser. A ludicrous term.

ADMONITORY, *adj.* [*admonitorius*, Lat.] That which admonishes.—The sentence of reason is either mandatory, shewing what must be done; or else permissive, declaring only what may be done; or thirdly, *admonitory*, opening what is most convenient for us to do. *Hooker.*

ADMORTIZATION, *f.* in the feudal customs, the reduction of the property of lands or tenements to mortmain. See **MORTMAIN**.

To **ADMOVE**, *v. a.* [*admoveo*, Lat.] To bring one thing to another. A word not in use.—If, unto the powder of loadstone or iron, we *admove* the north pole of the loadstone, the powders, or small divisions, will erect and conform themselves thereto. *Brown.*

ADMURMURATION, *f.* [*admurmuro*, Lat.] The act of murmuring, or whispering to another.

ADNATA, or **AGNATA**, *f.* [from *adnascor*, Lat. to grow to.] The outer coat of the eye; called also *circumcavalis*, *circumoffalis*, *albuginea*, *epiophycos*. It is that which makes the white of the eye, called also *exclonion*, and is thus formed: five of the muscles which move the eye take their origin from the bottom of the orbit, and the sixth arises from the edge of it; they are all inserted by a tendinous expansion into the anterior part of the tunica sclerotica; which expansion gives the whiteness peculiar to the fore part of the eye. It lies between the sclerotica and conjunctiva. It is extremely sensible, and abounds with blood-vessels, which are very visible in inflammations. It covers so much of the eye as is called the white; and, being reflected all round, it lines the two eye-lids, and thus hinders any thing from falling into the orbit. Where it covers the eye-lids, it is vascular and papillous. In passing over the orbit, it does not end at the cornea, but becomes transparent there, and is of different textures in different parts where it is spread. The sclerotica appears under it. When a foreign body gets between the eye and the eye-lid, it is hooked in the villi: the best way to extricate it is, to invert the eye-lid, and to introduce a probe armed with lint and dipped in oil, which will extract it. The inverted eye-lid proceeds from this coat. Though it is exactly commensurate to the orbit in health, yet in morbid habits, when it is inflamed, it is thickened and puffed out. If it does not yield to general remedies, as bleeding, purging, &c. scarify it; and, if this also fails, cut off the redundant part.

ADNATA, is also used for any hair, wool, or the like, which grows upon animals or vegetables.

ADNATA, or **ADNASCENTIA**, among gardeners, denote those off-sets, which, by a new germination under the earth, proceed from the lily, narcissus, hyacinth, and other flowers, and afterwards grow to true roots. The French call them *cayeux*, "stalks."

ADO, *f.* [from the verb to *do*, with *a* before it, as the French *affaire* from *a* and *faire*.] Trouble, difficulty. Bustle; tumult; business; sometimes with the particle *about*. It has a light and ludicrous sense, implying more tumult and show of business than the affair is worth: in this sense it is of late generally used.—Come, says Puff, without any more *ado*, 'tis time to go to breakfast; cats don't live upon dialogues. *L'Esrange.*

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ADOLESCENCE, or **ADOLESCENCY**, *f.* [*adolescencia*, Lat.] The age succeeding childhood, and succeeded by puberty; more largely that part of life in which the body has not yet reached its full perfection. The state of adolescence lasts so long as the fibres continue to grow, either in magnitude or firmness. Adolescence is commonly computed to be between fifteen and twenty-five, or even thirty, years of age; though in different constitutions its terms are very different. The Romans usually reckoned it from twelve to twenty-five in boys; and to twenty-one in girls, &c. And yet, among their writers, *juvenis* and *adolescens* are frequently used indifferently for any person under forty-five years.

ADOLESCENS, *f.* [Lat.] The iron bars that support the fire in a grate or furnace.—Paracelsus would make a man without a woman, and digested semen masculinum in a glass placed in a dung-hill, and produced something like a man, according to the assertion of some of his disciples; this was called homunculus Paracelsi; but would be as properly named *adolescens*.

ADOLLAM, or **ODOLLAM**, anciently a town in the tribe of Judah, to the east of Eleutheropolis. David is said to have hid himself in a cave near this town.

ADON, a populous village in the province of Stuhl-Weissenberg, belonging to Hungary. It lies in a fruitful country, towards the Danube. Lat. 47. 30. lon. 19. 20.

ADONAI, *f.* [Heb.] One of the names of the Supreme Being, in the Scriptures. The proper meaning of the word is *my lords*, in the plural number; as *adoni* is *my lord*, in the singular. The Jews, who either out of respect, or superstition, do not pronounce the name of *Jehovah*, read *Adonai* in the room of it, as often as they meet with *Jehovah* in the Hebrew text. But the ancient Jews were not so scrupulous; nor is there any law which forbids them to pronounce the name of God.

ADONIA, *f.* in antiquity, solemn feasts in honour of Venus, and in memory of her beloved Adonis. The Adonia were observed with great solemnity by most nations; Greeks, Phœnicians, Lycians, Syrians, Egyptians, &c. From Syria, they are supposed to have passed into India. The prophet Ezekiel, viii. 14. is understood to speak of them. They were still observed at Alexandria in the time of St. Cyril; and at Antioch in that of Julian the Apostate, who happened to enter that city during the solemnity, which was taken for an ill omen. The Adonia lasted two days: on the first of which certain images of Venus and Adonis were carried, with all the pomp and ceremonies practised at funerals: the women wept, tore their hair, beat their breasts, &c. imitating the cries and lamentations of Venus for the death of her paramour. The Syrians were not contented with weeping, but gave themselves discipline, shaved their heads, &c.

ADONIDES, *f.* in botany, a name given to botanists who described or made catalogues of plants cultivated in any particular place.

ADONIS, son to Cinyras king of Cyprus, the darling of the goddess Venus: being killed by a wild boar in the Italian woods, he was turned into a flower of a blood-colour, which still bears his name. Venus was inconsolable; and no grief was ever more celebrated than this, most nations, as stated above, having perpetuated the memory of it by a train of anniversary ceremonies. Among Shakespeare's Poems, is a long one on the subject of Venus's affection for Adonis.

ADONIS, or **ADONIUS**, a river of Phœnicia, rising in mount Lebanon, and falling into the sea, after a north-west course, at Bybulus; famous, in fable, as a beautiful shepherd-youth; son of Cinyras, king of the Cyprians; loved by Venus, slain by a boar, and turned into a river.

ADONIS, *f.* [so named from *Adonis*, the favourite of Venus.] In botany, a genus of the polyandria polygynia class, ranking in the natural order of multiflorae. The generic characters are—Calyx: perianthium five-leaved; leaflets obtuse, concave, a little coloured, deciduous. Corolla: petals five to fifteen, oblong, obtuse, shining. Sta-

mina:

mina: filaments very short, subulate; antheræ oblong, inflex. Pistillum: germis numerous, in a head; styles none; stigmas acute, reflex. Receptaculum: oblong, spiked. Seeds: numerous, irregular, angular, gibbous at the base, reflex at the top, a little prominent, naked.—*Essential Character.* Calyx, five-leaved; petals, five or more, without a nectary; seeds, naked.

Description. The leaves are multifid in some species, in others binate. The flowers are terminating, varying in the number of petals, from five to twelve or more; these are long, narrow, red or yellow, without any nectary as in anemone, which genus the flowers of adonis resemble. In fruit this genus approaches more to the ranunculus; having the seeds on a receptacle more or less lengthened out, forming a bunch, pretty much as in that genus.

Species. 1. *Adonis æstivalis*, or tall adonis: corollas five-petalled, heads of seeds ovate. Linnæus observes, that this is so nearly allied to the second species, as to be doubtful whether it is really distinct. Crantz unites them; and Mr. Curtis thinks it will most probably be found that they are the same. The number of petals is no certain character; and the time of flowering is none. Linnæus says, the corolla in this is red, in that dark purple: but the variation, even from scarlet to pale yellow, is no essential difference; the dark purple at the base of the petals remaining the same in all the varieties. According to M. Villars, this differs from *autumnalis*, in having the flower smaller, with the colour a higher red; the branches more open, and the fruit of an oval form. It is a native of the southern countries of Europe, among corn: flowering in May and June. Cultivated in 1768, by Mr. Miller.

2. *Adonis autumnalis*, or common adonis; called also bird's-eye, pheasant's-eye, red maithe, or red Morocco. Our common adonis is a native of most of the southern parts of Europe. Though now common in corn-fields with us near London, yet, not being mentioned as indigenous by any of our old writers, it is probably of no very long standing, and was originally conveyed from gardens, by the intervention of the dung-heap. It grows in Kent, particularly by the side of the river Medway, between Rochester and Maidstone, where it is found in great plenty, in the fields sown with wheat. Among spring corn, there is rarely a plant of it to be found; which shews the propriety of sowing the seeds in gardens in autumn; for those fields of spring corn, if suffered to remain undisturbed after the harvest, will abound with this plant the following year. Great quantities of the flowers are annually brought to London, and sold by the name of red Morocco. Both these annual sorts flower in the beginning of June, and the seeds ripen in August and September: this must be understood of those plants which grow from seeds sown in autumn, or such as have fallen to the ground; for, when any plants come up from seeds sown in the spring, they do not flower till July or August, and their seeds seldom ripen before October.

3. *Adonis vernalis*, or perennial or spring adonis: flower twelve-petalled; heads of seeds ovate; seeds equal thicker at the tip, styled below the tip, hirsute. Is a native of the mountains of Oeland, Switzerland, Austria, Carniola, Silesia, Prussia, Bohemia, the Palatinate, and other parts of Germany; where the root is often used for the true black hellebore. Its large yellow flowers are produced at the end of March or the beginning of April; and the seeds ripen in August. It is an old inhabitant of the English gardens; and was cultivated by Mr. Miller in 1731.

4. *Adonis Apennina*, or Apennine adonis: flowers fifteen-petalled; seeds angular acuminate-mucronate smooth. This species is found wild in the Apennines, and in Siberia.

5. *Adonis Capensis*, or Cape adonis: flowers ten-petalled; heads depressed; leaves binate; leaflets serrate heart-shaped. Found wild near the Cape of Good Hope.

6. *Adonis vesticaria*, or blister adonis: flowers ten-petalled; leaves binate; leaflets serrate smooth. This

is also a Cape plant, and the Africans use it for raising blisters.

Propagation and Culture. The two first sorts are annual; and, if the seeds are sown in autumn, the plants will come up the following spring; but, when they are not sown till spring, they rarely come up the same year: so that, when the seeds are permitted to fall on the ground, they generally succeed better than when sown by art. They will thrive best in a light soil, but by sowing some in a warm situation, and others in the shade, they may be continued longer in flower. The seeds ought to be sown where the plants are to remain to flower, for they do not bear transplanting, especially if they are not removed while the plants are very young: and when the plants come up, they should be thinned, leaving three or four in each patch, which will make a better appearance than where they grow single. The third and fourth are perennial, the seeds ripen in August, and should be sown soon after, otherwise they seldom succeed. When the plants come up, they must be carefully kept clean from weeds; and, in very dry weather, if they are now and then refreshed with water, it will promote their growth. They should remain in the place where they are sown until the second year, for they make but slow progress while young. The best time to transplant them is in autumn, when they ought to be planted where they are to remain; for, if often removed, they will not produce many flowers, nor those flowers be so strong as on the plants which are unremoved. They may be increased by parting the roots, either in autumn or spring. Being hardy and easily cultivated, and producing their showy flowers early in the season, they are desirable plants for the garden. The Cape species must be treated as other plants from that country.

ADONISTS, *f.* a sect or party among the divines and critics, who maintain, that the Hebrew points ordinarily annexed to the consonants of the word Jehovah are not the natural points belonging to that word, nor express the true pronunciation of it; but are the vowel-points, belonging to the words Adonai and Elohim, applied to the consonants of the ineffable name Jehovah; to warn the readers, that, instead of the word Jehovah, which the Jews were forbidden to pronounce, and the true pronunciation of which had been long unknown to them, they are always to read Adonai. They are opposed to *Jehovists*: of whom the principal are Drusius, Capellus, Buxtorf, Altling, and Reland, who has published a collection of their writings on this subject.

To ADOPT, *v. a.* [*adopto*, Lat.] To take a son by choice; to make him a son, who was not so by birth. To place any person or thing in a nearer relation, than they have by nature, to something else.

ADOPTEDLY, *adv.* After the manner of something adopted.

ADOPTER, *f.* He that gives some one by choice the rights of a son.

ADOPTIANI, *f.* in church-history, a sect of ancient heretics, followers of Felix of Urgel, and Elipand of Toledo, who, towards the end of the 8th century, advanced the notion, that Jesus Christ, in his human nature, is the son of God, not by nature, but by adoption.

ADOPTION, *f.* [*adoptio*, Lat.] The act of adopting, or taking to one's self what is not native. The state of being adopted.—In every act of our Christian worship, we are taught to call upon him under the endearing character of our Father, to remind us of our adoption, that we are made heirs of God, and joint heirs of Christ. *Rogers.*

The custom of adoption was very common among the ancient Greeks and Romans: yet it was not practised but for certain causes expressed in the laws, and with certain formalities usual in such cases. It was a sort of imitation of nature, intended for the comfort of those who had no children: wherefore he that was to adopt was to have no children of his own, and to be past the age of getting any; nor were eunuchs allowed to adopt, as being under an actual impotency of begetting children; neither was it law-ful

ful for a young man to adopt an elder, because that it would have been contrary to the order of nature: nay, it was even required that the person who adopted should be eighteen years older than his adopted son, that there might at least appear a probability of his being the natural father.

To prevent rash and inconsiderate adoptions, the Lacedæmonians had a law, that adoptions should be transacted, or at least confirmed, in the presence of their kings. The children adopted were invested with all the privileges, and obliged to perform all the duties, of natural children; and, being thus provided for in another family, ceased to have any claim of inheritance, or kindred, in the family which they had left, unless they first renounced their adoption; which, by the laws of Solon, they were not allowed to do, unless they had first begotten children, to bear the name of the person who had adopted them: thus providing against the ruin of families, which would otherwise have been extinguished by the desertion of those who had been adopted to preserve them. If the children adopted happened to die without children, the inheritance could not be alienated from the family into which they had been adopted, but returned to the relations of the adopter. It should seem, that, by the Athenian law, a person, after having adopted another, was not allowed to marry without permission from the magistrate: in effect, there are instances of persons, who, being ill used by their adoptive children, petitioned for such leave. However this be, it is certain that some men married after they had adopted sons: in which case, if they begat legitimate children, their estates were equally shared between the begotten and adopted.

Besides the formalities abovementioned, various other methods have taken place; which have given denominations to different species of adoption, among the Gothic nations, in different ages. As,

ADOPTION by Arms, was when a prince made a present of arms to a person, in consideration of his merit and valour. Thus it was that the king of the Heruli was adopted by Theodoric; Athalaric by the emperor Justinian; and Cosroes, nephew of the king of Persia, by the emperor Justin.—The obligation here laid on the adoptive son was, to protect and defend the father from injuries, affronts, &c. And hence, according to Selden, the ceremony of dubbing knights took its origin as well as name.

ADOPTION by Baptism, is that spiritual affinity which is contracted by god-fathers and god-children in the ceremony of baptism. This kind of adoption was introduced into the Greek church, and came afterwards into use among the ancient Franks, as appears by the Capitulars of Charlemagne. In reality, the god-father was so far considered as adoptive father, that his god-children were supposed to be intitled to a share in the inheritance of his estate.

ADOPTION by Hair, was performed by cutting off the hair of a person, and giving it to the adoptive father. It was thus that pope John VIII. adopted Boson king of Arles; which, perhaps, is the only instance in history, of adoption, in the order of the ecclesiastics; a law that professes to imitate nature, not daring to give children to those in whom it would be thought a crime to beget any.

ADOPTION by Matrimony, is the taking the children of a wife or husband, by a former marriage, into the condition of proper or natural children; and admitting them to inherit on the same footing with those of the present marriage. This is a practice peculiar to the Germans; among whom, it is more particularly known by the name of *einkindschaft*; among their writers in Latin, by that of *unio proutum*, or *union of issues*. But the more accurate writers observe, that this is no adoption. See **ADFILIA-TION**.

ADOPTION by Testament, that performed by appointing a person heir by will, on condition of his assuming the name, arms, &c. of the adopter. Of which kind we meet with several instances in the Roman history.

Among the Turks the ceremony of adoption is performed by obliging the person adopted to pass through the shirt of the adopter. Hence, among that people, to adopt is expressed by the phrase, *to draw another through my shirt*.

ADOPTION is also used, in theology, for a federal act of God's free grace; whereby those who are regenerated by faith are admitted into his household, and intitled to a share in the inheritance of the kingdom of heaven.

ADOPTION is sometimes also used, in speaking of the ancient clergy, who had a custom of taking a maid or widow into their houses, under the denomination of an *adoptive*, or *spiritual*, sister, or niece.

ADOPTION is also used in speaking of the admission of persons into certain hospitals, particularly that of Lyons; the administrators whereof have all the power and rights of parents over the children admitted.

ADOPTIVE, *adj.* [*adoptivus*, Lat.] He that is adopted by another, and made his son. He that adopts another, and makes him his son.

ADORABLE, *adj.* [*adorable*, Fr.] That which ought to be adored; that which is worthy of divine honours.—On these two, the love of God and our neighbour, hang both the law and the prophets, says the *adorable* Author of Christianity; and the Apostle says, the end of the law is charity. *Cheyne*.

ADORABLENESS, *f.* The quality of being adorable; worthiness of divine honours.

ADORABLY, *adv.* In a manner worthy of adoration.

ADORATION, *f.* [*adoratio*, Lat.] The external homage paid to the Divinity, distinct from mental reverence. Homage paid to persons in high place or esteem:

O ceremony, shew me but thy worth:

What is thy toll, O adoration!

Art thou nought else but place, degree, and form,

Creating awe and fear in other men?

Wherein thou art less happy, being fear'd,

Than they in fearing.

What drink'st thou oft, instead of homage sweet,

But poison'd flattery? *Shakespeare.*

The Romans practised adoration at sacrifices, and other solemnities; in passing by temples, altars, groves, &c. at the sight of statues, images, or the like, whether of stone or wood, wherein any thing of divinity was supposed to reside. Usually there were images of the gods placed at the gates of cities, for those who went in or out to pay their respects to. The ceremony of adoration among the ancient Romans was thus: The devotee, having his head *covered*, applied his right hand to his lips, the fore-finger resting on his thumb, which was erect, and thus bowing his head, turned himself round from left to right.—The Jewish manner of adoration was by prostration, bowing, and kneeling. The Christians adopted the Grecian rather than the Roman method, and adored always *uncovered*. The ordinary posture of the ancient Christians was kneeling, but on Sundays standing: and they had a peculiar regard to the east, to which point they ordinarily directed their prayers.

The Persian manner of adoration, introduced by Cyrus, was by bending the knee, and falling on the face at the prince's feet, striking the earth with the forehead, and kissing the ground. This ceremony, which the Greeks called *προσκυνωσις*, Conon refused to perform to Artaxerxes, and Calisthenes to Alexander the Great, as repugnant to impiety and unlawful.

The adoration performed to the Roman and Grecian emperors consisted in bowing or kneeling at the prince's feet, laying hold of his purple robe, and presently withdrawing the hand and clapping it to the lips. Some attribute the origin of this practice to Constantine. It was only persons of some rank or dignity that were intitled to the honour. Bare kneeling before the emperor to deliver a petition, was also called *adoration*.

The practice of adoration may be said to be still subsisting

ing in England, in the ceremony of kissing the king's or queen's hand, and in serving them at table, both being performed kneeling.

ADORATION is also used, in the court of Rome, for the ceremony of kissing the pope's feet. The introduction of adoration among the Romans is ascribed to the low flattery of Vitellius, who, upon the return of C. Cæsar from Syria, would not approach him otherwise than with his head covered, turning himself round, and then falling on his face. Heliogabalus restored the practice, and Alexander Severus again prohibited it. Dioclesian redemanded it; and it was, in some measure, continued under the succeeding princes, even after the establishment of Christianity, as Constantine, Constantius, &c. It is particularly said of Dioclesian, that he had gems fastened to his shoes, that divine honours might be more willingly paid him, by kissing his feet. The like usage was afterwards adopted by the popes, and is observed to this day. These prelates, finding a vehement disposition in the people to fall down before them and kiss their feet, procured crucifixes to be fastened on their slippers; by which stratagem, the adoration intended for the pope's person is supposed to be transferred to Christ. Divers acts of this adoration we find offered even by princes to the pope.

Barbarous ADORATION is a term used, in the laws of king Canute, for that performed after the manner of the heathens who adored idols. The Romish church is charged with the adoration of saints, martyrs, images, crucifixes, relics, the virgin, and the host; all which by Protestants are generally aggravated into idolatry, on a supposition, that the honour thus paid to them is absolute and supreme, called by way of distinction *Latria*, which is due only to God. Roman Catholics, on the contrary, explain them, as only a relative or subordinate worship, called *Dulia* and *Hyperdulia*, which terminates ultimately in God alone.

To ADORE, *v. à.* [*adoro*, Lat.] To worship with external homage: to pay divine honours. It is used, popularly, to denote a high degree of reverence or regard; to reverence; to honour; to love.—The people appear *adoring* their prince, and their prince *adoring* God. *Tatler*.

ADOREA, in Roman antiquity, a word used in different senses; sometimes for all manner of grain, sometimes for a kind of cakes made of fine flour, and offered in sacrifice; and finally for a dole or distribution of corn, as a reward for some service; whence by metonymy it is put for praise or rewards in general.

ADOREMENT, *f.* Adoration; worship; a word scarcely used.

ADORER, *f.* He that adores; a worshipper; a term generally used in a low sense; as, by lovers, or admirers. A worshipper; in a serious sense.—He was so severe an *adorer* of truth, as not to dissimble; or to suffer any man to think that he would do any thing, which he resolved not to do. *Clarendon*.

To ADORN, *v. a.* [*adorno*, Lat.] To dress; to deck the person with ornaments.—He hath clothed me with the garments of salvation, he hath covered me with the robe of righteousness, as a bridegroom decketh himself with ornaments, and as a bride *adorneth* herself with her jewels. *Isaiah*, lxi. 10.—To set out any place or thing with decorations. To embellish with oratory or elegance of language:

Thousands there are in darker fame that dwell,
Whose names some nobler poem shall *adorn*;
For, tho' unknown to me, they sure fought well. *Dryden*.

ADORN, *adj.* Adorned; decorated: a word peculiar to Milton:

She'll to realities yield all her shows,
Made so *adorn* for thy delight the more. *Milton*.

ADORNMENT, *f.* Ornament; embellishment; elegance; not now in use.

ADOSCUATION, a term used by Dr. Grew, to imply a kind of impregnation, without intromission; and in this manner he supposes the impregnation of plants is effected by the falling of the farina fecundans on the pistil.

ADOSEE, in heraldry, signifies two figures or bearings being placed back to back.

ADOUR, the name of a river of France, which rises in the mountains of Bigorre, and, running N. by Tarbes through Gascony, afterwards turns E. and, passing by Dax, falls into the bay of Biscay, below Bayonne.

ADOWN, *adv.* Down; on the ground.

ADOWN, *prep.* Down; towards the ground; from a higher situation towards a lower:

In this remembrance Emily ere day
Arose, and dress'd herself in rich array;
Fresh as the month, and as the morning fair,
Adown her shoulders fell her length of hair. *Dryden*.

ADOXA, [*α* and *δοξα*, praise; an ignoble plant, one of no show.] In botany, a genus of the octandria tetragynia class, ranking in the natural order of succulentæ. The generic characters are—Calyx: perianth inferior, bifid, flat, permanent. Corolla: monopetalous, flat, quadrifid; clefts ovate, acute, longer than the calyx. Stamina: filaments subulate, the length of the calyx. Antheræ roundish. Pistillum: germ below the receptacle of the corolla. Styles simple, erect, the length of the stamens, permanent. Stigmas simple. Pericarpium: a globose berry, between the calyx and corolla, the calyx being united below with the berry, umbilicate, four-celled. Seeds: solitary, compressed.—*Essential Character*. Calyx, bifid, inferior; corolla, four or five cleft, superior; berry, four or five celled, united with the calyx.

There is but one *species*, which is called *adoxa moschatellina*, or bulbous fumitory, hollow-foot, tuberous moschatel. This plant grows naturally in shady places, and woods; as in Hampstead and Charlton woods, &c. The flowers appear at the end of March or the beginning of April, and the berries ripen in May, soon after which the leaves decay. These and the flowers smell like musk, from whence it has by some been called musk crowfoot.

Propagation and Culture. The roots may be transplanted any time after the leaves are decayed, till winter. They must be planted in the shade, under shrubs; for, if they are exposed to the open sun, they will not thrive.

AD PONDUS OMNIUM, among physicians, an abbreviation in their prescriptions, signifying that the last mentioned ingredient is to weigh as much as all the rest together.

AD QUOD DAMNUM is a writ, issuing out of and returnable into the chancery, directed to the sheriff, to enquire by a jury, of what damage it will be to the king, or any other, to grant a liberty, fair, market, highway, or the like. And, according to the sheriff's return thereof, the grant is issued or withheld.

ADRACHNE, in botany, a species of the strawberry-tree. See ARBUTUS.

ADRAMMELECH, one of the gods of the inhabitants of Sepharvaim, who were settled in the country of Samaria, in the room of those Israelites who were carried beyond the Euphrates. The Sepharvaites made their children pass through the fire, in honour of this idol and another called *Anamelech*. It is supposed, that *Adrammelech* meant the sun, and *Anamelech* the moon: the first signifies the magnificent king; the second the gentle king.

ADRAMYTTIUM, now *Andramiti*; a town of Mysia Major, at the foot of mount Ida, an Athenian colony, with a harbour and dock near the Caicus. *Adramyttenus* the epithet; as, *Adramyttenus Sinus*, a part of the Egean Sea, on the coast of Mysia; *Adramyttenus Convenus*, sessions or assizes. The eighth in order of the nine *Conventus Juridici* of the province of Asia.

ADRANA, a river of Germany, now the Eder, rising on the borders of the county of Nassau, to the north-east of

of Dillenburg, running through the landgraviate of Hesse, the county of Waldeck, by Fritzlar, and then falling into the Wefer, to the south of Caffel.

ADRANUM, or **HADRANUM**, now *Aderno*; a town of Sicily, built by the elder Dionysius, at the foot of mount *Ætna*, four hundred years before Christ.

ADRASTEIA, in antiquity, an epithet given to the goddess Nemesis, or Revenge. It was taken from king Adrastus, who first erected a temple to that deity.

ADRASTIA CERTAMINA, in antiquity, a kind of Pythian games, instituted by Adrastus king of Argos, in the year of the world 2700, in honour of Apollo, at Sicyon. These are to be distinguished from the Pythian games celebrated at Delphi.

ADRASTUS, king of Argos, son of Talaus and Lysianissa, daughter of Polybius king of Sicyon, acquired great honour in the famous war of Thebes, in support of Polynices, his son-in-law, who had been excluded the sovereignty of Thebes by Eteocles his brother, notwithstanding their reciprocal agreement. Adrastus, followed by Polynices and Tideus his other son-in-law, by Capaneus and Hippomedon his sister's sons, by Amphiaras his brother-in-law, and by Parthenopæus, marched against the city of Thebes; and this is the expedition of the Seven Worthies, which the poets have so often sung. They all lost their lives in this war except Adrastus, who was saved by his horse called *Arian*. This war was revived ten years after by the sons of those deceased warriors, which was called the *war of the Epigones*, and ended with the taking of Thebes. None of them lost their lives except *Ægialeus* son of Adrastus; which afflicted him so much that he died of grief in Megara, as he was leading back his victorious army.

ADREAD, *adv.* In a state of fear; frightened; terrified; now obsolete.

ARIA, or **HADRIA**, the name of two ancient towns in Italy. One in the country of the Veneti, on the river Tartarus, between the Padus and the Athesis, called *Atria* by Pliny and Ptolemy, but *Adrias* by Strabo. Another on the river Vomanius, in the territory of the Piceni, the country of the ancestors of the emperor Adrian.

ADRIANUM, or **MARE ADRIATICUM**, a large bay in the Mediterranean, now the gulph of Venice, between Dalmatia, Sclavonia, Greece, and Italy.

ADRIAN, or **HADRIAN**, (Publius *Ælius*;) the Roman emperor. He was born at Rome the 24th of January, in the 76th year of Christ. His father left him an orphan, at ten years of age, under the guardianship of Trajan, and Cælius Tatianus a Roman knight. He accompanied Trajan in most of his expeditions, and particularly distinguished himself in the second war against the Daci; and having before been quaestor, as well as tribune of the people, he was now successively prætor, governor of Pannonia, and consul. After the siege of Atræ in Arabia was raised, Trajan, who had already given him the government of Syria, left him the command of the army: and at length, when he found death approaching, it is said he adopted him. Adrian, who was then in Antiochia, as soon as he received the news thereof, and of Trajan's death, declared himself emperor, on the 11th of August, 117. No sooner had he arrived at the imperial dignity, than he made peace with the Persians, to whom he yielded up great part of the conquests of his predecessors; and, from generosity, or policy, he remitted the debts of the Roman people, which, according to the calculation of those who have reduced them to modern money, amounted to 22,500,000 golden crowns; and he burnt all the bonds and obligations relating to those debts, that the people might be under no apprehension of being called to an account for them afterwards. There are medals in commemoration of this fact, in which he is represented holding a flambeau in his hand, to set fire to all those bonds which he had made void. He went to visit all the provinces; and did not return to Rome till the year 128, when the senate decreed him a triumph, and honoured him with the title of

Father of his country; but he refused both, and desired that Trajan's image might triumph. No prince travelled more than Adrian; there being hardly one province in the empire which he did not visit. In 120 he went into Gaul; from thence he came over to Britain, in order to subdue the Caledonians, who were making continual inroads into the provinces. Upon his arrival, they retired towards the north: he advanced however as far as York, where he was diverted from his intended conquest by the description some old soldiers he found there, who had served under Agricola, gave him of the country. In hopes, therefore, of keeping them quiet by enlarging their bounds, he delivered up to the Caledonians all the lands lying between the two Friths and the Tyne; and at the same time, to secure the Roman province from their future incursions, built the famous wall which still bears his name. It was carried on from the Solway Frith, a little west of the village of Burgh on the Sands, in as direct a line as possible, to the river Tyne on the east, at the place where the town of Newcastle now stands; so that it must have been above sixty English, and near seventy Roman, miles in length. Having thus settled matters in Britain, he returned to Rome, where he was honoured with the title of Restorer of Britain, as appears by some medals. He soon after went into Spain, to Mauritania, and at length into the east, where he quieted the commotions raised by the Parthians. After having visited all the provinces of Asia, he returned to Athens in 125, where he passed the winter, and was initiated in the mysteries of Eleusinian Ceres. He went from thence to Sicily, chiefly to view mount *Ætna*, contemplate its phenomena, and enjoy the beautiful and extensive prospect afforded from its top. He returned to Rome the beginning of the year 129; and, according to some, he went again, the same year, to Africa; and after his return from thence, to the east. He was in Egypt in the year 132, revisited Syria the year following, returned to Athens in 134, and to Rome in 135. The persecution against the Christians was very violent under his reign; but it was at length suspended, in consequence of the remonstrances of Quadrat bishop of Athens, and Aristides, two Christian philosophers, who presented the emperor with some books in favour of the Christian religion. He conquered the Jews; and, by way of insult, erected a temple to Jupiter on Calvary, and placed a statue of Adonis in the manner of Bethlehem; he caused also the images of swine to be engraven on the gates of Jerusalem. At last he was seized with a dropsy, which vexed him to such a degree, that he became almost raving mad. A great number of physicians were sent for, and to the multitude of them he ascribed his death. He died at Baia in the 62d year of his age, having reigned twenty-one years. The Latin verses he addressed to his soul, and which are translated by Mr. Pope, have been much criticised and variously interpreted. He also wrote the history of his own life: to which, however, he did not chuse to put his name; but that of Phlegon, one of his freed men, a very learned person, was prefixed to it. He had great wit, and an extensive memory. He understood the sciences perfectly well; but was very jealous of others who excelled in them. He was also cruel, envious, and lascivious. Antoninus his successor obtained his apotheosis; and prevented the rescission of his acts, which the senate once intended.

ADRIAN IV. (Pope), the only Englishman who ever had the honour of sitting in the papal chair. His name was Nicholas Brekepsere; and he was born at Langley, near St. Alban's, in Hertfordshire. His father having left his family, and taken the habit of the monastery of St. Alban's, Nicholas was obliged to submit to the lowest offices in that house for daily support. After some time, he desired to take the habit in that monastery, but was rejected by the abbot Richard. Upon this he resolved to try his fortune in another country, and accordingly went to Paris; where, though in very poor circumstances, he applied himself to his studies with great assiduity, and made a wonderful proficiency. But, having still a strong incli-

nation to a religious life, he left Paris, and removed to Provence, where he became a regular clerk in the monastery of St. Rufus. He was not immediately allowed to take the habit; but passed some time, by way of trial, in recommending himself to the monks by a strict attention to all their commands. This behaviour, together with the beauty of his person, and prudent conversation, rendered him so acceptable to those religious, that after some time they intreated him to take the habit of the canonical order. Here he distinguished himself so much by his learning and strict observance of the monastic discipline, that, upon the death of the abbot, he was chosen superior of that house; and we are told that he rebuilt that convent. Pope Eugenius III. being apprised of the great merit of Nicholas, and thinking he might be serviceable to the church in a higher station, created him cardinal bishop of Alba in 1146. In 1148, his holiness sent him legate to Denmark and Norway; where, by his fervent preaching and diligent instructions, he converted those barbarous nations to the Christian faith; and erected Upsal into an archiepiscopal see. When he returned to Rome, he was received by the pope and cardinals with great marks of honour: and pope Anastasius, who succeeded Eugenius, happening to die at this time, Nicholas was unanimously chosen to the holy see, in November 1154, and he took the name of *Adrian*. When the news of his promotion reached England, king Henry II. sent Robert abbot of St. Alban's, and three bishops, to Rome, to congratulate him on his election; upon which occasion Adrian granted very considerable privileges to the monastery of St. Alban's, particularly an exemption from all episcopal jurisdiction, excepting to the see of Rome. He died September 1st, 1159, in the fourth year and tenth month of his pontificate; and was buried in St. Peter's church, near the tomb of his predecessor Eugenius. There are extant several letters, and some homilies, written by Pope Adrian.

ADRIAN, cardinal-priest, of the title of St. Chrysogonus, was a native of Cornetto in Tuscany. Innocent VIII. sent him nuncio into Scotland and into France; and, after he had been clerk and treasurer of the apostolic chamber, pope Alexander VI. whose secretary he had been, honoured him with the cardinal's hat. His life was a continued scene of odd alterations. He narrowly escaped death the day Alexander VI. poisoned himself by mistake. Afterward he drew upon himself the hatred of Julius II. so that he was obliged to go and hide himself in the mountains of Trent. Having been recalled by Leo X. he was so ungrateful, that he engaged in a conspiracy against him. The pope pardoned his fault: but the cardinal, not caring to trust to this, made his escape, and it could never be known exactly what became of him. He was one of the first that effectually reformed the Latin style. He studied Cicero with great success, and made many excellent observations on the propriety of the Latin tongue. The treatise he composed *De sermone Latino*, is a proof of this. He had begun a Latin translation of the Old Testament. He wrote *De vera philosophia*. This treatise was printed at Cologne 1584.

ADRIAN VI. (Pope), was born at Utrecht in 1459. His father was not able to maintain him, but he got a place at Louvain, in a college in which a certain number of scholars were maintained *gratis*. It is reported that he used to read in the night-time by the light of the lamps in the churches or streets. He made a considerable progress in all the sciences; led an exemplary life; and there never was a man less intriguing and forward than he was. He took his degree of doctor of divinity at Louvain; was soon after made canon of St. Peter's, and professor of divinity at Utrecht, and then dean of St. Peter's and vice-chancellor of the university. He was obliged to leave an academical life, to be tutor to the archduke Charles. This young prince made no great progress under him: however, never was a tutor more considerably rewarded; for it was by Charles V.'s credit he was raised to the papal throne. He died Sept. 14, 1523.

ADRIANI (Joanni Battista), was born of a patrician family at Florence in 1511. He wrote a History of his own Times in Italian; which is a continuation of Guicciardini, beginning at the year 1536; to which Thuanus acknowledges himself greatly indebted: besides which he composed six funeral orations, on the emperor Charles V. and other noble personages. He died at Florence in 1579.

ADRIANISTS, in ecclesiastical history, a sect of heretics divided into two branches; the first were disciples of Simon Magus, and flourished about the year 34. Theodoret is the only person who has preserved their name and memory; but he gives us no account of their origin. Probably this sect, and the six others which sprung from the Simonians, took their name from the particular disciples of Simon. The second were the followers of Adrian Hamstead, the anabaptist; and held some particular errors concerning Christ.

ADRIANO-A-SIERRA, a chain of mountains of Biscay in Spain. There is a road over them to Aalba and Old Castile, which at its beginning is a dark path of fifty paces cut through a rock, and then leads over the highest of the Pyrenees.

ADRIANOPOLE, a city of Turkey in Europe, in the province of Rumania, and the see of an archbishop, under the patriarch of Constantinople. It is about seven or eight miles in circumference, including the old city and some gardens. The houses are low, and the streets dirty. The walls and towers are in a great measure fallen to decay. However, there is a beautiful bazar, or market, half a mile long, called Ali Basha. It is a vast arch building, with six gates, and 365 well-furnished shops, kept by Turks, Armenians, and Jews. The number of inhabitants of all nations and religions may be about 100,000; but it is dear living here, because the provisions are brought from distant places. The air is wholesome, and the country very pleasant in the summer time, on account of the river and streams that run near and about the city; the chief of which is the Mariza. These promote and preserve the verdure of the gardens, meadows, and fields, for a considerable part of the year. In the winter there is plenty of game. Near the principal bazar there is another, about a mile in length, full of shops, which contain all kinds of commodities. Sultan Selim's mosque stands on the side of a hill, in the midst of the city; and hence this magnificent structure may be seen on all sides. Gold and silver articles, jewels, pistols, scimitars, &c. are sold in another part of the city, called by travellers the *bizeftein*, though it differs little from a bazar. This contains about 200 shops, and is covered like the former: but the covering is supported by two rows of large pillars. The grand vizier's palace is an extensive house, after the Turkish manner of building. The emperor's seraglio, is a regular structure, in a plain near the river Tungia. It is two miles in compass, and has seven gates, besides those of the gardens, which are several miles in circumference. The city is governed by a mullah cadi, who has an absolute authority both in civil and criminal matters. In the time of the plague, or war, the grand signior sometimes resides here. The Turks took this city from the Greeks in 1362, and made it the capital of the empire, till Mahomet II. took Constantinople in 1453. E. lon. 26. 27. lat. 41. 41.

ADRIFT, *adv.* Floating at random; as any impulse may drive:

Then, shall this mount
Of paradise, by might of waves, be mov'd
Out of his place, push'd by the horned flood,
With all his verdure spoil'd, and trees *adrift*,
Down the great river, to the open gulf,
And there take root.

Milton.

ADROGATION, in Roman antiquities, a species of adoption, whereby a person who was capable of choosing for himself was admitted by another into the relation of a son.

fon. The word is compounded of *ad*, "to," and *rogare*, "to ask;" on account of a question put in the ceremony of it. Whether the adopter would take such a person for his son? and another to the adoptive, Whether he consented to become such a person's son?

ADROIT, *adj.* [Fr.] Dextrous; active; skilful.

ADROITNESS, *f.* Dexterity; readiness; activity. Neither this word, nor *adroit*, seem yet completely naturalized.

ADROP, *f.* A chemical term denoting the body itself, or lead, from whence mercury ought to be taken for the philosophers stone; in which signification it is taken also by Ripley. Or it denotes the philosophers stone itself. It is also called *saturnus*, i. e. antimony, or plumbum.

ADRY, *adv.* [from *a* and *dry*.] Athirst; thirsty; in want of drink.

ADSCITITIOUS, *adj.* [*adscititius*, Lat.] That which is taken in to complete something else, though originally extrinsic; supplemental; additional.

ADSIDELLA, *f.* in antiquity, the table at which the flames sat during the sacrifices.

ADSTRICTION, *f.* [*adstrictio*, Lat.] The act of binding together; and applied, generally, to medicaments and applications which have the power of making the part contract.

ADUACA, or **ATUACA**, anciently a large and famous city of the Tungri; now a small and inconsiderable village, called Tongeren, in the bishopric of Liege, in the territory of Haspengow, on the rivulet Jecker, that falls into the Maese. Lat. 50. 54. lon. 5. 52. E.

TO ADVANCE, *v. a.* [*avancer*, Fr.] To bring forward, in the local sense. To raise to preferment; to aggrandize. To improve.—What laws can be advised more proper and effectual to advance the nature of man to its highest perfection, than these precepts of Christianity? *Tillotson*.—To heighten; to grace; to give lustre to. To forward; to accelerate. To propose; to offer to the public; to bring to view or notice:

Some ne'er advance a judgment of their own,
But catch the spreading notion of the town. *Pope*.

TO ADVANCE, *v. n.* To come forward. To make improvement.—They who would advance in knowledge, and not deceive and swell themselves with a little articulated air, should not take words for real entities in nature, till they can frame clear and distinct ideas of those entities. *Locke*.

ADVANCE, *f.* The act of coming forward. A tendency to come forward to meet a lover; an act of invitation. Gradual progression; rise from one point to another. Improvement; progress towards perfection.—Our Saviour raised the ruler's daughter, the widow's son, and Lazarus; the first of these, when she had just expired; the second, as he was carried to his grave on the bier; and the third, after he had been some time buried. And having, by these gradual advances, manifested his divine power, he at last exerted the highest and most glorious degree of it; and raised himself also by his own all-quickening virtue, and according to his own express prediction. *Atterbury*.

ADVANCED, *adj.* in a general sense, denotes something posted or situated before another. Thus, *advanced-ditch*, in fortification, is that which surrounds the glacis or esplanade of a place.

ADVANCED-GUARD, or **VANGUARD**, in the art of war, the first line or division of an army, ranged or marching in order of battle; or, it is that part which is next the enemy, and marches first towards them. This term is more particularly used for a small party of horse stationed before the main-guard.

ADVANCEMENT, *f.* [*avancement*, Fr.] The act of coming forward. The state of being advanced; preferment. The act of advancing another. Improvement; promotion to a higher state of excellence.—Nor can we conceive it unwelcome unto those worthies, who endeavour the advancement of learning. *Brown*.

ADVANCER, *f.* He that advances any thing; a pro-

motor; forwarder. Among sportsmen, it is one of the starts or branches of a buck's attire, between the back antler and the palm.

ADVANTAGE, *f.* [*avantage*, Fr.] Superiority; often with *of* or *over* before a person.—In the practical prudence of managing such gifts, the laity may have some *advantage* over the clergy; whose experience is, and ought to be, less of this world than the other. *Sprat*.—All other sorts and sects of men would evidently have the *advantage* of us, and a much surer title to happiness than we. *Atterbury*.—Superiority gained by stratagem, or unlawful means. Opportunity; convenience. Favourable circumstances. Superior excellence. Gain; profit. Overplus; something more than the mere lawful gain. Preponderation on one side of the comparison.—Much more should the consideration of this pattern arm us with patience against ordinary calamities; especially if we consider his example with this advantage, that though his sufferings were wholly undeserved, and not for himself but for us, yet he bore them patiently. *Tillotson*.

TO ADVANTAGE, *v. a.* To benefit. To promote; to bring forward; to gain ground to.—The great business of the senses being to make us take notice of what hurts or *advantages* the body, it is wisely ordered by nature, that pain should accompany the reception of several ideas. *Locke*.

ADVANTAGEABLE, *adj.* Profitable; convenient; gainful.—As it is *advantageable* to a physician to be called to the cure of declining disease, so it is for a commander to suppress a sedition which has passed the height. *Hayward*.

ADVANTAGED, *adj.* Possessed of advantages; commodiously situated or disposed.—In the most *advantaged* tempers, this disposition is but comparative; whereas the most of men labour under disadvantages, which nothing can rid them of. *Glanville*.

ADVANTAGE-GROUND, *f.* Ground that gives superiority, and opportunities of annoyance or resistance.

ADVANTAGEOUS, *adj.* [*avantageux*, Fr.] Of advantage; profitable; useful; opportune; convenient. It is used with relation to persons, and followed by *to*.—Since every painter paints himself in his own works, 'tis *advantageous* to him to know himself, to the end that he may cultivate those talents which make his genius. *Dryden*.

ADVANTAGEOUSLY, *adv.* Conveniently; opportunely; profitably.

ADVANTAGEOUSNESS, *f.* Quality of being advantageous; profitableness; usefulness; convenience.—The last property, which qualifies God for the fittest object of our love, is the *advantageousness* of his to us, both in the present and the future life. *Boyle*.

ADUAR, *f.* in the Arabian and Moorish customs, a kind of ambulatory village, consisting of tents, which these people remove from one place to another, as suits their convenience.

TO ADVENE, *v. n.* [*advenio*, Lat.] To accede to something; to become part of something else, without being essential; to be superadded.

ADVENIENT, *adj.* [*adveniens*, Lat.] Advening; coming from outward causes; superadded.—If to suppose the soul a distinct substance from the body, and extrinsically *advenient*, be a great error in philosophy, almost all the world hath been mistaken. *Glanville*.

ADVENT, *f.* [from *adventus*; i. e. *adventus* *Redemptoris*, Lat.] The name of one of the holy seasons, signifying the coming; that is, the coming of our Saviour; which is made the subject of our devotion during the four weeks before Christmas. It begins on St. Andrew's day, or on the Sunday before or after it. During Advent, and to the end of the octaves of Epiphany, the solemnizing of marriage is forbidden without a special licence.

ADVENTINE, *adj.* [from *advenio*, *adventum*, Lat.] Adventitious; that which is extrinsically added; that which comes from outward causes; a word scarcely in use.

ADVENTITIOUS, *adj.* [*adventitius*, Lat.] That which advenes; accidental; supervenient; extrinsically added, not essentially inherent.—Diseases of continuance get an *adventitious*

adventitious strength from custom, besides their material cause from the humours. *Bacon.*

ADVENTIVE, *f.* [from *advenio*, Lat.] The thing or person that comes from without: a word not now in use.

ADVENTUAL, *adj.* [from *Advent*.] Relating to the season of Advent.

AD VENTREM INSPICIENDUM, *f.* in law, a writ by which a woman is to be searched whether she be with child by a former husband, on her withholding of lands from the next, failing issue of her own body.

ADVENTURE, *f.* [Fr.] An accident; a chance; a hazard; an event of which we have no direction.—The general summoned three castles; one desperate of succour, and not desirous to dispute the defence, presently yielded; but two stood upon their *adventure*. *Hayward.*—In this sense is used the phrase, *at all adventures*, [*à l'aventure*, Fr.] By chance; without any rational scheme.—Where the mind does not perceive probable connection, there men's opinions are the effects of chance and hazard, of a mind floating *at all adventures*, without choice and without direction. *Locke.*—The occasion of casual events; an enterprise in which something must be left to hazard. This noun, with all its derivatives, is frequently written without *ad*; as, *venture*, *venturous*.

TO ADVENTURE, *v. n.* [*adventurer*, Fr.] To try the chance; to dare.—The tender and delicate woman among you, which would not *adventure* to set the sole of her foot upon the ground, for delicateness and tenderness. *Deuter.* xxviii. 26.

TO ADVENTURE, *v. a.* To put into the power of chance.—For my father fought for you, and *adventured* his life for, and delivered you out of the hand of Midian. *Judges*, ix. 17.—It is often used with the reciprocal pronoun; as, *he adventured himself*.

BILL OF ADVENTURE, *f.* among merchants, a writing signed by a merchant, testifying the goods mentioned in it to be shipped on-board a certain vessel belonging to another person, who is to run all hazards; the merchant only obliging himself to account to him for the produce.

ADVENTURE-BAY, in Van Diemen's land. There is a beautiful sandy beach, about two miles long, at the bottom of Adventure-bay, formed to all appearance by the particles which the sea washes from a fine white sand-stone. This beach is very well adapted for hauling a seine. Behind it is a plain, with a brackish lake, out of which are caught, by angling, some bream and trout. The parts adjoining the bay are mostly hilly, and are an entire forest of tall trees, rendered almost impassable by brakes of fern, shrubs, &c. The soil on the flat land, and on the lower part of the hills, is sandy, or consists of a yellowish earth, and in some parts of a reddish clay; but further up the hills, it is of a grey tough cast. This country, upon the whole, bears many marks of being very dry, and the heat appears to be great. No mineral bodies, nor stones of any other kind than the white sand-stone, were observed by the late navigators; nor could they find any vegetables that afforded subsistence for man. The forest-trees are all of one kind, and generally quite straight: they bear clusters of small white flowers. The principal plants observed, are wood-sorrel, milk-wort, cud-weed, bell-flower, gladiolus, samphire, and several kinds of fern: the only quadruped, a species of opossum, about twice the size of a large rat. The kangaroo, found further northward in New Holland, may also be supposed to inhabit here, as some of the inhabitants had pieces of the skin of that animal. The principal sorts of birds in the woods are brown hawks or eagles, crows, large pigeons, yellowish paroquets, and a species which they call *motacilla cyanea*, from the beautiful azure colour of its head and neck. On the shore were seen several gulls, black oyster-catchers, or sea-pies, and plovers of a stone-colour.

The inhabitants seem mild and cheerful, with little of that wild appearance that savages in general have. They are almost totally devoid of personal activity or genius, and are nearly upon a par with the wretched natives of

Terra del Fuego. They display, however, some contrivance in their method of cutting their arms and bodies in lines of different directions, raised above the surface of the skin. Their indifference for presents, their general inattention, and want of curiosity, were very remarkable, and testified no acuteness of understanding. Their complexion is a dull black, which they sometimes heighten by smutting their bodies, as was supposed, from their leaving a mark behind on any clean substance. Their hair is perfectly woolly, and is clotted with grease and red ochre, like that of the Hottentots. Their noses are broad and full, and the lower part of their face projects considerably. Their eyes are of a moderate size, and though they are not very quick or piercing, they give the countenance a frank, cheerful, and pleasing cast. They are, upon the whole, well proportioned, though their belly is rather protuberant.

ADVENTURER, *f.* [*adventurier*, Fr.]—He that seeks occasions of hazard; he that puts himself in the hands of chance.

ADVENTURERS, *f.* is particularly used for an ancient company of merchants and traders, erected for the discovery of lands, territories, trades, &c. unknown. The society of adventurers had its rise in Burgundy, and its first establishment from John duke of Brabant, in 1248, being known by the name of "The Brotherhood of St. Thomas-à-Becket." It was afterwards translated into England, and successively confirmed by several of our kings, under the appellation of "Merchant Adventurers."

ADVENTUROUS, *adj.* [*adventureux*, Fr.] He that is inclined to adventures; and, consequently bold, daring, courageous. Applied to things, that which is full of hazard; which requires courage; dangerous.

ADVENTUROUSLY, *adv.* After an adventurous manner; boldly; daringly.

ADVENTURESOME, *adj.* The same with **ADVENTUROUS**. A low word scarcely used in writing.

ADVENTURESOMENESS, *f.* The quality of being adventuresome.

ADVERB, *f.* [*adverbium*, Lat.] A word joined to a verb or adjective, and solely applied to the use of qualifying and restraining the latitude of their signification, by the intimation of some circumstance thereof; as, of quality, manner, degree. Thus we say, he runs *swiftly*; the bird flies *aloft*; he lives *virtuously*, &c.

ADVERBIAL, *adj.* [*adverbialis*, Lat.] That which has the quality or structure of an adverb.

ADVERBIALLY, *adv.* [*adverbialiter*, Lat.] Like an adverb; in the manner of an adverb.

ADVERSABLE, *adj.* [from *adverse*.] Contrary to; opposite to.

ADVERSARIA, *f.* [Lat. a book, as it should seem, in which *debtor* and *creditor* were set in opposition.] A common-place; a book to note in.

ADVERSARY, *f.* [*adversaire*, Fr. *adversarius*, Lat.] An opponent; antagonist; enemy: generally applied to those that have verbal or judicial quarrels; as, *controversists* or *litigants*: sometimes to an opponent in single combat. It may sometimes imply an open profession of enmity; as, we say, a secret enemy is worse than an open *adversary*.—An *adversary* makes a stricter search into us, and discovers every flaw and imperfection in our tempers. A friend exaggerates a man's virtues; an enemy inflames his crimes. *Addison.*

ADVERSATIVE, *adj.* [*adversativus*, Lat.] A term of grammar, applied to a word which makes some opposition or variety; as, in this sentence: This diamond is orient, *but* it is rough. *But* is an *adversative conjunction*.

ADVERSATOR, *f.* in antiquity, a servant who attended the rich in returning from supper, to give them notice of any obstacles in the way, at which they might be apt to stumble.

ADVERSE, *adj.* [*adversus*, Lat.] In prose it has now the accent on the first syllable; in verse, it is accented on the first by Shakespeare; on either, indifferently, by Milton;

ton; on the last, by Dryden; on the first, by Roscommon. Acting in contrary directions; as, two bodies in collision. Figuratively, contrary to the wish or desire; thence, calamitous; afflictive; pernicious. It is opposed to *prosperous*. Personally opponent; the person that counteracts another, or contests any thing.

ADVERSITY, *f.* [*adversus*, Fr.] Affliction; calamity; that is, opposition to our wishes. The cause of our sorrow; affliction; misfortune. In this sense it may have a plural. The state of unhappiness; misery.

Sweet are the uses of *adversity*,
Which like the toad, ugly and venomous;
Wears yet a precious jewel in his head. *Shakespeare*.

ADVERSELY, *adv.* In an adverse manner; oppositely; unfortunately.

To ADVERT, *v. n.* [*adverto*, Lat.] To attend to; to regard; to observe; with the particle *to* before the object of regard.—The mind of man being not capable at once to *advert* to more than one thing, a particular view and examination of such an innumerable number of vast bodies will afford matter of admiration. *Ray*.—We sometimes say, To *advert* the mind to an object.

ADVERTENCE, *f.* Attention to; regard to; consideration.

ADVERTENCY, *f.* The same with **ADVERTENCE**. Attention; regard; heedfulness.

ADVERTENT, *adj.* Attentive; vigilant; heedful.—This requires choice parts, great attention of mind, sequestration from the importunity of secular employments, and a long *advertent* and deliberate connexing of consequences. *Hale*.

To ADVERTISE, *v. a.* [*advertir*, Fr.] It is now spoken with the accent upon the last syllable; but appears to have been anciently accented on the second. To inform another; to give intelligence; with an accusative of the person informed. To inform; to give notice; with *of* before the subject of information. To give notice of any thing by means of an advertisement in the public prints; as, He *advertised* his loss.

ADVERTISEMENT, *f.* [*advertissement*, Fr.] Instruction; admonition. Intelligence; information. Notice of any thing published in a paper of intelligence.

ADVERTISER, *f.* [*advertiseur*, Fr.] He that gives intelligence or information. The paper in which advertisements are published.

ADVERTISING, *part. adj.* Active in giving intelligence; monitory: a word scarcely now in use.

To ADVESPERATE, *v. n.* [*advespero*, Lat.] To draw towards evening.

ADVICE, *f.* [*avis*, *avis*, Fr. from *adviseo*, low Lat.] Counsel; instruction: except that instruction implies superiority, and *advice* may be given by equals or inferiors; O troubled, weak, and coward, as thou art!
Without thy poor *advice*, the lab'ring heart
To worse extremes with swifter steps would run;
Not sav'd by virtue, yet by vice undone. *Prior*.

Reflection; prudent consideration: as, He always acts with good *advice*. Consultation; deliberation: with the particle *with*.—Great princes, taking *advice* with workmen, with no less cost, set their things together. *Bacon*.—Intelligence: as, The merchants received *advice* of their loss. This sense is somewhat low, and chiefly commercial.

ADVICE-BEAT, *f.* A vessel employed to bring intelligence.

ADVISABLE, *adj.* Prudent; fit to be advised.—Some judge it *advisable* for a man to account with his heart every day; and this, no doubt, is the best and surest course; for still the oftener, the better. *South*.

ADVISABLENESS, *f.* The quality of being advisable or fit; fitness; propriety.

To ADVISE, *v. a.* [*advise*, Fr.] To counsel: with the particle *to* before the thing advised.—I would *advise* all

gentlemen to learn merchants' accounts, and not to think it a skill that belongs not to them. *Locke*.—To give information; to inform; to make acquainted with any thing: often with the particle *of* before the thing told.

To ADVISE, *v. n.* To consult: with the particle *with* before the person consulted; as, He *advised* with his companions. To consider; to deliberate.

ADVISED, *part. adj.* Acting with deliberation and design; prudent; wise. Performed with deliberation; done on purpose; acted with design.

Th' Almighty Father, where he fits
Shrin'd in his sanctuary of heav'n secure,
Consulting on the sum of things foreseen,
This tumult, and permitted all, *advis'd*. *Milton*.

ADVISEDLY, *adv.* Soberly; heedfully; deliberately; purposely; by design; prudently.—This book, *advisedly* read and diligently followed but one year at home, would do more good than three years travel abroad. *Ascham*.

ADVISEDNESS, *f.* Deliberation; cool and prudent procedure.—While things are in agitation, private men may modestly tender their thoughts to the consideration of those that are in authority; to whose care it belongeth, in prescribing concerning indifferent things, to proceed with all just *advisedness* and moderation. *Saunderson*.

ADVISEMENT, *f.* [*advisement*, Fr.] Counsel; information. It is taken likewise, in old writers, for prudence and circumspection. It is now, in both senses, antiquated.

ADVISER, *f.* The person that advises, or gives counsel; a counsellor.

ADULA, anciently a mountain in Rætia, or the country of the Grisons, part of the Alps, in which are the fountains of the Rhine; now St. Godhards.

ADULATION, *f.* [*adulation*, Fr. *adulatio*, Lat.] Flattery; high compliment.

ADULATOR, *f.* [*adulator*, Lat.] A flatterer.

ADULATORY, *adj.* [*adulatorius*, Lat.] Flattering; full of compliments.

ADULE, or **ADULIS**, anciently a town of Egypt, built by fugitive slaves, distant from its port on the Red Sea twenty stadia. Pliny calls the inhabitants *Adulitae*.

ADULT, *adj.* [*adultus*, Lat.] Grown up; past the age of infancy and weakness.

ADULT, *f.* A person above the age of infancy, or grown to some degree of strength; sometimes full-grown: a word used chiefly by medicinal writers.—The depression of the cranium, without a fracture, can but seldom occur; and then it happens to children, whose bones are more pliable and soft than those of *adults*. *Sharp*.

ADULTNESS, *f.* The state of being adult.

To ADULTER, *v. a.* [*adulterer*, Fr. *adultero*, Lat.] To commit adultery with another: a word not classical.

ADULTERANT, *f.* [*adulterans*, Lat.] The person or thing which adulterates.

To ADULTERATE, *v. a.* [*adulterer*, Fr. *adultero*, Lat.] To commit adultery. To corrupt by some foreign admixture; to contaminate.—The present war has so *adulterated* our tongue with strange words, that it would be impossible for one of our great-grandfathers to know what his posterity have been doing. *Spektator*.

ADULTERATE, *adj.* Tainted with the guilt of adultery. Corrupted with some foreign mixture.

ADULTERATENESS, *f.* The quality or state of being adulterate, or counterfeit.

ADULTERATION, *f.* The act of adulterating or corrupting by foreign mixture; contamination. The state of being adulterated, or contaminated.

We have laws against the adulteration of coffee, tea, tobacco, snuff, wine, beer, bread, wax, hair-powder, &c.

ADULTERATION of COIN, properly imports the making or casting of a wrong metal, or with too base or too much alloy. Adulterations of coins are effected divers ways; as, by forging another stamp or inscription; by mixing impure metals with the gold or silver: most properly,

perly, by making use of a wrong metal, or an undue alloy, or too great an admixture of the baser metals with gold or silver.

To adulterate or debase the current coin, is a capital crime in all nations. The ancients punished it with great severity: among the Egyptians both hands were cut off; and, by the civil law, the offender was thrown to wild beasts. The emperor Tacitus enacted, that counterfeiting the coin should be capital; and under Constantine it was made treason, as it is also among us.

ADULTERER, f. [*adulter*, Lat.] The person guilty of adultery:

With what impatience must the muse behold
The wife by her procuring husband sold;
For, though the law makes null th' *adulterer's* deed
Of lands to her, the cuckold may succeed. *Dryden.*

ADULTERESS, f. A woman that commits adultery.—The Spartan lady replied, when she was asked, What was the punishment for *adulteresses*? There are no such things here.

An adulteress, by our law, undergoes no temporal punishment whatever, except the loss of her dower; and she does not lose even that, if her husband is weak enough to be reconciled to her, and cohabit with her after the offence committed. 13 Edw. I. cap. 34.

ADULTERINE, f. [*adulterine*, Fr. *adulterinus*, Lat.] A child born of an adulteress: a term of canon law.

ADULTEROUS, adj. [*adulter*, Lat.] Guilty of adultery.—An *adulterous* person is tied to restitution of the injury, so far as it is reparable; and to make provision for the children, that they may not injure the legitimate. *Taylor.*

ADULTERY, f. [*adulterium*, Lat.] The act of violating the bed of a married person. Punishments have been annexed to adultery in most ages and nations, though of different degrees of severity. In many it has been capital; in others venial, and attended only with slight pecuniary mulcts. Some of the penalties are ferocious, and even cruel; others of a jocose and humorous kind. Even contrary things have been enacted as punishments for adultery. By some laws, the criminals are forbid marrying together, in case they became single; by others, they are forbid to marry any besides each other; by some, they are incapacitated from ever committing the like crime again; by others, they are glutted with it till it becomes downright nauseous.

Among the rich Greeks, adulterers were allowed to redeem themselves by a pecuniary fine; the woman's father, in such cases, returned the dower he had received from her husband, which some think was refunded by the adulterer. Another punishment among those people was, putting out the eyes of adulterers.

The Athenians had an extraordinary way of punishing adulterers, practised at least on the poorer sort, who were not able to pay the fines. This was an awkward sort of empalement, performed by thrusting one of the largest radishes up the anus of the adulterer, or, in defect thereof, a fish with a large head, called *mugil*, "mullet." Alcæus is said to have died this way, though it is doubted whether the punishment was reputed mortal. Juvenal and Catullus speak of this custom as received also among the Romans, though not authorised by an express law, as it was among the Greeks.

There are various conjectures concerning the ancient punishment of adultery among the Romans. Some will have it to have been made capital by a law of Romulus, and again by the twelve tables. Others, that it was first made capital by Augustus; and others, not before the emperor Constantine. The truth is, the punishment in the early days was very various, much being left to the discretion of the husband and parents of the adulterous wife, who exercised it differently, rather with the silence and countenance of the magistrate than any formal authority from him. Thus we are told, the wife's father was allowed to

kill both parties, when caught in the fact, provided he did it immediately, killed both together, and as it were with one blow. The same power ordinarily was not indulged the husband, except the crime were committed with some mean or infamous person; though, in other cases, if his rage carried him to put them to death, he was not punished as a murderer. On many occasions, however, revenge was not carried so far; but mutilating, castrating, cutting off the ears, noses, &c. served the turn. The punishment allotted by the *lex Julia*, was not, as many have imagined, death; but rather banishment, or deportation, being interdicted fire and water: though Octavius appears, in several instances, to have gone beyond his own law, and to have put adulterers to death. Under Macrinus, many were burnt at a stake. Constantine first by law made the crime capital. Under Constantius and Constans, adulterers were burnt, or sewed in sacks and thrown into the sea. Under Leo and Marcian, the penalty was abated to perpetual banishment, or cutting off the nose. Under Justinian, a farther mitigation was granted, at least in favour of the wife, who was only to be scourged, lose her dower, and be shut up in a monastery; after two years, the husband was at liberty to take her back again; if he refused, she was shaven, and made a nun for life: but it still remained death in the husband. The reason alleged for this difference is, that the woman is the weaker vessel.

Under Theodosius, women convicted of this crime were punished after a very singular manner, viz. by a public constupration; being locked up in a narrow cell, and forced to admit to their embraces all the men that would offer themselves. To this end, the gallants were to dress themselves on purpose, having several little bells fastened to their clothes, the tinkling of which gave notice to those without of every motion. This custom was again abolished by the same prince.

By the Jewish law, adultery was punished by death in both parties, where they were both married, or only the woman. The Jews had a particular method of trying, or rather purging, an adulteress, or a woman suspected of the crime, by making her drink the bitter waters of jealousy; which, if she were guilty, made her swell.

Among the Mingrelians, according to Chardin, adultery is punished with the forfeiture of a hog, which is usually eaten in good friendship between the gallant, the adulteress, and the cuckold. In some parts of the Indies, it is said any man's wife is permitted to prostitute herself to him who will give an elephant for the use of her; and it is reputed no small glory to her to have been rated so high. Adultery is said to be so frequent at Ceylon, that not a woman but practises it, notwithstanding its being punishable with death. Among the Japanese, and divers other nations, adultery is only penal in the woman. Among the Abyssinians, the crime of the husband is said to be only punished on the innocent wife. In the Marian islands, on the contrary, the woman is not punishable for adultery; but if the man go astray he pays severely: the wife and her relations waste his lands, turn him out of his house, &c. Among the Chinese, adultery is not capital; for it is said that fond parents will make a contract for their daughters' future husbands to allow them the indulgence of a gallant.

In Spain, they punished adultery in men by cutting off that part which had been the instrument of the crime. In Poland, before Christianity was established, they punished adultery and fornication in a very particular manner: the criminal they carried to the market-place, and there fastened him by the testicles with a nail; laying a razor within his reach, and leaving him under a necessity, either of doing justice upon himself or of perishing in that condition.

The Saxons formerly burnt the adulterers, and over her ashes erected a gibbet, whereon the adulterer was hanged. In this kingdom, likewise, adultery, by the ancient laws, was severely punished. King Edmund the Saxon ordered adultery to be punished in the same manner as homicide; and Canute the Dane ordered that a man who

who committed adultery should be banished, and that the woman should have her nose and ears cut off. In the time of Henry I. it was punished with the loss of eyes and genitals.

In England adultery is a crime left by our laws to the coercion of the spiritual courts; yet, considered as a civil injury, the law gives a satisfaction to the husband for it by action of *trespas vi et armis* against the adulterer, where-in the damages recovered are usually very large and exemplary. 3 *Blackst.* 139.

As to the moral turpitude of this offence, some have vainly endeavoured to deny or explain it away by various arguments, and even by an appeal to scripture. On the part of the *man* who solicits the chastity of a married woman, it certainly includes the crime of SEDUCTION, and is attended with mischief still more complicated and extensive: it creates a new sufferer, the injured husband, upon whose simplicity and affection is inflicted a wound the most painful and incurable, that human nature knows. The infidelity of the *woman* is aggravated by cruelty to her children, who are generally involved in their parents' shame, and always made unhappy by their quarrel.

It has been argued, that these consequences ought less to be attributed to the crime than to the discovery. But in the first place, the crime could not be discovered unless it were committed, and the commission is never secure from discovery. 2dly, If adulterous connections were allowable whenever the parties could hope to escape detection, which is the conclusion to which this argument leads, the husband would be left no other security for his wife's chastity than in her want of opportunity or temptation: which would probably deter most men from marrying; or render marriage a state of continual jealousy and alarm to the husband, which would end in the slavery and confinement of the wife.

The marriage-vow is "witnessed before God," and accompanied with circumstances of solemnity and religion which approach to the nature of an oath. The married offender, therefore, incurs a crime little short of perjury, and the seduction of a married woman is little less than subornation of perjury:—and this guilt is independent of the discovery.

But the usual apology for adultery is the prior transgression of the other party; and so far, indeed, as the bad effects of adultery are anticipated by the conduct of the husband or wife who offends first, the guilt of the second offender is extenuated. But this can never amount to a justification; unless it could be shewn that the obligation of the marriage-vow depends upon the condition of reciprocal fidelity; a construction which appears founded neither in expediency, nor in the terms of the vow, nor in the design of the legislature which prescribed the marriage-rite.

It has been controverted, whether adultery may be lawfully committed in war, with the enemies' wives? The answer is in the negative, and the authorized practice of civilized nations is agreeable to this. It has also been a famous question, whether it be lawful for a woman to commit adultery with the consent of her husband, and for the procuring some great good to him? St. Austin apparently allows of it; at least, does not condemn it.

It has likewise been a dispute, whether it be lawful for one of the parties married to commit adultery, with the consent of the other, for the sake of having children? Of which we have instances in Abraham, who, on this account, conversed with Hagar; and likewise among the Greeks and Romans. Pollman, a German professor, has a dissertation on the husband's right to alienate his wife's body to another's use.

It is much disputed, whether adultery dissolves the bond of matrimony, and be a sufficient cause of divorce, so that the parties may marry again. This was allowed in the ancient church, and is still continued in the Greek as well as the Lutheran and Calvinist churches. Romanists, however, disallow of it, and the council of Trent even ana-

thematized those who maintained it; though the canon of anathematization was mitigated in deference to the republic of Venice, in some of whose dominions, as Zant, Céphalonie, &c. the contrary usage obtains. The ecclesiastical courts in England so far agree with the Papists, that they only grant a divorce *à mensa et thoro*, in case of adultery; so that a complete divorce, to enable the parties to marry again, cannot be had without an act of parliament.

ADULTERY is also used in ancient customs, for the punishment or fine imposed for that offence, or the privilege of prosecuting for it. In which sense, *adulterium* amounts to the same with what the Saxons call *legerwita*.

ADULTERY is sometimes used, in a more extensive sense, for any species of impurity or crime against the virtue of chastity; and in this sense divines understand the seventh commandment.

ADULTERY is also used, especially in scripture, for idolatry, or departing from the true God to the worship of a false one.

ADULTERY is also used, in ecclesiastical writers, for a person's invading or intruding into a bishopric during the former bishop's life. The reason of the appellation is, that a bishop is supposed to contract a kind of spiritual marriage with his church.

ADULTERY is also used in ancient naturalists, for the act of ingrafting one plant upon another. In which sense Pliny speaks of the adulteries of trees, *arborum adulteria*, which he represents as contrary to nature, and a piece of luxury, or needless refinement.

ADUMBRANT, *adj.* That which gives a slight resemblance.

To ADUMBRATE, *v. a.* [*adumbro*, Lat.] To shadow out; to give a slight likeness; to exhibit a faint resemblance, like that which shadows afford of the bodies which they represent.—Heaven is designed for our reward, as well as rescue; and therefore is *adumbrated* by all those positive excellencies which can endear or recommend.

ADUMBRATION, *f.* The act of adumbrating, or giving a slight and imperfect representation. The slight and imperfect representation of a thing; a faint sketch.

ADUNATION, *f.* [from *ad* and *unus*, Lat.] The state of being united; union: a word of little use.

ADUNCITY, *f.* [*aduncitas*, Lat.] Crookedness; flexure inwards; hookedness.—There can be no question, but the *aduncity* of the pounces and beaks of the hawks, is the cause of the great and habitual immorality of those animals. *Arbutnot.*

ADUNQUE, *adj.* [*aduncus*, Lat.] Crooked; bending inwards; hooked.—The birds that are speakers, are parrots, pies, jays, daws, and ravens; of which parrots have an *adunque* bill, but the rest not. *Bacon.*

ADVOCACY, *f.* The act of pleading; vindication; defence; apology; a word in little use.—If any there are who are of opinion that there are no antipodes, or that the stars do fall, they shall not want herein the applause or advocacy of Satan. *Brown.*

ADVOCATE, *f.* [*advocatus*, Lat.] He that pleads the cause of another in a court of judicature. He that pleads any cause, in whatever manner, as a controvertist or vindicator. It is used with the participle *for* before the person or thing, in whose favour the plea is offered. The ecclesiastical or church advocate was originally of two sorts: either an advocate of the causes and interest of the church, retained as a counsellor and pleader of its rights; or an advocate or patron of the presentation or advowson. Both these offices at first belonged to the founders of churches and convents, and their heirs, who were bound to protect and defend their churches, as well as to nominate and present to them. The Romans, in the first ages of their state, held the profession of an advocate in great honour; and the seats of their bar were crowded with senators and consuls; they, whose voices commanded the people, thinking it an honour to be employed in defending them. They were styled *comites*, *honorati*, *clarissimi*, and even *patroni*;

as if their clients were not left obliged to them than freed men to their masters. The bar was not at that time venal. Those who aspired to honours and offices took this way of gaining an interest in the people, and always pleaded *gratis*. But no sooner were luxury and corruption introduced into the commonwealth, than the bar became a sharer in them. Then it was that the senators let out their voices for pay, and zeal and eloquence were sold to the highest bidder. To put a stop to this abuse, the tribune Cincius procured a law to be passed, called from him *Lex Cincia*, whereby the advocates were forbidden to take any money of their clients. It had before this been prohibited the advocates to take any presents or gratuities for their pleading. The emperor Augustus added a penalty to it: notwithstanding which, the advocates played their part so well, that the emperor Claudius thought it an extraordinary circumstance, when he obliged them not to take above eight great sesterces, which are equivalent to about 64*l.* sterling, for pleading each cause.

ADVOCATE of a CITY, in the German polity, a magistrate appointed in the emperor's name to administer justice.

Consistorial ADVOCATES; officers of the consistory at Rome, who plead in all oppositions to the disposal of benefices in that court: they are ten in number.

Elective ADVOCATES, those chosen by the abbot, bishop, or chapter; a particular licence being had from the king or prince for that purpose. The elections were originally made in the presence of the count of the province.

Feudal ADVOCATES. These were of the military kind, who, to make them more zealous for the interest of the church, had lands granted them in fee, which they held of the church, and did homage, and took an oath of fidelity to the bishop or abbot. These were to lead the vassals of the church to war, not only in private quarrels of the church itself, but in military expeditions for the king's service, in which they were the standard-bearers of their churches.

Fiscal ADVOCATE, [*fisci advocatus*,] in Roman antiquity, an officer of state under the Roman emperors, who pleaded in all causes wherein the *fiscus*, or private treasury, was concerned.

Juridical ADVOCATES, in the middle age, were those who from attending causes in the court of the comes, or count of the province, became judges themselves, and held courts of their vassals thrice a-year, under the name of the *tria placita generalia*. In consideration of this further service, they had a particular allowance of one third part of all fines, or mulcts, imposed on defaulters, &c. besides a proportion of diet for themselves and servants.

Matricular ADVOCATES, were the advocates of the mother or cathedral churches.

Military ADVOCATES, those appointed for the defence of the church, rather by arms and authority than by pleading and eloquence. These were introduced in the times of confusion, when every person was obliged to maintain their own property by force; bishops and abbots not being permitted to bear arms, and the scholastic or gown'd advocates being equally unacquainted with them, recourse was had to knights, noblemen, soldiers, or even to princes.

Nominative ADVOCATES, those appointed by a king or pope. Sometimes the churches petitioned kings, &c. to appoint them an advocate; at other times this was done of their own accord. By some regulations, no person was capable of being elected advocate, unless he had an estate in land in the same county.

Regular ADVOCATES, those duly formed and qualified for their profession, by a proper course of study, the requisite oath, subscription, licence, &c.

Subordinate ADVOCATES, those appointed by other superior ones, acting under them, and accountable to them. There were various reasons for the creation of these subordinate advocates; as, the superior quality of the principal advocate, his being detained in war, or being involv-

ed in other affairs; but chiefly the too great distance of some of the church-lands, and their lying in the dominions of foreign princes.

Supreme or Sovereign ADVOCATES, were those who had the authority in chief; but acted by deputies or subordinate advocates. These were called also *principal*, *greater*, and sometimes *general*, advocates. Such in many cases were kings, &c. when either they had been chosen advocates, or became such by being founders or endowers of churches. Princes had also another title to advocateship, some of them pretending to be *advocati nati* of the churches within their dominions.

ADVOCATES, in the English courts, are more generally called *counsel*. See **COUNSEL**.

Faculty of ADVOCATES, in Scotland, a respectable body of lawyers, who plead in all causes before the Courts of Session, Justiciary, and Exchequer. They are also intitled to plead in the house of peers, and other supreme courts in England.

Lord ADVOCATE, or **KING'S ADVOCATE**, one of the eight great officers of state in Scotland, who as such sat in parliament without election. He is the principal crown-lawyer in Scotland. His business is to act as a public prosecutor, and to plead in all causes that concern the crown.

ADVOCATION, *f.* The office or act of pleading; plea; apology.

ADVOLUTION, *f.* [*advolo*, *advolutum*, Lat.] The act of flying to something.

ADVOLUTION, *f.* [*advolutio*, Lat.] The act of rolling to something.

ADVOUTRY, *f.* [*avoutrie*, Fr.] Adultery.—He was the most perfidious man upon the earth, and he had made a marriage compounded between an *advoutry* and a rape. *Bacon*.

To ADVOW, *v. a.* [*advocare*, Lat.] In law, to justify or maintain an act formerly done. As if one takes a distress for rent, and he that is distressed sues a replevin; in this case, the distrainer, justifying or maintaining the act, is said to *advow* or *avow*; and hence come *advowant*, and *advowry*. This word is also used to signify to bring forth any thing: anciently, when goods stolen were bought by one, and sold to another, it was lawful for the right owner to take them wherever they were found; and he, in whose possession they were found, was bound *advocare*; that is, to call in or produce the seller to justify the sale, and so on till they found the thief.

ADVOWEE, *f.* in ancient customs and law-books, denotes the advocate of a church, religious house, or the like. There were advowees of cathedrals, abbeys, monasteries, &c. Thus, Charlemagne had the title of advowee of St. Peter's; king Hugh, of St. Riquier; and Bolandus mentions some letters of pope Nicholas, by which he constituted king Edward the Confessor, and his successors, advowees of the monastery at Westminster, and of all the churches in England. These advowees were the guardians, protectors, and administrators, of the temporal concerns of the churches, &c. and under their authority were passed all contracts which related to them. It appears also, from the most ancient charters, that the donations made to churches were conferred on the persons of the advowees. They always pleaded the causes of the churches in court, and distributed justice for them, in the places under their jurisdiction. They also commanded the forces furnished by their monasteries, &c. for the war; and even were their champions, and sometimes maintained duels for them.

Spelman distinguishes two kinds of ecclesiastical advowees. The one, of causes or processes, *advocati causarum*; the other, of territory or lands, *advocati soli*. The former were nominated by the king, and were usually lawyers, who undertook to plead the causes of the monasteries. The others, which still subsist, and are sometimes called by their primitive name, *advowees*, though more usually *patrons*, were hereditary; as being the founders and endowers of churches, &c. or their heirs. Women were

were sometimes advowees, *advocatifæ*. And, in effect, the canon law mentions some who had this title, and who had the same right of presentation, &c. in their churches, which the advowees themselves had. In a stat. 25 Edw. III. we meet with *advowee paramount* for the highest patron; that is, the king.

ADVOWSON, *f.* in law, is the right of presentation to a church or ecclesiastical benefice. It signifies being advocate of the church, or taking it into protection; and therefore is synonymous with *patronage*: and he who has the right of advowson is called the patron of the church. For when lords of manors first built churches on their own demesnes, and endowed them with glebe or other possessions, every such lord had of common right a power annexed of nominating a minister to officiate in that church of which he was the founder, endower, maintainer, or, in one word, the patron. 2 *Blackst.* 21.

Advowsons are either *appendant*, or *in grofs*. Lords of manors being originally the only founders, and of course the only patrons, of churches, the right of patronage or presentation, so long as it continues annexed to the possession of the manor, as some have done from the foundation of the church to this day, is called an advowson *appendant*; and it will pass or be conveyed, together with the manor, as incident and appendant thereto, by a grant of the manor only, without adding any other words. But where the property of the advowson hath been once separated from the property of the manor, by legal conveyance, it is called an advowson *in grofs*, or at large, and never can be appendant any more; but is for the future annexed to the person of its owner, and not to his manor or lands.

Advowsons are also either *presentative*, *collative*, or *donative*. An advowson *presentative* is, where the patron hath a right of presentation to the bishop or ordinary, and moreover to demand of him to institute his clerk, if he finds him canonically qualified. An advowson *collative* is, where the bishop and patron are one and the same person: in which case the bishop cannot present to himself; but he doth, by the one act of collation or conferring the benefice, the whole that is done in common cases by both presentation and institution. An advowson *donative* is, when the king, or any subject by his licence, doth found a church or chapel, and ordains that it shall be merely in the gift or disposal of the patron, subject to his visitation only, and not to that of the ordinary; and vested absolutely in the clerk by the patron's deed of donation, without presentation, institution, or induction. *Id.* An advowson *in fee* is, aslets by descent, to satisfy bond creditors. 3 *Ath.* 465.

TO ADURE, *v. n.* [*aduro*, Lat.] To burn up: not in use.—Such a degree of heat, which doth neither melt nor scorch, doth mellow, and not *adure*. *Bacon*.

ADUST, *adj.* [*adustus*, Lat.] Burnt up; hot as with fire; scorched. It is generally now applied, in a medicinal or philosophical sense, to the complexion and humours of the body. Such is choler supposed to be. Melancholy is usually considered as black and adust bile. Blood is said to be adust, when, by reason of some extraordinary heat, its more subtle parts are all evaporated, leaving the grosser, with all the impurities therein, half torrifried.

ADUSTED, *adj.* Burnt; scorched; dried with fire. Hot, as the complexion.

ADUSTIBLE, *adj.* That which may be adusted, or burnt up.

ADUSTION, *f.* The act of burning up, or drying, as by fire.—This is ordinarily a consequent of a burning colliquative fever; the softer parts being melted away, the heat continuing its *adustion*, upon the drier and fleshy parts, changes into a marcid fever. *Harvey*.

ADY, *f.* in botany. See **PALMA ADY**.

ADYNAMIA, *f.* [from *α*, priv. and *δυναμις*, strength, force.] Lagour, weakness, impotence, from sickness or disease: *adunatos*, *leipopsychia*. Also drowsiness or sleepiness, lassitude, defect of vital powers. In Dr. Cullen's Nosology, this word distinguishes an order in his class neu-

roses: he defines it to be diseases consisting in a weakness or loss of motion, in either the vital or natural functions. These diseases are also called *defectivi*.

ADYNAMON, *f.* among ancient physicians, a kind of weak factitious wine, prepared from *musc* boiled down with water; to be given to patients to whom genuine wine might be hurtful.

ADYTUM, *f.* in pagan antiquity, the most retired and sacred place of their temples, into which none but the priests were allowed to enter. The Sanctum Sanctorum of the temple of Solomon was of the nature of the pagan adytum, none but the high-priest being admitted into it, and he but once a-year.

ADZ, *f.* See **ADDICE**.

Æ, or **Æ**, a diphthong of very frequent use in the Latin language, which seems not properly to have any place in the English; since the *æ* of the Saxons has been long out of use, being changed to *e* simple, to which, in words frequently occurring, the *æ* of the Romans is, in the same manner, altered, as in *æquator*, *æquinoctial*, and even in *Æneas*.

ÆACEA, *f.* in Grecian antiquity, solemn festivals and games celebrated at Ægina, in honour of Æacus.

ÆACUS, the son of Jupiter by Ægina. When the Isle of Ægina was depopulated by a plague, his father, in compassion to his grief, changed all the ants upon it into men and women, who were called Myrmidons, from *μυρμις*, ant. The foundation of the fable is said to be, that when the country had been depopulated by pirates, who forced the few that remained to take shelter in caves, Æacus encouraged them to come out, and, by commerce and industry, recover what they had lost. His character for justice was such, that, in a time of universal drought, he was nominated by the Delphic oracle to intercede for Greece, and his prayer was answered. See the article **ÆGINA**.

ÆBURA, an ancient town of Spain, in Estremadura, on the river Guadiana, to the west of Merida, now called Talavera. Lat. 38. 40. lon. 7. 15. W.

ÆCHMALOTARCHA, *f.* in Jewish antiquity, a title given to the principal leader or governor of the Hebrew captives residing in Chaldea, Assyria, and the neighbouring countries. This magistrate was called by the Jews *rosh-galath*, i. e. the chief of the captivity: but the above term, of like import in the Greek, is that used by Origen and others who wrote in the Greek tongue.

ÆCULANUM, anciently a town of the Hirpini, in Italy, at the foot of the Appenin, to the east of Abellinum, situate between Beneventum and Tarentum. Now called Fricento, forty-three miles east of Naples. Lat. 41. 15. lon. 15. 38. E.

ÆDES, *f.* in Roman antiquity, besides its more ordinary signification of a house, likewise signified an inferior kind of temple, consecrated to some deity.

ÆDÍCULA, *f.* a term used to denote the inner part of the temple, where the altar and statue of the deity stood.

ÆDILATE, *f.* the office of *ædile*, sometimes called *ædilitas*. See the next article.

ÆDILE, *f.* [*adilis*, Lat.] In Roman antiquity, a magistrate whose chief business was to superintend buildings of all kinds, but more especially public ones, as temples, aqueducts, bridges, &c. To the *ædiles* likewise belonged the care of the highways, public places, weights and measures, &c. They also fixed the prices of provisions, took cognizance of debauches, punished lewd women, and such persons as frequented gaming houses. The custody of the plebiscita, or orders of the people, was likewise committed to them. They had the inspection of comedies and other pieces of wit; and were obliged to exhibit magnificent games to the people, at their own expence, whereby many of them were ruined. To them also belonged the custody of the plebiscita, and the censure and examination of books. They had the power, on certain occasions, of issuing edicts; and, by degrees, they procured to themselves a considerable jurisdiction, the cognizance of

various causes, &c. This office ruined numbers by its expensiveness; so that, in Augustus's time, even many senators declined it on that account.

We also read of an *ædiles alimentarius*, expressed in abbreviation by *Ædil. alim.* whose business seems to have been to provide diet for those who were maintained at the public charge, though others assign him a different office. In an ancient inscription we also meet with *ædile of the camp*, *ædilis castrorum*.

ÆDILITIUM EDICTUM, *f.* among the Romans, was that whereby a remedy was given a buyer, in case a vicious or unsound beast, or slave, was sold him. It was called *ædilitium*, because the preventing of frauds in sales and contracts belonged especially to the *ædiles*.

ÆDITUUS, *f.* in Roman antiquity, an officer belonging to the temple, who had the charge of the offerings, treasure, and sacred utensils. The female deities had a woman officer of this kind called *Æditua*.

ÆDOSOPHIA, *f.* [from *αἰδώς*, *puddenza*, and *δοσῶν*, *streptum edo*.] In the Nosology of Sauvages, also of Sagar, it is defined to be a flatus passing from the uterus, or from the urinary bladder, through the vagina or the urethra; hence it is formed into two species, *ædosophia urethræ & uterina*. This flatus is sometimes very fetid, which circumstance cannot always be accounted for. It sometimes happens when women are in labour, and hath been taken for a sign that the child is dead, but this cannot be depended on; an intolerable stench sometimes attends when the child is living.

ÆGAGROPILA, *f.* a ball composed of a substance resembling hair, generated in the stomach of the chamois-goat. This ball is of the same nature with those found in cows, hogs, &c.

ÆGÆ, or *ÆGÆA*, the ancient name of *Ædessa*, so called from the following adventure:—Caranus, the first king of Macedonia, being ordered by the oracle to seek out a settlement in Macedonia, under the conduct of a flock of goats, surprised the town of *Ædessa*, during a thick fog and rainy weather, in following the goats that fled from the rain; which goats ever after, in all his military expeditions, he caused to precede his standard; and in memory of this he called *Ædessa Ægæa*, and his people *Ægæadae*. And hence, probably, in the prophet Daniel, the he-goat is the symbol of the king of Macedonia.

ÆGEAN SEA, now the Archipelago, a part of the Mediterranean, separating Europe from Asia and Africa; washing, on the one hand, Greece and Macedonia; on the other, Caria and Ionia.

ÆGEIRINON, *f.* [αἰγύρεον, *Gr.* a poplar.] An ointment so called, because the fruit of the poplar, or its catkins, are an ingredient in it.

ÆGEUS, in fabulous history, was king of Athens, and the father of Theseus. The Athenians having basely killed the son of Minos king of Crete, for carrying away the prize from them, Minos made war upon the Athenians; and, being victorious, imposed this severe condition on *Ægeus*, that he should annually send into Crete seven of the noblest of the Athenian youths, chosen by lot, to be devoured by the Minotaur. On the fourth year of this tribute, the choice fell on Theseus; or, as others say, he himself intreated to be sent. The king, at his son's departure, gave orders, that, as the ship sailed with black sails, it should return with the same in case he perished; but, if he became victorious, he should change them into white. When Theseus returned to Crete, after killing the Minotaur, he forgot to change the sails in token of his victory, according to the agreement with his father; the latter, who watched the return of the vessel, supposing by the black sails that his son was dead, cast himself headlong into the sea, which thence obtained the name of the *Ægean Sea*.

ÆGIAS, *f.* among physicians, a white speck on the pupil of the eye, which occasions a dimness of sight.

ÆGICERAS, *f.* [from *αἰξ*, a goat, and *κερας*, a horn.]

In botany, a genus of the pentandria monogynia class. The generic characters are—Calyx: perianthium one-leaved, bell-shaped, half-five-cleft, coriaceous, permanent. Corolla: petals five. Stamina: filaments five. Pistillum: germ oblong; style single. Pericarpium: capsule bowed, coriaceous, one-celled, one-valved, gaping on the convex side. Seed: single.—*Essential Character*. Calyx bell-shaped, half-five-cleft. Capsule bow-shaped, one-celled, gaping on the convex side. Seed inverted.

Species. 1. *Ægiceras majus*: leaves ovate quite entire; legumes long sickle-shaped. This species is a shrub about twelve feet in height at the most, with several stems a foot in thickness, putting out many twigs and suckers. It is a native of the Molucca Islands.

2. *Ægiceras minus*: leaves ovate sometimes notched; legumes short crescent-shaped. This is a native of Ceylon.

ÆGIDA, now Capo d'Istria, the principal town on the north of the territory of Istria, situated on a little island, joined to the land by a bridge. Lat. 45. 50. lon. 14. 20. E. It was afterwards called Justinopolis, after the emperor Justinus.

ÆGIDES, *f.* [αἰγίς, *Gr.*] Small white cicatrices of the eyes, caused by a sharp humour there; or small white concretions on the pupil; called also *aglia*. In inflammations we see little white specks on the pupil of the eye, like a film, if an afflux of humours is considerable; these always disappear spontaneously when the inflammation is resolved and the humours diverted; but if sharp powders are used, or collyriums applied, they oft are hardened so as never after to be moved.

ÆGILOPS, or *ÆGYLOPS*, *f.* [from *αἶξ*, a goat, and *ὄψ*, an eye, or goat's eye.] A disease in the inward corner of the eye; so called because, according to some, goats are subject to this disease. Paulus *Ægineta* calls it *anchylops* before it bursts, and *ægylops* after. Avicenna calls it *garab* and *algarab*. *Anchylops* and *ægylops*, are but different states of the disorder called *fistula lachrymalis*. The *ægylops* is the fistula lachrymalis beginning to discharge pus. Dr. Wallis says, why the distinction of the ancients should be at present neglected with respect to the *anchylops* and *ægylops*, and a general term adopted which is in itself highly absurd, will not be easy to account for. Surely to denominate a complaint fistulous, where no fistula exists, must be ridiculous, and the two different species as well as the third are styled *fistula lachrymalis* by the moderns. Some of the ancient physicians considered the lachrymal sac in its state of tumefaction as an *anchylops*; when ruptured an *ægylops*; and certainly the distinction ought to be preserved.

It is either scrophulous, atheromatous, or of the nature of a meliceris. Sometimes it is a symptom of the lues veneria. Sometimes it is with, and at others without, inflammation. If it is attended with erosion, it terminates in a cancer. In opening this abscess, we should be careful not to cut the edge of the eye-lid, for thus an incurable wateriness will there be occasioned. When it is strumous, it proceeds from congestion, and the tubercle is round without discolouring the skin. If it is caused by fluxion, pain and redness appear, with inflammation all over the eye. Sometimes it begins with a weeping, and is not suspected until a redness appears in the eye, and then, by a gentle pressure on the part, a matter is discharged, a part of which resembles the white of an egg. If this matter makes its way into the nose, it acquires a foetid smell, and is discharged through the nostril.

As to the cure, if the case is recent, we should begin with a cautious use of bleeding and purging; or, if these are contra-indicated, give such alteratives as are most esteemed in scrophulous disorders. The tumour may be resolved by anodyne and discutient applications; but if there is a tendency to a suppuration it should be hastened, and the discharge of the pus, with all convenient speed, lest the bone underneath should be affected; the abscess cleaned

ÆCIDIDIUM, AND AGARICUS.

J. Pass sculp.

Fig. 1 to 4, *Æcidium abietinum*, *elatinum*, *columnare*, and *violæ*: the small Letters shew the same magnified. Fig. 5 to 9, *Agaricus scabellus*, *vitellum*, *tricolor*, *porphyria*, and *lepidomyces*.

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cleansed and healed, with the tinct. of myrrh and aloes mixed with mel rosæ. If the matter had passed also under the cilium, a powerful desiccative, such as strong lime-water, assisted by a compress, should be used.

If the periosteum under the tumour is laid bare, an exfoliation must be hastened by a caustic, and a passage opened into the nose, after which dry lint alone may suffice.

ÆGILOPS, *f.* [αἴγος ὤψ, goat's-face: from its roughness.] In botany, a genus of the polygamia monoecia class, in the natural order of gramina or grasses. The generic characters are—Calyx: a large bivalvular glume, sustaining three flowers; valves ovate, truncate, streaked, with various awns. Corolla: a bivalvular glume, the outer valve ovate, terminated by a double or triple awn; the inner lanceolate, erect, awnless, with the edge bent in longitudinally; nectary two-leaved, leaflets ovate, flat, transparent, very small. Stamina: filaments three, capillary, with oblong antheræ. Pistillum: germ turbinate; styles two, reflex, with hairy stigmas. Seeds: oblong, convex on one side, grooved on the other, with the inner valve of the corolla adhering to it, and not opening.—*Essential Character.* Calyx, a glume; subtriflorous, cartilaginous. Corolla, a glume, terminating in a threefold awn. Stamina, three. Styles, two. Seed, one.

Species. 1. *Ægilops ovata*: spike awned, all the calyxes with three awns. Scopoli makes no account of the sex in this grass, for the flowers are some hermaphrodite, others male, others without either stamens or germ: from the structure of the flower therefore he makes it a *phleum*. According to Gärtner there are sometimes two male flowers, differing in nothing from the others but in being only one-third of their size; no calyx; the larger valve of the corolla awned, the smaller not; both calyx and corolla permanent, covering the seed, and at length letting it drop.

2. *Ægilops caudata*: spike awned, all the calyxes with two awns.

3. *Ægilops triuncialis*: spike awned, the lower calyxes with two awns.

4. *Ægilops squarrosa*: spike awl-shaped, longer than the awns.

The first of these grasses is wild in the southern countries of Europe, and was cultivated in 1683 by Mr. Jas. Sutherland. The second was found by M. Tournefort in Crete. The third grows about Montpellier, Marseilles, Nice, and Smyrna. The last was found by Tournefort in the Levant, and by Cavanilles in Spain. They all seem to be annual.

ÆGILOPS, *f.* in botany. See *AVENA*, *ANDROPOGON*, *BROMUS*, *QUERCUS*.

ÆGIMURUS, an island on the bay of Carthage, about thirty miles distance from that city; now called Galetta. This island being afterwards sunk in the sea, two of its rocks remained above water, which were called *Aræ*, and mentioned by Virgil, because the Romans and Carthaginians entered into an agreement or league to settle their mutual boundaries at these rocks.

ÆGINA, in fabulous history, the daughter of *Æso-phus*, king of *Bæotia*, was beloved by Jupiter, who debauched her in the similitude of a lambent flame, and then carried her from *Epidaurus* to a desert island called *Oenope*, which afterwards obtained her own name.

ÆGINA, an island on the Saronic Bay, or Bay of *Engia*, twenty miles distant from the *Piræus*, formerly vying with *Athens* for naval power, and at the sea-fight of *Salamis* disputing the palm of victory with the *Athenians*. It was the country and kingdom of *Æacus*, who called it *Ægina* from his mother's name, it being before called *Oenopia*. The inhabitants were called *Æginetæ* and *Æginenses*. The Greeks had a common temple dedicated to Jupiter in *Ægina*. The *Æginetæ* applied to commerce; and were the first who coined money, called *νομισμα Ἀγιναιον*: hence *Ægineticum æs*, formerly in great repute. The inhabitants were called *Myrmidones*, or a nation of ants, from their great application to agriculture.

This island was surrounded by *Attica*, the territory of *Megara*, and the *Peloponnesus*, each distant about one hundred stadia, or twelve miles and a half. In circumference it was reckoned one hundred and eighty stadia, or twenty-two miles and a half. It was washed on the east and south by the *Myrtoan* and *Cretan* seas.

It is now called *Egina*, or *Egina*, the *g* soft and the *i* short. The temple above-mentioned is situated upon the summit of a mountain called *Panhellenius*, about an hour distant from the shore. The *Æginetans* affirmed it was erected by *Æacus*; in whose time *Hellas* being terribly oppressed by drought, the *Delphic* oracle was consulted; and the response was, "That Jupiter must be rendered propitious by *Æacus*." The cities intreated him to be their mediator: he sacrificed and prayed to Jupiter *Panhellenius*, and procured rain.

The temple was of the *Doric* order, and had six columns in front. Twenty-one of the exterior columns are yet standing, with two in the front of the *pronaos* and of the *posticum*, and five of the number which formed the ranges of the cell. The entablature, except the architrave, is fallen. The stone is of a light brownish colour, much eaten in many places, and indicating a very great age. Some of the columns have been injured by boring to their centres for the metal. In several, the junction of the parts is so exact, that each seems to consist of one piece. This ruin Mr. Chandler considers as scarcely to be paralleled in its claim to a remote antiquity. The situation on a lonely mountain, at a distance from the sea, has preserved it from total demolition, amid all the changes and accidents of numerous centuries.

The soil of this island is, as described by *Strabo*, very stony, especially the bottoms, but in some places not unfertile in grain. Besides corn, it produces olives, grapes, and almonds; and abounds in pigeons and partridges. It has been related, that the *Æginetans* annually wage war with the feathered race, carefully collecting or breaking their eggs, to prevent their multiplying, and in consequence a yearly famine. They have no hares, foxes, or wolves. The rivers in summer are all dry. The *vaiwode* or governor farms the revenue of the *Grand Signior* for twelve purshes, or 6000 piastres. About half this sum is repaid yearly by the caratch-money, or poll-tax.

ÆGINA, the capital of the above island. Its site has been long forsaken. Instead of the temples mentioned by *Pausanias*, there are thirteen lonely churches, all very mean; and two *Doric* columns supporting their architrave. These stand by the sea-side toward the low cape; and, it has been supposed, are a remnant of a temple of *Venus*, which was situated by the port principally frequented. The theatre, which is recorded as worth seeing, resembled that of the *Epidaurians* both in size and workmanship. It was not far from the private port; the stadium, which, like that at *Priene*, was constructed with only one side, being joined to it behind, and each structure mutually sustaining and propping the other. The walls belonging to the ports and arsenal were of excellent masonry, and may be traced to a considerable extent; above, or nearly even with, the water. At the entrance of the mole, on the left, is a small chapel of *St. Nicholas*; and opposite, a square tower with steps before it, detached, from which a bridge was laid across, to be removed on any alarm. This structure, which is mean, was erected by the *Venetians*, while at war with the *Turks* in 1693.

ÆGINETA (*Paulus*), a celebrated surgeon of the island of *Ægina*, from whence he derived his name. According to *M. Le Clerc's* calculation, he lived in the fourth century; but *Abulpharagius* the Arabian, who is allowed to give the best account of those times, places him with more probability in the seventh. His knowledge in surgery was very great, and his works are deservedly famous. *Fabricius ab Aquapendente* has thought fit to transcribe him in a great variety of places. Indeed the doctrine of *Paulus Ægineta*, together with that of *Celsus* and *Albucasis*, make up the whole text of this author. He is the first

first writer who takes notice of the cathartic quality of rhubarb; and, according to Dr. Milward, is the first in all antiquity who deserves the title of a man-midwife.

ÆGINETIA, *f.* in botany. See **OROBANCHE**.

ÆGINHARD, the celebrated secretary and supposed son-in-law of Charlemagne. He is said to have been carried through the snow on the shoulders of the affectionate and ingenious Imma, to prevent his being tracked from her apartments by the emperor her father: a story which the elegant pen of Addison has copied and embellished from an old German Chronicle, and inserted in the 3d volume of the *Spectator*. This happy lover (supposing the story to be true) seems to have possessed a heart not unworthy of so enchanting a mistress, and to have returned her affection with the most faithful attachment; for there is a letter of Æginhard's still extant, lamenting the death of his wife; which is written in the tenderest strain of conjugal affection. He was a native of Germany, and educated by the munificence of his imperial master, of which he has left the most grateful testimony in his preface to the life of that monarch. Æginhard, after the loss of his lamented wife, is supposed to have passed the remainder of his days in religious retirement, and to have died soon after the year 840. His life of Charlemagne, his annals from 741 to 889, and his letters, are all inserted in the 2d volume of Duchesne's *Scriptores Francorum*. But there is an improved edition of this valuable historian, with the annotations of Hermann Schmincke, in 4to, 1711.

ÆGIPAN, in heathen mythology, a denomination given to the god Pan, because he was represented with the horns, legs, feet, &c. of a goat.

ÆGIPHILA, *f.* [*αἴξ* and *φύλον*, from goats being fond of it.] In botany, a genus of the tetrandria monogynia class, ranking in the natural order of viticeæ. The generic characters are—Calyx: perianth one-leaved, bell-shaped, four-toothed, loose, very short, permanent. Corolla: one-petalled, salver-shaped; tube cylindric; narrower and longer than the calyx, border quadrifid, flat, equal; clefts oblong. Stamina: filaments capillary, inserted into the mouth of the tube, erect. Antheræ roundish. Pistillum: germ roundish, superior. Style capillary, deeply bifid. Stigmas simple. Pericarpium: a roundish two-celled berry, surrounded with the permanent calyx. Seeds: either in pairs or solitary.—*Essential Character.* Calyx, four-toothed; corolla, quadrifid; style, semibifid; berry four-seeded.

Species. 1. *Ægiphila martinicensis*: leaves ovate-lanceolate acuminate smooth, branches diffused, panicles terminating or axillary, calyxes smooth. This is a shrub six feet high; simple, opposite, petioled, lanceolate-ovate, acuminate, very smooth, quite entire. Panicles terminal and axillary, leafy, compound, stiff. Flowers white; and is a native of Martinico, at the edge of the woods. It flowers in November.

2. *Ægiphila elata*: leaves elliptic acuminate membranaceous, panicles terminating, calyxes pubescent. It is a climber, and rises frequently to the height of six or seven feet, or more. This and the two following species are natives of Jamaica.

3. *Ægiphila foetida*: leaves ovate-lanceolate, beneath hirsute, as are also the petioles, peduncles axillary solitary.

4. *Ægiphila trifida*: leaves ovate-lanceolate, smooth, peduncles axillary trifid crowded.

ÆGIS, in the ancient mythology, a name given to the shield or buckler of Jupiter and Pallas. The goat Amalthea, which had suckled Jove, being dead, that god is said to have covered his buckler with the skin thereof; whence the appellation *ægis*, from *αἴξ*, *αἴγος*, she-goat. Jupiter, afterwards restoring the beast to life again, covered it with a new skin, and placed it among the stars. As to his buckler, he made a present of it to Minerva: whence that goddess's buckler is also called *ægis*. Minerva, having killed the Gorgon Medusa, nailed her head in the middle of the ægis, which henceforth had the faculty of

converting into stone all those who looked thereon; as Medusa herself had done during her life.

ÆGISTHUS, in ancient history, was the son of Thyestes by his own daughter Pilopeia, who, to conceal her shame, exposed him in the woods; some say he was taken up by a shepherd, and suckled by a goat, whence he was called *Ægisthus*. He corrupted Clytemnestra the wife of Agamemnon; and with her assistance slew her husband, and reigned seven years in Mycenæ. He was, together with Clytemnestra, slain by Orestes. Pompey used to call Julius Cæsar *Ægisthus*, on account of his having corrupted his wife Mutia, whom he afterwards put away, though he had three children by her.

ÆGITHALLUS, a promontory and citadel of Sicily, between Drepanum and the Emporium Aegistanum, afterwards called *Acellus*; corruptly written *Aegitharus*, in Ptolemy; situate near mount Eryx, and now called *Capo di Santo Teodoro*.

ÆGIUM, a town of Achaia Propria, five miles from the place where Helice stood, and famous for the council of the Aeheans, which usually met there on account either of the dignity or commodious situation of the place.

ÆGOBOLIUM, in antiquity, the sacrifices of a goat offered to Cybele. The ægobolium was an expiatory sacrifice, which bore a near resemblance to the taurobolium and eribolium, and seems to have been sometimes joined with them.

ÆGOCÉRATOS, *f.* in botany. See **HUGONIA**.

ÆGOPODIUM, *f.* [*αἴξ*, a goat, and *πῶς*, a foot.] In botany, a genus of the pentandria digynia class, of the natural order of umbellatæ or umbelliferæ. The generic characters are—Calyx: umbel universal manifold, convex: partial similar, but flat. Involucre none. Proper perianth scarcely observable. Corolla: universal uniform, with every floscule fertile: particular with five petals, obovate, concave, inflex at the tip, and equal. Stamina: filaments simple, twice as long as the corolla, with roundish antheræ. Pistillum: germ inferior. Styles simple, erect, the length of the corolla, with headed stigmas. Fruit ovate-oblong, streaked, bipartite. Seeds: two, ovate-oblong, convex and streaked on one side, and flat on the other.—*Essential Character.* Fruits, ovate-oblong, streaked.

The ægopodium podagraria, called in English herb-gerrard, gout-weed, ash-weed, and wild master-wort, is a weed not uncommon in hedges, orchards, &c. It is a perennial, and, being a great creeper, cannot be admitted into gardens without great caution. It requires no care, but to plant it in the shade and to confine the roots. The stem grows from two to three feet in height, is branching and furrowed: the upper leaves are ternate, and opposite: leaflets lanceolate, serrate. The umbels have about fourteen rays; the flowers are white, and appear from May to July. Though it has the quality of most umbellate plants in being aromatic, yet it is not used at all in medicine: nor has it any title to its name of goutweed, though the Germans formerly used it to assuage the pains both of the gout and piles. Linnæus says it is eaten in Sweden, boiled for greens, when tender in the spring. Ash-weed, one of the English names, is probably a corruption from ash-weed.

ÆGOPIDIUM, *f.* in botany. See **CICUTA**, **SMYRNIUM**.

ÆGOPRICON, *f.* [It seems to be derived from *αἴξ*, and *πρῶν* or *πρίον*, to sew, tie, or fasten.] In botany, a genus of the monœcia monandria class. The generic characters are—I. Male flowers small, in an ovate ament. Calyx: one-leaved, tubulous, trifid. Stamina: filament one, longer than the calyx, erect; with an ovate antheræ. II. Female flowers on the same plant, solitary. Calyx and corolla: same as in the male. Pistillum: germ ovate, superior; styles three; divaricate; with simple permanent stigmas. Pericarpium: a globular berry, tricoceous and trilocular within, with a bifid point. Capsule tricoceous and elastic.

elastic, *g.* Seeds: solitary, angular on one side.—*Essential Character.* Male, an ament. Calyx, common trifid; partial tubulous. Antheræ, four-lobed. Female flowers solitary. Calyx, as in the male; corolla, none; styles, three, coadunate at the base; capsule, trilocular.

It is called *Ægopricon betulinum*, and is a tree very much branched. Branchlets alternate, bent different ways, leafy, flowering at the ends. Bark somewhat wrinkled, except in the younger shoots. Dalberg noticed it in Surinam; and Aublet in Guiana.

ÆGOSPOTAMOS, a river in the Thracian Chersonesus, falling with a south-east course into the Hellespont, to the north of Sestos; also a town, station, or road, for ships, at its mouth. Here the Athenians, under Conon, through the fault of his colleague Isocrates, received a signal overthrow from the Lacedæmonians under Lysander, which was followed by the taking of Athens, and put an end to the Peloponnesian war. The Athenian fleet, having followed the Lacedæmonians, anchored in the road, over against the enemy, who lay before Lampacus. The Hellespont is not above two thousand paces broad in that place. The two armies, seeing themselves so near each other, expected only to rest that day, and were in hopes of coming to a battle on the next.

But Lysander had another design in view. He commanded the seamen and pilots to go on-board their galleys, as if they were in reality to fight the next morning at break of day, to hold themselves in readiness, and to wait his orders with profound silence. He commanded the land-army in like manner to draw up in battle upon the coast, and to wait the day without noise. On the morrow, as soon as the sun was risen, the Athenians began to row towards them with their whole fleet in one line, and to bid them defiance. Lysander, though his ships were ranged in order of battle, with their heads towards the enemy, lay still without making any movement. In the evening, when the Athenians withdrew, he did not suffer his soldiers to go a-shore, till two or three galleys, which he had sent out to observe them, were returned with advice that they had seen the enemy land. The next day passed in the same manner, as did the third and fourth. Such a conduct, which argued reserve and apprehension, extremely augmented the security and boldness of the Athenians, and inspired them with an extreme contempt for an army, which fear, in their sense, prevented from shewing themselves, and attempting any thing.

The fifth day the Athenians presented themselves again, and offered battle; retiring in the evening according to custom with more insulting airs than the days before. Lysander, as usual, detached some galleys to observe them, with orders to return with the utmost diligence when they saw the Athenians landed, and to put up a brazen buckler at each ship's head as soon as they reached the middle of the channel. Himself in the mean time ran through the whole line in his galley, exhorting the pilots and officers to hold the seamen and soldiers in readiness to row and fight on the first signal.

As soon as the bucklers were put up in the ships heads, and the admiral galley had given the signal by the sound of trumpet, the whole fleet set forward in good order. The land-army at the same time made all possible haste to the top of the promontory to see the battle. The strait that separates the two continents in this place is about fifteen stadia, or three quarters of a league, in breadth; which space was presently cleared through the activity and diligence of the rowers. Conon, the Athenian general, was the first who perceived from shore that fleet advance in good order to attack him; upon which he immediately cried out for the troops to embark. In the height of sorrow and trouble, some he called to by their names, some he conjured, and others he forced to go on-board their galleys; but all his endeavours and emotions were ineffectual, the soldiers being dispersed on all sides. For they were no sooner come on-shore, than some ran to the sut-

lers, some to walk in the country, some to sleep in their tents, and others had begun to dress their suppers. This proceeded from the want of vigilance and experience in their generals, who, not suspecting the least danger, indulged themselves in taking their repose, and gave their soldiers the same liberty.

The enemy had already fallen on with loud cries and a great noise of their oars, when Conon, disengaging himself with nine galleys, of which number was the sacred ship called the *Paralian*, stood away for Cyprus, where he took refuge with Evagoras. The Peloponnesians, falling upon the rest of the fleet, took immediately the galleys which were empty, and disabled and destroyed such as began to fill with men. The soldiers, who ran without order or arms to their relief, where either killed in the endeavour to get on-board, or flying on-shore were cut to pieces by the enemy, who landed in pursuit of them. Lysander took 3000 prisoners, with all the generals, and the whole fleet. After having plundered the camp, and fastened the enemy's galleys to the sterns of his own, he returned to Lampacus amidst the sound of flutes and songs of triumph. It was his glory to have achieved one of the greatest military exploits recorded in history with little or no loss, and to have terminated a war in the small space of an hour, which had already lasted twenty-seven years, and which, perhaps, without him, had been of much longer continuance.

ÆGYPTIACUM, *f.* in pharmacy, the name of several detergent ointments; which are described under the article **OINTMENT**.

ÆGYPTILLA, *f.* in natural history, the name of a stone described by the ancients, and said, by some authors, to have the remarkable quality of giving water the colour and taste of wine. This seems a very imaginary virtue, as are indeed too many of those in former ages attributed to stones. The descriptions left us of this remarkable fossil tell us, that it was variegated with, or composed of, veins of black and white, or black and bluish, with sometimes a plate or vein of whitish red. The authors of these accounts seem to have understood by this name the several stones of the onyx, sardonius, and camæa, kind; all which we have at present common among us, but none of which possess any such strange properties.

ÆGYPTUS, in fabulous history, was the son of Be-leus, and brother of Danaus.

ÆINATÆ, *f.* in antiquity, a denomination given to the senators of Miletus, because they held their deliberations on-board a ship, and never returned to land till matters had been agreed on.

ÆL, **EAL**, or **AL**, [in compound names, as *παι* in the Greek compounds,] signifies *all*, or *altogether*. So *Ælwin* is a complete conqueror; *Albert*, all illustrious; *Aldred*, altogether reverend; *Alfred*, altogether peaceful. To these *Pannachius*, *Pancratius*, *Pamphilus*, &c. do in some measure answer.

ÆLF, [which, according to various dialects, is pronounced *ulf*, *wolph*, *hulph*, *hilp*, *helfe*, and, at this day, *helpe*,] implies assistance. So *Ælfrin*, is victorious; and *Ælfwald*, an auxiliary governor; *Ælfgif*, a lender of assistance; with which, *Boetius*, *Symmachus*, *Epicurus*, &c. bear a plain analogy.

ÆLIAN (Claudius), born at Præneste, in Italy. He taught rhetoric at Rome, according to Perizonius, under the emperor Alexander Severus. He was surnamed *Μελιγλωστος*, *Honey-mouth*, on account of the sweetness of his style. He was likewise honoured with the title of *Sophist*, an appellation in his days given only to men of learning and wisdom. He loved retirement, and devoted himself to study. He greatly admired and studied Plato, Aristotle, Isocrates, Plutarch, Homer, Anacreon, Archilochus, &c. and, though a Roman, gives the preference to the writers of the Greek nation. His two most celebrated works are, his *Various History*, and *History of Animals*. He composed likewise a book on Providence, mentioned

tioned by Eusebii; and another on Divine Appearances, or The Declarations of Providence.

ÆLI PONS, one of the fortresses near the wall or rampart, or, in the words of the Notitia, through the line of the hither wall; built, as it is thought, by Adrian. Now Porteland, in Northumberland, between Newcastle and Morpeth.

ÆLIUS PONS, now il Ponte S. Angelo, a stone-bridge at Rome, over the Tyber, which leads to the Burgo and Vatican from the city, along Adrian's mole, built by the emperor Adrian.

ÆLURUS, in Egyptian mythology, the deity or god of cats; represented sometimes like a cat, and sometimes like a man with a cat's head. The Egyptians had so superstitious a regard for this animal, that the killing it, whether by accident or design, was punished with death: and Diodorus relates, that, in the time of extreme famine, they chose rather to eat one another than touch these sacred animals.

ÆM, **AM**, or **AME**, a liquid measure used in most parts of Germany; but different in different towns; the æm commonly contains 20 vertils, or 80 masses; that of Heidelbergh is equal to 48 masses; and that of Wirtemberg to 160 masses.

ÆMILIUS (Paulus), the son of Lucius Paulus, who was killed at the battle of Cannæ, was twice consul. In his first consulate he triumphed over the Ligurians; and in the second subdued Perseus king of Macedonia, and reduced that country to a Roman province, on which he obtained the surname of Macedonicus. He returned to Rome loaded with glory, and triumphed for three days. He died 168 years before Christ.

ÆMILIUS (Paulus), a celebrated historian, born at Verona, who obtained such reputation in Italy, that he was invited into France by the cardinal of Bourbon, in the reign of Louis XII. in order to write the history of the kings of France in Latin, and was given a canonry in the cathedral of Paris. He was near thirty years writing that history, which has been greatly admired. He died at Paris on the 5th of May, 1529.

ÆNOBOLIUM, *f.* in antiquity, the blood of a bull or ram offered in the sacrifices, called *taurobolia* and *criobolia*; in which sense the word occurs in ancient inscriptions.

ÆNARIA, an island on the bay of Cumæ, or over-against Cumæ in Italy. It is also called Inarime, and now Ischia: scarcely three miles distant from the coast, and the promontory Misenus to the west; twenty miles in compass; called Pithecusa by the Greeks. It is one of the Oenotrides, and fenced round by very high rocks, so as to be inaccessible but on one side; it was formerly famous for its earthenware.

ÆNEA, *f.* [as, Lat.] An epithet given to the instrument called a catheter, from its being formerly made of brass.

ÆNEAS, a famous Trojan prince, the son of Anchises and Venus. At the destruction of Troy, he bore his aged father on his back, and saved him from the Greeks; but, being too solicitous about his son and household gods, lost his wife Creusa in the escape. Landing in Africa, he was kindly received by queen Dido: but, quitting her coast, he arrived in Italy, where he married Lavinia the daughter of king Latinus, and defeated Turnus, to whom she had been contracted. After the death of his father-in-law, he was made king of the Latins, over whom he reigned three years: but, joining with the Aborigines, he was slain in a battle against the Tuscans. Virgil has rendered the name of this prince immortal, by making him the hero of his poem.

ÆNEATORES, *f.* in antiquity, the musicians in an army, including those who played trumpets, horns, &c. The word is formed from *æneus*, on account of the brazen instruments used by them.

ÆNEID, the name of Virgil's celebrated epic poem. The subject of the *Æneid*, which is the establishment of Æneas in Italy, is extremely happy. Nothing could be more interesting to the Romans than to look back to their

origin from so famous a hero. While the object was splendid itself, the traditionary history of his country opened an interesting field to the poet; and he could glance at all the future great exploits of the Romans, in its ancient and fabulous state.

As to the unity of action, it is perfectly well preserved in the *Æneid*. The settlement of Æneas, by the order of the gods, is constantly kept in view. The episodes are linked properly with the main subject. The nodus, or intrigue of the poem, is happily managed. The wrath of Juno, who opposes Æneas, gives rise to all his difficulties, and connects the human with the celestial operations throughout the whole poem.

One great imperfection of the *Æneid*, however, is, that there are almost no marked characters in it. Achates, Cloanthus, Gyas, and other Trojan heroes, who accompanied Æneas into Italy, are insipid figures. Even Æneas himself is without interest. The character of Dido is the best supported in the whole *Æneid*.

The principal excellency of Virgil is tenderness. His soul was full of sensibility. He must have felt himself all the affecting circumstances in the scenes he describes; and he knew how to touch the heart by a single stroke. In an epic poem this merit is the next to sublimity. The second book of the *Æneid* is one of the greatest masterpieces that ever was executed. The death of old Priam, and the family-pieces of Æneas, Anchises and Crensa, are as tender as can be conceived. In the fourth book, the unhappy passion and death of Dido are admirable. The episodes of Pallas and Evander, of Nisus and Euryalus, of Lausus and Mezentius, are all superlatively fine. In his battles, Virgil is far inferior to Homer. But in the important episode, the descent into hell, he has outdone Homer by many degrees. There is nothing in antiquity to equal the sixth book of the *Æneid*.

ÆNGINA, one of the islands of the Archipelago. It lies in the bay of Engia, and the town of that name contains about 800 houses and a castle; and near it are the ruins of a magnificent structure, which was probably a temple.

ÆNIGMA, *f.* denotes any dark saying, wherein some well-known thing is concealed under obscure language. The word is Greek, *αἰνigma*, formed of *αἰνιτίζω*, *obscure innuere*, to hint a thing darkly, and of *αἶνος*, an obscure speech or discourse. The popular name is *riddle*; from the Belgic *racen*, or the Saxon *araethan*, to interpret. Fa. Bouhours, in the Memoirs of Trevoux, defines an *ænigma*, A discourse or painting, including some hidden meaning, which is proposed to be guessed.

Painted ÆNIGMAS, are representations of the works of nature or art, concealed under human figures, drawn from history or fable.

A Verbal ÆNIGMA, is a witty, artful, and abstruse, description of any thing. In a general sense, every dark saying, every difficult question, every parable, may pass for an *ænigma*. Hence obscure laws are called *Ænigmata juris*. The alchemists are great dealers in the *ænigmatic* language, their processes for the philosophers stone being generally wrapped up in riddles. F. Menestrier has attempted to reduce the composition and resolution of *ænigmata* to a kind of art, with fixed rules and principles, which he calls the philosophy of *ænigmatic* images. The subject of an *ænigma*, or the thing to be concealed and made a mystery of, he justly observes, ought not to be such in itself: but, on the contrary, common, obvious, and easy to be conceived. It is to be taken, either from nature, as the heavens or stars; or from art, as painting, the compass, a mirror, or the like.

The Form of ÆNIGMAS consists in the words, which, whether they be in prose or verse, contain either some description, a question, or a prosopopæia. The last kind are the most pleasing, inasmuch as they give life and action to things which otherwise have them not. To make an *ænigma*, therefore, two things are to be pitched on, which bear some resemblance to each other; as the sun and

and a monarch; or a ship and a house: and on this resemblance is to be raised a superstructure of contrarieties to amuse and perplex. It is easier to find great subjects for ænigmas in figures than in words, inasmuch as painting attracts the eyes and excites the attention to discover the sense. The subjects of ænigmas in painting, are to be taken either from history or fable: the composition here is a kind of metamorphosis, wherein human figures are changed into trees, and rivers into metals. It is essential to ænigmas, that the history or fable, under which they are presented, be known to every body; otherwise it will be two ænigmas instead of one; the first of the history or fable, the second of the sense in which it is to be taken. Another essential rule of the ænigma is, that it only admits of one sense. Every ænigma which is susceptible of different interpretations, all equally natural, is so far imperfect. What gives a kind of erudition to an ænigma, is the invention of figures in situations, gestures, colours, &c. authorized by passages of the poets, the customs of artists in statues, basso relievos, inscriptions, and medals. In foreign colleges, the explication of ænigmas makes a considerable exercise; and that one of the most difficult and amusing, where wit and penetration have the largest field.

ÆNIGMATOGRAPHY, or **ÆNIGMATHOLOGY**, *f.* the art of resolving or making ænigmas.

ÆNONA, a city of Liburnia, called by Pliny Civitas Prasini, also Enona, and is now called Nona; on the Adriatic, by which it is for the greater part surrounded, over-against the island Giffa, from which it is distant four miles to the west. Lat. 28. o. lon. 16. o. E.

ÆNUS, now the Inn, a river of Germany, which, rising in the country of the Grisons, out of the Alps, in the district called Gottes-haus-punt, runs throught the Grisons, the county of Tyrol, the duchy of Bavaria, and through Passau into the Danube.

ÆNUS, **ÆNOS**, or **ÆNUM**, anciently a town of Thrace, situate on the east mouth of the Hebrus, which has two mouths; and said to be built by the Cumeans. Now Eno.

ÆNITHOLOGUS, *f.* in poetry, a verse of two dactyls and three trochei; as, *Prælia dira placent truci juvenæ.*

ÆOLIAE INSULÆ, now Isle di Lipari, seven islands, situated between Sicily and Italy, so called from Æolus, who reigned there about the time of the Trojan war.

ÆOLIC, *adj.* in a general sense, denotes something belonging to Æolis.

ÆOLIC, or **ÆOLIAN**, in grammar, denotes one of the five dialects of the Greek tongue. It was first used in Bœotia; whence it passed into Æolia, and was that which Sappho and Alcæus wrote in. The Æolic dialect generally throws out the aspirate or sharp spirit, and agrees in so many things with the Doric dialect, that the two are usually confounded together.

ÆOLIC VERSE, in prosody, a verse consisting of an iambus, or spondee; then of two anapests, separated by a long syllable; and, lastly, of another syllable. Such as *O stelliferi conditor orbis*. This is otherwise called *eulogic verse*; and, from the chief poets who used it, *Archilochian* and *Pindaric*.

ÆOLIPILE, *f.* in hydraulics, is a hollow ball of metal, generally used in courses of experimental philosophy, in order to demonstrate the possibility of converting water into an elastic steam or vapour by heat. The instrument, therefore, consists of a slender neck, or pipe, having a narrow orifice inserted into the ball by means of a shouldered screw. This pipe being taken out, the ball is filled almost full of water, and, the pipe being again screwed in, the ball is placed on a pan of kindled charcoal, where it is well heated, and there issues from the orifice a vapour, with prodigious violence and great noise, which continues till all the included water is discharged. The stronger the fire is, the more elastic and violent will be the steam; but care must be taken that the small orifice of the pipe be not, by any accident, stopped up; because the instrument would in that case infallibly burst in pieces with such vio-

lence as may greatly endanger the lives of the persons near it. Another way of introducing the water is to heat the ball red-hot when empty, which will drive out almost all the air; and then by suddenly immersing it in water, the pressure of the atmosphere will force in the fluid till it is nearly full. Des Cartes and others have used this instrument to account for the natural cause and generation of the wind: and hence it was called *Æolopila*, *q. d. pila Æoli*, the ball of Æolus or of the god of the winds.

ÆOLIS, or **ÆOLIA**, the ancient name of a country of the Hither Asia, settled by colonies of Æolian Greeks. Taken at large, it comprehends all Troas, and the coast of the Hellespont to the Propontis, because in those parts there are several Æolian colonies: more strictly, it is situated between Troas to the north, and Ionia to the south. The people are called Æoles or Æolii.

ÆOLIUM MARE, a part of the Ægean Sea, washing Æolis; called also Myfium, from Myfia. It is now called Golfo di Smyrna.

ÆOLUS, in heathen mythology, the god of the winds, was said to be the son of Jupiter by Acasta, or Sigesia, the daughter of Hippotus: or, according to others, the son of Hippotus by Meneclea, daughter of Hyllus king of Lipara. He dwelt in the island Strongyle, now called Strombolo, one of the seven islands called Æolian, from their being under the dominion of Æolus. Others say, that his residence was at Regium, in Italy; and others again place him in the island Lipara. He is represented as having authority over the winds, which he held enchained in a vast cavern, to prevent their continuing the devastations they had been guilty of before they were put under his direction. Mythologists explain the original of these fables, by saying, that he was a wise and good prince; and, being skilled in astronomy, was able, by the flux and reflux of the tides, and the nature of the volcano in the island of Strongyle, to foretel storms and tempests.

ÆON, *f.* a Greek word, properly signifying the age or duration of any thing.

ÆON, among the followers of Plato, was used to signify any virtue, attribute, or perfection: hence they represented the deity as an assemblage of all possible æons; and called him *pleroma*, a Greek term signifying *fullness*. The Valentinians, who, in the first ages of the church, blended the conceits of the Jewish cabalists, the Platonists, and the Chaldean philosophers, with the simplicity of the Christian doctrine, invented a kind of Theogony, or Genealogy of Gods (not unlike that of Hesiod), whom they called by several glorious names, and all by the general appellation of **ÆONS**: among which they reckoned *Zen, Life; Aelos; Word; Monseems; Only-begotten; Πανρωμα, Fullness*; and many other divine powers and emanations, amounting in number to thirty: which they fancied to be successively derived from one another; and all from self-originated deity, named *Bythus*, i. e. *profound or unfathomable*; whom they likewise called *The most high and ineffable Father*. See **VALENTINIANS**.

ÆORA, *f.* [from *αναοραω*, to lift up, to suspend on high.] A species of exercise used by the ancients for gestation, and of which Aetius gives the following account:

Gestation, while it exercises the body and limbs, still they seem to be at rest. Of the motion there are several kinds. 1st, Swinging in a hammock, which, at the decline of a fever, is beneficial. 2dly, Being carried in a litter, in which the patient either sits or lies along. It is useful when the gout, stone, and such other disorders, attend, that do not admit of violent motions. 3dly, Riding in a chariot, which is of service in most chronic disorders, especially before the stronger exercise can be admitted. 4thly, Sailing in a boat or ship. This produces various effects, according to the different agitation of the waters, and in many tedious chronic disorders proves efficacious beyond what is observed from the most skilful administration of drugs. These are instances of passive exercise, and are useful, particularly when active exercise would be improper, or impracticable. Asclepiades was the

the first who brought passive exercise into practice, which was used after severe illness, in order to conquer debility, and invigorate the system by gentle means.

ÆQUANA JUGA, mountains of Picedum, in the kingdom of Naples, now called Montagna di Sorrento, denominated from the town Equa, which being destroyed, was replaced by Vicus, now Vico di Sorrento.

ÆRA, *f.* in chronology, a fixed point of time from whence any number of years is begun to be counted. It is sometimes also written in ancient authors *era*. The origin of the term is contested, though it is generally allowed to have had its rise in Spain. Sepulveda supposes it formed from A. E. R. A. the note or abbreviations of the words, *annus erat Augusti*, occasioned by the Spaniards beginning their computation from the time their country came under the dominion of Augustus, or that of receiving the Roman calendar.

The difference between the terms *era* and *epoch* is, that the *æras* are certain points fixed by some people or nation, and the *epochs* are points fixed by chronologists and historians. The idea of an *æra* comprehends also a certain succession of years proceeding from a fixed point of time, and the *epoch* is that point itself. Thus the Christian *æra* began at the epoch of the birth of our Saviour Jesus Christ.

ÆRARIUM, *f.* the treasury or place where the public money was deposited amongst the Romans.

ÆRARIUM SANCTIUS contained the monies arising from the twentieth part of all legacies: this was kept for the extreme necessities of the state.

ÆRARIUM PRIVATUM was the emperor's privy purse, or the place where the money arising from his private patrimony was deposited.

ÆRARIUM VICESIMARUM, the place where the money arising from the taxes levied from foreign countries was laid up, so called because it most commonly consisted of a twentieth part of the produce.

ÆRARIUM ILITHYÆ, or **JUNONIS LUCINÆ**, was where the monies were deposited which parents paid for the birth of each child.

There are several other treasuries mentioned in history, as the *Ærarium Juventutis*, *Veneris*, &c. The temple of Saturn was the public treasury of Rome, either because Saturn first taught the Italians to coin money, or, which is most likely, because this temple was the strongest and most secure, and therefore the fittest place for that purpose. *Ærarium* differs from *fiscus*, as the first contained the public money, the second that of the prince.

The two are, however, sometimes indiscriminately used for each other.

ÆRARIUS, *f.* a name given by the Romans to a degraded citizen, who had been struck off the list of his century. Such persons were so called because they were liable to all the taxes, without enjoying any of its privileges.

ÆRARIUS was also an officer instituted by Alexander Severus, for the distribution of money given in largesses to the soldiery, or people. *Ærarius* was likewise used for a person employed in coining or working brass. These are sometimes called *ararii fusores*: at other times, *ararius* is distinguished from *fusor*; the former answering to what we now call copper-smiths, the latter to founders. *Ærarius* was likewise applied to a soldier who received pay.

AERIA, or **EERIA**, the ancient name of Egypt: the scholiast on Apollonius Rhodius, says, that not only Thesaly, but Egypt, was called *Hefia* by the Greeks, which Eusebius also confirms; and hence Apollinarius, in his translation of the 114th Psalm, uses it for Egypt. Heyfchius applies this name to Ethiopia.

AERIAL, *adj.* [*aërius*, Lat.] Belonging to the air, as consisting of it.—Vegetables abound more with *aerial* particles than animal substances. *Arbutnot.*—Produced by the air. Inhabiting the air. Placed in the air. High; elevated in situation, and therefore in the air.

AERIANS, in church-history, a branch of Arians, who, to the doctrines of that sect, added some peculiar dogmas of their own; as, that there is no difference between bishops and priests; a doctrine maintained by many modern divines, particularly of the presbyterian and reformed churches. The sect received its denomination from Aërius, an Armenian priest of the fourth century.

AERIE, *f.* [*airie*, Fr.] Is a proper term for hawks, which for other birds is called a *nest*. The liberty of keeping aeries of hawks was a privilege granted to great men: and the preserving the aeries in the king's forests, was one sort of tenure of lands by service.

Flos ÆRIS, *f.* among alchemists, small scales procured from copper melted by a strong heat; it is sometimes used for ærugo or verdegris.

AEROGRAPHY, *f.* [from *αἴρ*, air, and *γραφω*, I describe.] A description of the air or atmosphere, its limits, dimensions, properties, &c. This amounts to much the same with aerology, unless we suppose the latter to enter into the rationale, and the former to confine itself to a description of the more obvious affections thereof. See **ATMOSPHERE**.

A E R O L O G Y.

AEROLOGY, *f.* [*αἴρ*, and *λογος*, Gr.] The doctrine or science of **AIR**, its nature and different species, with their ingredients, properties, phenomena, and uses. **Air**, in a general sense, is that invisible fluid every-where surrounding this globe; on which depends not only animal but vegetable life; and which seems, in short, to be one of the great agents employed by nature in carrying on her operations throughout the world.

Though the attention of philosophers has in all ages been engaged in some measure by inquiries concerning the nature of the atmosphere, yet, till within these last thirty years, little more than the mere mechanical action of this fluid was discovered, with the existence of some anomalous and permanently-elastic vapours, whose properties and relation to the air we breathe were almost entirely un-

known. Within the above-mentioned period, however, the discoveries concerning the constituent parts of the atmosphere itself, as well as the nature of the different permanently-elastic fluids which go under the general name of *air*, have been so numerous and rapid, that they have at once raised this subject to the dignity of a *Science*, and now form a very considerable, as well as important, part of the modern system of natural philosophy.

Those discoveries, indeed, have not been more interesting to philosophers, than useful to science and beneficial to society. Many perplexing processes in chemistry have been explained in consequence of them, several have been facilitated, and a number of new and useful ones have been introduced. The phenomena attending metallic calcinations and reductions have been greatly elucidated.

The

The knowledge of the use of the air in respiration; the method of ascertaining its purity and fitness for that function; the investigation of dephlogisticated air; the method of impregnating water with fixed air; are all calculated to answer purposes of the highest utility. The medicinal properties of fixed air have been in a great measure ascertained, and its antiseptic qualities in other respects promise to be of considerable advantage. The method of ascertaining the purity of the air of a place, and the manner of ventilating an apartment, are of great use for those concerned in public buildings. In short, there is perhaps no station in life where some knowledge of this subject may not be of use.

Of the general Constitution, Mechanical Properties, and Operations, of the Air.

The general Constitution of the Air we breathe.—For many ages this fluid was supposed to be simple and homogeneous; its common operations to depend on its heat, cold, moisture, or dryness; and any effects which could not be explained by these (such as the appearance of pestilential diseases), were reckoned to be entirely supernatural, and the immediate effects of Divine power. But, however simple and homogeneous this fluid may have been thought in former times, it is so far from possessing the simplicity of an element, that it is the receptacle of all kinds of effluvia produced from terrestrial substances either naturally or artificially. Hence, whatever may be the nature of the aerial fluid when absolutely pure, that which we breathe, and commonly goes under the name of *air*, must be considered as an exceedingly heterogeneous mixture, various at various times, and which it is by no means possible to analyse with accuracy.

Though, in this view, air seems to be a kind of sink or common sewer, where all the poisonous effluvia arising from putrid and corrupted matters are deposited; yet it has a wonderful facility of purifying itself, and one way or other of depositing those vapours contained in it; so that it never becomes noxious except in particular places, and for a short time; the general mass remaining upon all occasions pretty much the same. The way in which this purification is effected is different, according to the nature of the vapour with which the air is loaded. That which most universally prevails is water; and from experiments it appears, that the quantity of aqueous vapour contained in the atmosphere is immense. Dr. Halley, from an experiment on the evaporation from a fluid surface heated to the same degree with that given by our meridian sun, has calculated, that the evaporation from the Mediterranean Sea alone is sufficient to yield all the water of the rivers which run into it. Dr. Watson, in his Chemical Essays, has given an account of some experiments made with a view to determine the quantity of the water raised from the earth itself alone in time of drought. He informs us, that when there had been no rain for above a month, and the grass was become quite brown and parched, the evaporation from an acre was not less than 1600 gallons in twenty-four hours. Making afterwards two experiments, when the ground had been wetted by a thunder-shower the day before, the one gave 1973, the other 1905, gallons, in twelve hours. From this the air is every moment purified by the ascent of the vapour, which, flying off into the clouds, thus leaves room for the exhalation of fresh quantities; so that as the vapour is considerably lighter than the common atmosphere, and of consequence ascends with great velocity, the air during all this time is said to be *dry*, notwithstanding the vast quantity of aqueous fluid that passes through it.

Nor is it only from the aqueous vapour that the air is purified at this time. Much of that vapour arising from decayed and putrid animal and vegetable substances, and which by some modern philosophers is called *phlogiston*, attaches itself to the aqueous vapour, and ascends along with it. Another part is absorbed by vegetables; for the phlogistic vapour is probably the food of plants. The

phlogistic vapours which ascend along with the water probably continue there, and descend along with the rain; whence the fertilizing qualities of rain-water above those of any other. Thus we may see why a dry air, whether cold or hot, must always be wholesome; but, as the atmosphere cannot always receive vapours, it is obvious, that when great rains come on, especially if attended with heat, the lower regions of the air must be overloaded with vapours both of the aqueous and phlogistic kind, and of consequence be very unwholesome.

But besides the aqueous and phlogistic vapours, both of which are specifically lighter than common air, there are others, which, being specifically heavier, cannot be carried off in this manner. Hence these gross vapours contaminate certain places of the atmosphere, rendering them not only unhealthy, but absolutely poisonous. Of these are, sulphureous, acid, and metalline, exhalations, produced principally by volcanoes; and, as they descend, in consequence of their specific gravity, they suffocate and spread destruction all around them, poisoning not only animals, but vegetables also. The vapours arising from houses where lead and other metals are melted, have the same pernicious qualities; inasmuch that the men who breathe them, the cattle who eat the grass, and the fishes who inhabit the waters on which they fall, are poisoned by them, if taken into the body in a certain proportion. Of the same kind are the *mofetes*, or emanations of fixed air, which sometimes proceed from old lavas, or perhaps from some other places even of the surface. From all these the air seems not capable of purifying itself, otherwise than either by dispersing them by winds, or by letting them subside by their superior gravity, till they are absorbed either by the earth or water, according as it is their nature to unite with one or other of these elements. Of this kind also seem to be the vapours which are called properly *pestilential*. The contagion of the plague itself seems to be of an heavy sluggish nature, incapable of arising in the air, but attaching itself to the walls of houses, bed-clothes, and wearing apparel. Hence, scarcely any constitution of the atmosphere can dispel these noxious effluvia; nor does it seem probable that pestilential distempers ever cease until the contagion has operated so long, and been so frequently communicated from one to another, that, like a ferment much exposed to the atmosphere, it becomes rapid, communicates a milder infection, and at last loses its strength altogether.

The two most important properties of the atmosphere are its gravity and its elasticity. The first compared to the specific gravity of water, according to the computations of Mr. Boyle, is as 1 to 938, but, according to later experiments, as 1 to 800. This property is rendered evident in a variety of ways, but in none more decisive than in simply evacuating the receiver of an air-pump, so as to evince the prodigious pressure of the atmosphere on its outside. M. Pascal has computed the quantity of this pressure on the earth's surface to be upwards of 2232lb. on every square foot.

On the gravity of the air depend the ascent of water in pumps, syphons, &c. and likewise all the phenomena of the barometer. But besides gravity, which the air has in common with other fluids, there is another property which it has only in common with steam or vapour. This is called its *elasticity*; by which, like a spring, it allows itself to be compressed into a smaller bulk, and then returns again to its original size upon removing the pressure.

The elasticity of the air, which was first ascertained by some experiments of lord Bacon, is no less easy of proof than its gravity. If a shrivelled bladder containing only a very small quantity of air be put under the receiver of an air-pump, and the pressure of the atmosphere taken off the outside of the bladder by exhausting the receiver, the elasticity of the air within will be shewn by its expanding the bladder to its full dimensions. The same fact is shewn in a variety of other experiments not necessary to be detailed here. It may be proper however to observe, that

this elasticity is capable of some diminution by long-continued and violent pressure, as late experiments have proved.

The weight or pressure of the air has no dependence on its elasticity; but would be the same whether it had such a property or not. The air, however, being elastic, is necessarily affected by the pressure, which reduces it into such a space, that the elasticity, which re-acts against the compressing weight, is equal to that weight. In effect, the law of this elasticity is, that it encreases as the density of the air encreases; and the density encreases as the force encreases by which it is pressed. Now there must necessarily be a balance between the action and re-action; i. e. the gravity of the air which tends to compress it, and the elasticity by which it endeavours to expand, must be equal. Hence the elasticity increasing or diminishing universally, as the density increases or diminishes, it is no matter whether the air be compressed and retained in such a space by the weight of the atmosphere, or by any other means; it must endeavour in either case to expand with the same force. And hence, if air near the earth be pent up in a vessel, and all communication with the external fluid cut off, the pressure of the inclosed air will be equal to the weight of the atmosphere at the time the quantity was confined. Accordingly, we find mercury sustained to the same height, by the elastic force of air inclosed in a glass vessel, as by the whole atmospherical pressure. On the same principle air may be artificially condensed; and hence the structure of the AIR-GUN.

The utmost limits to which air, of the density which it possesses at the surface of the earth, is capable of being compressed, have not been ascertained. Dr. Hales, by means of a press, condensed it 38 times; and, afterwards, by forcing water in an iron globe, into 1551 times less space than it naturally occupies. However, Dr. Halley, from the experiments made at London and Florence, concludes, that no force whatever is able to reduce air into 800 times less space than that which it naturally possesses on the surface of our earth. The dilatation of the air, however, by virtue of its elastic force, is found to be very surprising. In the experiments made by Mr. Boyle, it dilated into 10,000, and even at last into 13,679, times its space; and this altogether by its own expansive force, without the help of fire.

In fact, it appears, that the air we breathe is compressed by its own weight into at least the 13,679th part of the space it would possess in *vacuo*. But if the same air be condensed by art, the space it would take up when most dilated, to that it possesses when condensed, will be, according to the same author's experiments, as 550,000 to 1.

Dr. Hales found, that the air in a retort, when the bottom of the vessel was just beginning to be red-hot, was expanded through twice its former space; and, in a white heat, it occupied thrice its former space: but Mr. Robins found it was expanded by the heat of iron, just beginning to be white, to four times its former bulk.

The elastic power of the air is the second great source of the effects of this important fluid. Thus it enters the pores of bodies; and by this prodigious faculty of expanding, which is so easily excited, puts their particles into perpetual oscillations. Indeed, the degree of heat, and the air's gravity and density, and consequently its elasticity and expansion, never remaining the same for the least space of time, there must be an incessant vibration or dilatation and contraction in all bodies.

From this cause it is, that the air contained in bubbles of ice, by its continual action, bursts the ice. Thus also entire columns of marble sometimes are cleft, in the winter time, from the increased elasticity of some little bubble of air contained in them. From the same principle arise all putrefaction and fermentation; neither of which will proceed, even in the best disposed subjects, in *vacuo*.

Besides these properties of gravity and elasticity, authors have attributed to air several qualities which rather belong to the accidental mixture of other fluids in its composition. Of this nature is its property of corroding me-

tals, stones, &c. but we shall not dwell on them at present farther than to observe, that, in these cases the dissolving power of air is increased by heat, and by other causes. It combines with water; and, by access of cold, deposits part of the matter which was kept dissolved in it by a greater degree of heat. Hence the water, by being deposited and condensed upon any cold body, such as glass, &c. in windows, forms fogs, and becomes visible.

In the operations of chemistry, air is a very important agent; the result of particular processes depending on its presence or absence, on its being open or inclosed. Thus, the parts of animals and vegetables can only be calcined in open air; in close vessels they never become any other than black coals. And these operations are affected by the changes to which the air is liable. Many instances might be adduced to this purpose. Let it suffice to observe, that it is very difficult to procure oil of sulphur, *per campanam*, in a clear dry atmosphere; but in a thick moist air it may be obtained with greater ease, and in larger quantities. So, pure well fermented wine, if it be carried to a place where the air is replenished with the fumes of new wine then fermenting, will begin to ferment afresh.

The changes in the air arise from various causes, and are observable, not only in its mechanical properties, but in the ingredients that compose it. Thus, at Fahlun, noted for copper mines, the mineral exhalations affect the air in such a manner as to discolour the silver coin in purses, and change the colour of brads. In Carniola, Campania, &c. where are mines of sulphur, the air sometimes becomes very unwholesome, which occasions frequent epidemic diseases, &c. The effluvia of animals also have their effect in varying the air; as it is evident in contagious diseases, plagues, murrains, and other mortalities, which are spread by an infected air.

Of the successive discoveries relative to atmospheric and other aerial fluids, we might here give an historical account, were it not more our object rather to detail facts themselves, than dwell on the circumstances under which they were discovered. We shall however briefly observe that Van Helmont was the first who made discoveries on this important subject. Mr. Boyle followed his steps; and after him, Dr. Hales, and Professor Venel, contributed to the advancement of this important branch of philosophy. But their discoveries at length were greatly eclipsed by our modern chemists Dr. Black, Mr. Cavendish, and Dr. Priestley; but particularly the latter, to whom it was reserved, to prove by the most decisive tests the composition and nature of our atmosphere, which appears to be composed of two fluids; the one absolutely noxious, and incapable of supporting animal life for a moment; the other extremely salutary, and capable of preserving animals alive and healthy for a much longer time than the purest air we can meet with, the properties of which we shall now proceed to explain.

Of Dephlogificated or Vital Air.

This kind of air Dr. Priestley names *dephlogificated*, from his opinion that common air, in the act of burning, absorbs phlogiston. In the course of his inquiries, he fell upon a method of extracting it from a great variety of substances, viz. by moistening them with spirit of nitre, and then distilling them with a strong heat. Thus he obtained it from flowers of zinc, chalk, quicklime, slaked lime, tobacco-pipe clay, flint, Muscovy talcs, and even glass. He then found, that by simply dissolving any metal in the nitrous acid, and then distilling the solution, he could obtain very pure air: and Mr. Wartire found even the trouble of distillation unnecessary; nothing more being requisite than to moisten red lead with the spirit of nitre, and then pour upon it the oil of vitriol, which instantly disengaged the dephlogificated air without applying any more heat than what was generated by the mixture.

But Mr. Scheele, without knowing of Dr. Priestley's discovery, fell upon a method by which this air may be still more readily procured, viz. by the distillation of ni-

tre with a strong heat; by which means it may be obtained in very considerable quantity, and in as great purity as by the more expensive processes. It appears however, that the mode of applying heat has also a very considerable effect on the quantity of air produced. Thus, Dr. Priestley remarks, that "from equal quantities of red lead, without any mixture of spirit of nitre, and using the same apparatus for distilling it, he obtained, by means of heat applied suddenly, more air than when slowly applied in the proportion of ten to six. The proportion of fixed air was the same in both cases, and the remainder equally dephlogisticated."

By heat alone, the doctor found, that fedative salt, manganese, lapis calaminaris, and the mineral called *lapis ponderosus*, wolfram, or *tungsten*, would yield dephlogisticated air; the first indeed, in very small quantity, and sometimes even of a quality very little superior to common air. In these experiments, he made use of small-bellied retorts of green glass, which can stand the fire best, containing about an ounce of water, and having narrow necks eighteen or twenty inches long. The substance to be examined was put into a retort of this kind, and then exposed to a red heat, either in sand or over a naked fire, while the neck of the vessel was plunged in water or mercury.

Having dissolved six pennyweights of very clean iron in oil of vitriol, and then distilled the solution to dryness in a long-necked retort, he received the common air a little phlogisticated, some fixed air, much vitriolic acid air, and lastly eighteen ounce-measures of dephlogisticated air. The iron that remained undissolved weighed twenty-three grains, so that the air was yielded by five pennyweights one grain of iron. The ochre weighed seven pennyweights thirteen grains: so that, says he, there probably remained a quantity of oil of vitriol in it; and consequently, had the heat been greater, more air would have been obtained.

In his experiments with the nitrous acid, as it had constantly been found, that by pouring fresh nitrous acid on the residuum, and repeating the operation, more dephlogisticated air might be obtained, the doctor determined to try whether the same would not hold good with vitriolic acid also. For this purpose, he added more oil of vitriol to the residuum of the last-mentioned experiment. When in a red heat with a glass retort, it yielded a quantity of vitriolic acid air, no fixed air, but about twenty four ounce-measures of dephlogisticated air; when, the retort being melted, a good deal of the air was necessarily lost; but, on resuming the process in a gun-barrel, he procured as much air as had been got before.

The result of these and innumerable other experiments made by philosophers in different countries, was, that dephlogisticated air may be obtained from a vast variety of mineral and metallic substances by means of the vitriolic and nitrous acids. It now remained only to discover in what manner this fluid, so essentially necessary to the support of animal life, is naturally produced in quantities sufficient for the great expence of it throughout the whole world, by the breathing of animals, the support of fires, &c. This discovery, indeed, had been made before even the existence of dephlogisticated air itself was known. Dr. Priestley, after having tried various methods of purifying contaminated air unsuccessfully, found at last, that some kinds of vegetables, but particularly mint, answered this purpose very effectually. Having rendered a quantity of air thoroughly noxious, by mice breathing and dying in it, he divided it into two receivers inverted in water, introducing a sprig of mint into one of them, and keeping the other receiver unaltered. About eight or nine days after, he found that the air of the receiver into which he had introduced the sprig had become respirable; for a mouse lived very well in this, whereas it died the moment it was put into the other.

From these experiments he at first concluded, that in all cases the air was meliorated by the vegetation of plants: but some experiments of this kind did not answer so well towards the end of the year as they had done in the hot sea-

son; and a second course seemed to be almost entirely contrary to the former. At the time of making these experiments, he supposed that the air was meliorated merely by the absorption or phlogiston from that which had been tainted; but the experiments of Dr. Ingenhousz, in 1779, shewed that this was accomplished, not only by the absorption just mentioned, but also by the *emission* of dephlogisticated air. He observed in general, that plants have a power of correcting bad air, and even of improving common air in a few hours, when exposed to the light of the sun; but, in the night time, or when they are not influenced by the solar rays, they contaminate the air. This property, however, does not belong in an equal degree to all kinds of plants: nor is it possible to discover, by the external properties of a plant, whether it be fit for this purpose or not. Air phlogisticated by breathing, and in which a candle could not burn, after being exposed to the sun for three hours with a sprig of peppermint in it, was so far corrected, as to be again capable of supporting flame. The following experiment, made with a mustard plant, may be looked upon as decisive: A plant of this kind was put into a glass receiver containing common air, and its stem cut off even with the mouth of the receiver. The vessel was then inverted in an earthen pan, containing some water to keep the plant alive; and the whole apparatus was set overnight in a room. Next morning the air was found so much contaminated, that it extinguished the flame of a wax-taper. On exposing the apparatus to the sun for a quarter of an hour, the air was found to be somewhat corrected; and after an hour and an half it was so far improved, that by the test of nitrous air it appeared considerably better than common air.

Among the discoveries to which these experiments led, was that of procuring pure air from pump water, which had stood till a green matter had extended itself over the bottom and sides of the vessel containing it. Water, in this situation, emits pure air very copiously, and that even when the green matter exhibits signs of decay, and becomes yellowish; but the light of the sun, it appears, is essential to this process; very little pure air being emitted in the dark. An improvement on this idea was soon afterwards suggested by Dr. Ingenhousz, who procured pure air very readily from the leaves of different vegetables, some of them of the poisonous kind; but more especially from aquatic plants, the turpentine trees, and the green matter collected from a stone trough.

The purity of this dephlogisticated air was equal, if not superior, to that procured by the best chemical processes; as it sometimes required eight times its own quantity of nitrous air to saturate it. All parts of the plants were not found equally proper for the production of it; the full-grown leaves yielded it in the greatest quantity and purity, especially from their under surface. It was also procured from the green stalks.—One hundred leaves of *Nasturtium Indicum*, put into a jar holding a gallon, filled with ordinary pump-water, and exposed to the sun from ten to twelve o'clock, yielded as much air as filled a cylindrical jar four inches and an half in length, and one and three quarters in breadth. On removing this quantity of air, and exposing them again to the sun till seven o'clock, about half as much was produced, of a quality still superior to the former; and next morning by eleven o'clock they yielded as much more of an equal quality. The roots of plants he says, when kept out of ground, generally yield bad air, and at all times contaminate common air, a few only excepted. Flowers and fruits, in general, yield a very small quantity of noxious air, and contaminate a great quantity of common air at all times, especially in the night, and when kept in the dark. Two dozen of young and small French beans, kept in a quart-jar of common air for a single night, contaminated the air to such a degree, that a very lively chicken died by being confined in it less than half a minute.

That the vegetation of plants is one of the great means employed by nature to purify the atmosphere, so as to counteract,

counteract, in a great measure, the damage done by animal respiration, combustion, &c. is evident from these experiments. It may only be said, that vegetation does not appear to be sufficient to remedy entirely that damage. The power of vegetables in yielding dephlogificated air, begins a few hours after the sun has made its appearance in the horizon, or rather after it has passed the meridian, and ceases with the close of day; excepting some plants, which continue it a short time after sun-set. The quantity of dephlogificated air, in general, is greater in a clear day than when it is cloudy. It is also greater when the plants are more exposed to the sun than when they are situated in shady places. The damage done by plants in the night, is also more than counterbalanced by the benefit they afford in the day-time. By a rough calculation, the poisonous air, yielded by any plant during the whole night, could not amount to one hundredth part of the dephlogificated air which the same plant yielded in two hours time in a fair day. It does not appear, however, that plants yield dephlogificated air by any kind of generation of that fluid, but only by filtrating the common air, which all plants absorb through their pores; the phlogistic part becoming part of their substance. Dry plants have little or no effect upon the air until they are moistened. On all these experiments, however, it must be observed, that they have sometimes failed in the hands of those whom we cannot but suppose very capable of trying them; as Mr. Scheele, Mr. Cavallo, and the Abbé Fontana.

After the publication of Dr. Ingenhoufz's experiments, those of Sir Benjamin Thompson appeared, in which the green matter supposed to be vegetable was shewn to consist of a number of animalculæ. He observed further, that several animal substances, as well as vegetables, have a power of separating dephlogificated air from water when exposed to the light of the sun, and that for a very great length of time. Not that the same quantity of water will always continue to furnish air; but the same animal substance being taken out, washed, and again put into fresh water, seems to yield dephlogificated air, without any kind of limitation.

Raw silk was the substance on which his experiments were first attempted; and he not only found that it was capable of yielding pure air in considerable quantity when placed in the same circumstances with the leaves of plants, but also that the light, no less required to produce dephlogificated air from animal than vegetable substances, was not, in either case, necessarily that of the sun; though indeed the pure air was more sparingly supplied, under the influence of an artificial light, than in the other case. In making the experiments, as it was found somewhat troublesome to invert the globes in water, they were at last only kept in an inclined posture on the table, the air collecting itself in the upper part of the belly. Having provided himself with a number of globes, of different sizes, he proceeded in the following manner:

Finding that raw silk, exposed to the action of light, produced so great a quantity of air, he was induced to try some other substances. Having, therefore, prepared six globes of $4\frac{1}{2}$ inches in diameter, and filled them with spring water, he introduced into each of them fifteen grains of one of the following substances, viz. sheep's-wool, eider-down, fur of a Russian hare, cotton-wool, lint, or the ravelings of linen-yarn, and human-hair. The results of these experiments were various, though all yielded more or less of pure air. The wool, even in the most favourable circumstances, never afforded more than one-third of the quantity which would have been yielded by silk. The eider-down began to furnish air almost immediately, and continued to do so in quantities little less than had been furnished by the silk, and nearly of the same quality. The fur of the hare produced more air than the wool, but less than the eider-down. The cotton yielded a considerable quantity of air of better quality than any of the former. The ravelings of linen were very slow in furnishing air,

and produced but a small quantity; only two cubic inches being collected in the space of a fortnight. This substance appeared to be the very reverse of the hare's fur; for the air, instead of attaching and collecting itself about the substance in large bubbles, scarcely ever made its appearance in sufficient quantity to raise it to the top of the water. The human-hair furnished still less than the linen, and the produce was of inferior quality, though still superior to the common atmosphere.

In order to discover the comparative purity of air produced from vegetables and from raw silk, a small quantity of air from the stem of a pea-plant, which had four healthy leaves upon it, was proved with nitrous air, and found greatly inferior to that from raw silk, and several of the substances already mentioned. An entire plant of house-wort, of a moderate size, furnished only three-fourths of a cubic inch of air in seven hours, and that greatly inferior to common air; but the leaves alone afforded a much greater quantity, and of a quality greatly superior.

In order to ascertain how much air would be yielded by exposure to the sun's rays, a globe containing 296 inches, filled with fresh spring water, and thirty grains of raw silk, was exposed to the air for three days in the month of May, but for the most part cold and cloudy. Only nine inches and a half of air were produced; but next day, by exposure to the sun from nine in the morning till five in the afternoon, 8.46 inches more were produced. Next day, the product of air was nine cubic inches, of a better quality; and the day following, six inches still superior, though exposed only for three hours and a half; but the next day, it being cold and cloudy, only three-fourths of an inch of air were produced, and these manifestly inferior to the foregoing. No more air could afterwards be procured, except one quarter of a cubic inch; so that from 296 inches of this water, 33.96 of air were obtained.

In this experiment the air was every day removed, and its place supplied with water: the following was made to determine what alteration would take place on allowing the quantity of air produced to remain from first to last. The globe being therefore filled again, and the silk well washed and replaced in it, the quantity of air produced amounted in four days to 30.1 cubic inches; and would probably have been still more considerable.

On employing unwashed raw silk, it was found, that seventeen grains in twenty cubic inches of water, produced, for the first four days, air of a worse quality than the atmosphere; but afterwards yielded near two inches of a superior quality. The quantity of this air was superior to that in other experiments, though its quality was somewhat inferior.

These results led to a trial of the cotton-like substance yielded by the *populus nigra*. One hundred and twenty grains of this in 296 inches of water, during the first four days gave a very inconsiderable quantity of air, and that in a phlogificated state. On becoming suddenly greenish, however, it yielded in six days forty-four cubic inches and a quarter of purer air than had been before produced.

Suspecting that the quantity of pure air might depend on the comparative quantity of surface, an hair of silk and one of poplar cotton were examined with a microscope, and found to be as 1000 to 3468. Whilst thirty grains of the cotton presented a surface of 6600 square inches, the like quantity of silk exhibited no more than 476. Hence the produce of air from the two substances was neither in proportion to their weights nor their surfaces. It appeared also, that the quality of the air produced at first was considerably inferior to that yielded some time afterwards. In order to ascertain the times at which air of the best quality was produced, &c. several experiments were made. In some of them, the water had acquired a faint greenish cast; but the colour of that with the cotton was deepest. On examining with a microscope, it was found to contain a great number of animalcules exceedingly small, and nearly of an oval figure; that with the silk contained them likewise, but not in such numbers:

numbers: however, in all cases in which the water acquired a greenish hue, they never failed to exist, so as to render it probable, that, from their presence alone, the colour of the water in the first instance universally arose.

To determine a point which appeared by no means decided, viz. what share the substances employed had in producing air, and whether any other which presented a large surface, and attracted air from water, would not do as well, the experiment was repeated with a quantity of *spun glass*, and the result was, that, the globe being exposed in the sun, air-bubbles began almost instantly to make their appearance on the surface, and in four hours 0.77 of a cubic inch of air was procured; after which, not a single globule more was produced, though the globe was exposed for a whole week in sunshine weather. Hence it appears that something more than mere surface was wanted to produce dephlogificated air from water by means of the sun's light.

To determine the quantity and quality of air produced by means of the heat and light of the sun from water alone, a large glass, containing 455 cubic inches, was filled with fresh spring water, inverted, and exposed for twenty-eight days. Another jar was also filled with water from a pond in which many aquatic plants were growing, and exposed in the same way. The latter yielded air in pretty large quantities on the third day, and continued to do so till the fourteenth; the former little or none till the fourteenth, when it began to emit air, and continued to do so till the twenty-second. On removing the air produced, that from the spring water was fourteen inches in quantity, and 138 in quality (taking the quality of atmospheric air at 100); but, from the pond water, thirty-one and a half in quantity, and 252 in quality. The colour of the water remaining unchanged, the thickness of the glass vessel was thought an objection. The experiment therefore was repeated in a thin conical jar containing 344 inches, and exposed twenty-one days to the sun. Little air was furnished till the seventh day, when, a fine slimy sediment of green matter beginning to be formed, air was furnished in pretty large quantities till the eighteenth, when it entirely ceased. The whole amounted to forty cubic inches, and the quality 213.

The opinion of Dr. Ingenhousz, that the dephlogificated air was *elaborated* in the vessels of the plant, appeared exceedingly doubtful to the ingenious author of these experiments: for, besides that many other substances, in which no elaboration takes place, cause the water to yield dephlogificated air as well as plants, and even in much greater quantities, and of a more eminent quality; the circumstances of the leaves of a vegetable, which, accustomed to grow in air, are separated from its stem and confined in water, are so unnatural, that it is difficult to conceive they can perform the same functions in such different situations.

Fresh healthy leaves furnish air only for a short time, and, after a day or two, change colour and cease to yield any. This has been conceived to arise from the death of the plant: and from hence it has been inferred, with some degree of plausibility, not only that the leaves actually retain their vegetative powers for some time after being separated from their stock; but that it was in consequence of the exertion of those powers, that the air yielded in the experiment was produced. But though the leaves, exposed in water to the action of light, actually do cease to furnish air after a certain time, yet they *regain* this power after a short interval, when they furnish (or rather cause the water to furnish) more and better air than at first; which can hardly be accounted for upon the supposition that the air is elaborated in the vessels of the plant. A confirmation of this doctrine has resulted from various experiments; and thus we see, that nature is provided with abundant means of supplying that pure part of the atmosphere which is subject to such continual waste. No doubt the light of the sun produces vital air from water

as well as from vegetables, and even the waters of the ocean contribute towards this salutary purpose.

As dephlogificated air may possibly answer a valuable purpose in medicine, a cheap method of procuring it is suggested by Mr. Cavallo, who proposes to distil it from nitre with a strong heat; but the experiments already related point out an easier method.

Properties of Dephlogificated Air. This kind of air possesses some of, though not all, the properties of common air. Those in which it excels, are the support of flame and of animal life. It is equally elastic, or rather more so than common air; as it likewise exceeds it a little in specific gravity, the proportion betwixt it and common air being that of 160 to 152. In dephlogificated air, the flame of a candle not only grows larger, but becomes exceedingly bright; and burns with a crackling noise, as if the air contained some combustible matter, at the same time that the wax or tallow wastes surprisingly fast. The heat of the flame is in proportion to its light. If a bladder full of dephlogificated air be pricked with a pin, the stream of air will augment the heat of a candle to such a degree, that if any small bits of metal be placed on a piece of charcoal, and held in the apex of the flame, they will almost instantly be melted.

On mixing dephlogificated and inflammable air together, an explosion takes place as on mixing common and inflammable air, but with much greater violence. If an ounce vial, which for this purpose should be very strong, be filled with a little more than one-third of dephlogificated, and the rest inflammable, air, and the flame of a candle presented to its mouth, it will explode nearly as loud as a small pistol. All phlogistic processes are promoted much better by dephlogificated than common air. Dr. Priestley put a quantity of pyrophorus into a small jar, and threw in dephlogificated air. It always occasioned a vehement accension, like the flashing of gunpowder, and the air was greatly diminished.

It has been, almost throughout all ages, believed, that combustion in every instance diminished common air, or reduced it to a smaller volume: but the late experiments of M. Lavoisier have shewn, that this is a mistake; and that in ordinary processes, attended with the production of fixed and phlogificated air, the quantity of vapour produced is equivalent to that absorbed, or otherwise made to disappear, during the operation. With dephlogificated air the case is very different. M. Lavoisier having introduced a burning candle into a glass jar filled with very pure air obtained from calcined mercury, a great heat took place; which at first expelled a small quantity of the air; but afterwards, when the candle was extinguished, it was found that two-thirds of the bulk of air employed had been converted into fixed air, or a quantity of this kind of air equivalent to the former had been produced. The remainder, after taking up the fixed air by caustic alkali, was still as pure as before. In the common processes, he observes, that not more than one-tenth of the air employed is converted into fixed air. In this experiment, the superior gravity of fixed air, and the consequent condensation of the other, must undoubtedly have produced some diminution in the volume of air, though M. Lavoisier does not take notice of it. In other cases, however, the diminution is much more perceptible. Mr. Scheele having introduced a piece of phosphorus into seven ounce-measures of this kind of air, stopped the mouth of the bottle, and set fire to the phosphorus within: the vial broke in pieces, as soon as the flame was extinguished, by the pressure of the external air. A stronger vial being used, and opened afterwards under water, the fluid rushed into it in such a manner as almost to fill it entirely. This extraordinary diminution was also demonstrated by filling a matras with dephlogificated air, and inverting it over a vial containing an effervescing mixture of vitriolic acid and iron-filings plunged into a vessel of hot water, and furnished with a slender tube reaching above the surface.

face of the vessel. The inflammable air, issuing from the orifice of the small tube, was set on fire previous to the inversion of the matrafs, and the mouth of the latter immersed in the water; on which that fluid soon began to rise, and continued to do so till seven-eighths of the vessel were full. In cases of slow combustion, where common air is diminished and phlogificated, the dephlogificated kind was found to be almost entirely destroyed.

The purity of dephlogificated air is ascertained by its degree of diminution with nitrous air; which is to be considered as a phlogistic process. Very great differences are perceived in this respect; and, according to the quantity of diminution, the air is said to be two, three, or four, times better than common air. It is not yet accurately determined how far this proportionable purity extends. Dr. Priestley mentions some extracted from red lead five times as pure as common air. Another quantity produced from a solution of mercury in nitrous acid, was so pure, that one measure of it mixed with two of nitrous air, which had been obtained in the first part of the same process, occupied only 0.03 of a measure. On the whole, he is inclined to think, that, were it possible to make both the dephlogificated and nitrous air in the greatest purity, and then to mix them in some exact proportion, the aerial form of them both would be destroyed, the whole quantity seeming to disappear, as in the mixture of alkaline and acid air. Yet, notwithstanding its great purity, the best dephlogificated air is capable of being contaminated by some of the processes which affect the atmosphere. Dr. Priestley found $\frac{1}{10}$ consumed by a quantity of clean dry nails, which had remained in it nine months, though without being rusted. The effects of combustion have already been mentioned, as producing a great quantity of pure fixed air; but putrefaction and animal respiration probably contaminate it as in atmospheric air. Mr. Cavallo informs us, that, when an animal is confined in dephlogificated air till it dies, that air is not so bad but that it will still be capable of diminution by nitrous air; which seems to shew, that dephlogificated air is somewhat different from pure common air; or that common air is originally different from dephlogificated air lowered by the addition of phlogiston. It is certainly very remarkable; and sometimes a quantity of dephlogificated air, after having been breathed by an animal till it died, will appear by the nitrous test to be even better than common air. When the experiment is performed over lime-water (to absorb the fixed air produced in respiration), the diminution by a mixture of nitrous air is less than it would otherwise be; but it is still diminished much more than common air after an animal has died in it; which seems to intimate, that the death of the animal in dephlogificated air is principally owing to the fixed air formed by the act of respiration.

Dephlogificated air is much inferior to that of the common atmosphere in supporting vegetable life. This has been ascertained by the experiments of Dr. Priestley, Mr. Fontana, Mr. Scheele, Dr. Ingenhousz, &c. Dr. Priestley took three sprigs of mint, and introduced them into different jars of dephlogificated air, common air, and air which had been phlogificated with nitrous air several months before. The plant in phlogificated air grew much better than that in common air; while that in dephlogificated air had a sickly appearance. It was found, however, that, though the plant in phlogificated air had grown so well, the air was not sensibly improved by it, whilst the dephlogificated air was injured by the plant.

Composition of Dephlogificated Air.—When Dr. Priestley first discovered the existence of this fluid, he imagined it was composed of the nitrous acid and earth, with as much phlogiston as was necessary to its elasticity; and that the common atmosphere had as much more as was required to bring it into the mean condition in which we find it. His experiments however were opposed by others made by Lavoisier; who insisted, that, when a solution of mercury was carefully distilled, the metal was obtained in full quanti-

ty, or with scarcely any loss, notwithstanding the dephlogificated air produced. Having put two ounces and one drachm of mercury into red precipitate, and afterwards revived it, a very few grains of the metal were lost. Mr. Fontana repeated the experiment often, losing less than a grain. The vessel he used had a neck of about two feet long; and he particularly remarks, that, in order to succeed in this experiment, the fire should be managed with very great dexterity; for, if that be too strong, part of the precipitate will be volatilized.

These experiments were opposed by others made by Dr. Priestley; but still the quantity of mercury lost, or rather the proportion of it to that of the metal employed, was always various, and the difference not very small; whence Mr. Cavallo and others, with great appearance of reason, conclude, that the true reason of any perceptible loss was the strong heat made use of in the distillation, and consequently that there is no reason to suppose that any earth exists in dephlogificated air. The next question was, Whether any of the nitrous acid existed in dephlogificated air? That it contains none in a proper state of acidity, is indeed evident from many decisive experiments; but an idea was naturally entertained, that in the formation of dephlogificated air the nitrous acid was decomposed, and part of it entered into the composition of the aerial fluid. This gave rise to the theories of Mr. Lavoisier and Mr. Kirwan, which are noticed under the article ACID; as also the experiments of Mr. Watt, which tended to shew that no nitrous acid was destroyed in the composition of dephlogificated air.

On calcining metals in dephlogificated air, very singular phenomena are observed, which seem to throw great light upon the composition of this fluid. "One of the most simple of all phlogistic processes (says Dr. Priestley) is that in which metals are melted in dephlogificated air. I therefore began with this, with a view to ascertain whether any water be produced when the air is made to disappear in it. Accordingly, into a glass-vessel, containing seven ounce-measures of pretty pure dephlogificated air, I introduced a quantity of thin iron-turnings. I then fired the iron by means of a burning lens, and presently reduced the seven ounce-measures to 0.65 of a measure; but I found no more water after this process than I imagined it had not been possible for me to exclude, as it bore no proportion to the air which had disappeared. Examining the residuum of the air, I found one-fifth of it to be fixed air; and, when I tried the purity of that which remained by the test of nitrous air, it did not appear that any phlogificated air had been produced in the process: for though it was more impure than I suppose the air with which I began the experiment must have been, it was not more so than the phlogificated air of the seven ounce-measures which had not been affected by the process, and which must have been contained in the residuum, would necessarily make it. In this case, one measure of this residuum, and two of nitrous air, occupied the space of 0.32 of a measure. In another, ten ounce-measures of dephlogificated air were reduced to 0.8 of a measure; and by washing in lime-water to 0.38 of a measure. In another experiment, $7\frac{1}{2}$ ounce-measures of dephlogificated air were reduced to half an ounce-measure, of which one-fifth was fixed air, and the residuum was quite as pure as the air with which I began the experiment; the test with nitrous air, in the proportions above-mentioned, giving 0.4 in both cases."

From these experiments the doctor was led to the discovery, that the dephlogificated air had actually been imbibed by the melted iron, in the same manner as inflammable air had been imbibed by the melted calces of metals in his former experiments. In the first instance, about twelve ounce-measures of dephlogificated air had disappeared, and the iron had gained six grains in weight. On repeating the experiment, other quantities of iron, treated in the same manner, gained an addition of weight, always very nearly that of the air which had disappeared.

Dr. Priestley now proceeded to try the effect of fusing iron

iron in the open air by means of a burning lens, and he presently found that it saturated itself with pure air from the atmosphere. "I always found (says he) that it had gained weight in the proportion of $7\frac{1}{2}$ to twenty-four. The same was the effect when I melted steel. But I have reason to think, that with a greater degree of heat than I could apply, the iron might have imbibed more than even one-third of its original weight." On attempting to revive the calx of iron in inflammable air, a very unexpected appearance took place. Having put a piece of iron saturated with pure air into a vessel filled with inflammable air confined by water, the inflammable air disappeared and the metal was revived; but on weighing it, $2\frac{1}{2}$ grains out of $11\frac{1}{2}$ had been lost, besides the $7\frac{1}{2}$ ounce-measures of inflammable air which had vanished. Considering all these circumstances, the doctor had now no doubt that the two kinds of air had united, and formed either fixed air or water; and, with a view to determine this point, he repeated the experiment in a vessel where the inflammable air was confined by mercury, both the vessel and mercury having been previously made as dry as possible. In these circumstances he had no sooner begun to heat the iron, than the air was perceived to diminish, and at the same time the inside of the vessel to become cloudy, with particles of dew that covered almost the whole of it. These particles by degrees gathered into drops, and ran down. On collecting this water by means of a piece of filtering paper, he found it as nearly as possible of the same weight with that which had been lost by the iron; and also that the quantity of inflammable air which had disappeared was about double that of the dephlogificated air set loose in the operation. Thus, at one time, a piece of this slag absorbed $5\frac{1}{2}$ ounce-measures of inflammable air, while it lost the weight of about three ounce-measures of dephlogificated air, and the water collected weighed two grains. Another time a piece of slag lost 1.5 grains, and the water produced was 1.7 grains. In a third case, where $6\frac{1}{2}$ ounce-measures of inflammable air were reduced to 0.92 of a measure, the iron had lost the weight 3.3 ounce-measures of dephlogificated air, or nearly two grains.

The doctor, having succeeded so well with iron, next tried the calx of copper, and found water produced in the inflammable air in the same manner. On using precipitate *per se*, he found no more water than might be supposed to have been contained as an extraneous substance either in the inflammable air, or in the red precipitate. With iron, however, the case was vastly different. As he had formerly satisfied himself that inflammable air always contains a portion of water, and also that when it has been some time confined by water it imbibes more, he repeated the experiment with inflammable air received in a vessel of dry mercury; but in this case the water was produced, to appearance, as copiously as before. "Indeed (says he) the quantity of water produced, so greatly exceeding the weight of all the inflammable air, is sufficient to prove that it must have had some other source than any constituent part of that air, or the whole of it, together with the water contained in it, without taking into consideration the corresponding loss of weight in the iron.

"I must here observe, that the iron slag which I had treated in this manner, and which had thereby lost the weight which it had acquired in dephlogificated air, became perfect iron as at first, and was then capable of being melted by the burning lens again; so that the same piece of iron would serve for these experiments as long as the operator should choose. It was evident, therefore, that, if the iron had lost its phlogiston in the preceding fusion, it had acquired it again from the inflammable air which it had absorbed; and I do not see how the experiment can be accounted for in any other way." These experiments certainly throw some light on the composition of dephlogificated air; and others made by Mr. Cavendish, Dr. Priestley, and the French chemists, upon water, have a similar tendency. From all of them it is concluded by the most

celebrated philosophers and chemists, that dephlogificated air is one of the constituent and elementary parts of water, inflammable air being the other.

From the experiments made to ascertain this important fact, an account of which may be found in the Philosophical Transactions, Mr. Cavendish draws the following conclusions. He says—"There seem two ways by which the production of the nitrous acid may be explained: first, by supposing that dephlogificated air contains a little nitrous acid, which enters into it as one of its component parts; and that this acid, when the inflammable air is in sufficient proportion, unites to the phlogiston, and is turned into phlogificated air, but does not when the inflammable air is in too small proportion; and, secondly, by supposing that there is no nitrous acid mixed with or entering into the composition of dephlogificated air; but that, when the air is in sufficient proportion, part of the dephlogificated air with which it is debased is, by the strong affinity of phlogiston to dephlogificated air, deprived of its phlogiston, and turned into nitrous acid; whereas, when the dephlogificated air is not more than sufficient to consume the inflammable air, none then remains to deprive the phlogificated air of its phlogiston, and turn it into acid. If the latter explanation be true, I think we must allow that dephlogificated air is in reality nothing but *dephlogificated water*, or water deprived of its phlogiston; or, in other words, that water consists of dephlogificated air united to phlogiston. On the other hand, if the former explanation be true, we must suppose that dephlogificated air consists of water united to a little nitrous acid, and deprived of its phlogiston; but still the nitrous acid in it must only make a very small part of the whole, as it is found that the phlogificated air into which it is converted is very small in comparison of the dephlogificated air. I think the second of these explanations seems much the more likely; as it was found that the acid in the condensed liquor was of the nitrous kind, not only when the dephlogificated air was prepared from nitrous acid, but when procured from plants or turbith mineral. Another strong argument in favour of this opinion is, that dephlogificated air yields no nitrous acid when phlogificated by liver of sulphur; for if this air contains nitrous acid, and yields it when phlogificated by explosion with inflammable air, it is very extraordinary that it should not do so by other means. But what forms a stronger, and, I think, almost decisive, argument in favour of this explanation, is, that, when the dephlogificated air is very pure, the condensed liquor is made much more strongly acid by mixing the air to be exploded with a little phlogificated air."

The whole of Dr. Priestley's opinions on the component parts of this kind of air, are summed up thus—"The only kind of air that is now thought to be properly elementary, and to consist of a simple substance, is dephlogificated air; with the addition at least of the principle of heat, concerning which we know very little; and, as it is not probable that this adds any thing to the *weight* of bodies, it can hardly be called an *element* in their composition. Dephlogificated air appears to be one of the elements of water, of fixed air, of all the acids, and many other substances, which, till lately, have been thought to be simple."

The experiments of the French philosophers were of the same nature with those of Mr. Cavendish, but conducted on a larger scale. The inference drawn from them was the same with that already mentioned, viz. that dephlogificated and inflammable air in all cases are the two constituent parts of water. This opinion is also adopted by Mr. Kirwan in his *Treatise on Phlogiston*.

Notwithstanding these positive conclusions, however, by some of the most respectable men in this country, the evidences adduced have been unsatisfactory to some French chemists, who maintain, that Messrs. Cavendish, Priestley, and Kirwan, are totally mistaken with regard to the production of water from dephlogificated and inflammable air; and contend that the water obtained had previously existed in the air, and was not originally produced in the

the operation. The fact, indeed, becomes somewhat dubious from some experiments related by Dr. Priestley himself, and of which we shall now proceed to give an account.

One consequence of the hypothesis in question is evident, that, if water really be *produced* by the deflagration of either dephlogisticated or common air with inflammable air, the quantity of liquid obtained ought to increase in proportion to the quantity of the two airs consumed, and that without any limitation. This, however, is not the case; and Dr. Priestley describes as the greatest difficulty he ever met, with regard to the preceding theory, his never having been able to procure any water when he revived red precipitate in inflammable air; or at least not more than might have been supposed to exist in the inflammable air as an extraneous substance.—“The difficulty (says he) with respect to what becomes of the two kinds of air, was not lessened by the attempts which I made to collect all that I could from repeated decompositions of inflammable and dephlogisticated air in a close vessel. As I had produced water in this process when no more than a single explosion was made at a time, I thought that, by continuing to make explosions in the same vessel, the water would not fail to accumulate till any quantity might be collected; and I intended to have collected a considerable part of an ounce. And, as I should know exactly what quantity of air I decomposed, I had no doubt of being able to ascertain the proportion that the water and air bore to each other. With this view a mixture was made of a large quantity of air, $\frac{1}{2}$ dephlogisticated, and $\frac{3}{4}$ inflammable, from iron and oil of vitriol. But, though I had a sensible quantity of water at the first explosion (in each of which between four and five ounce-measures of the mixture of air were used), I was surprised to perceive no very sensible increase of the quantity of water on repeating the explosions. Having therefore expended forty-eight ounce-measures of the mixture, the process was discontinued; and, collecting the water with all the care that I could, I found no more than three grains, when there ought to have been 11.”—In this process, the inside of the vessel was always very black after each explosion: and there issued from the mouth of it a dense vapour, which the doctor took some pains to collect and examine, but without effect.

“That water, in great quantities, (says he,) is sometimes produced from burning inflammable and dephlogisticated air, is evident from the experiments of Messrs. Cavendish and Lavoisier. I have also frequently collected considerable quantities of water in this way, though never quite so much as the weight of the two kinds of air decomposed. My apparatus for this purpose was the following: Into the mouth of a large glass balloon I introduced a tube, from the orifice of which there continually issued inflammable air from a vessel containing iron and oil of vitriol. This, being lighted, continued to burn like a candle. Presently after the lighting of it, the inside of the balloon always became cloudy, and the moisture soon gathered in drops, and settled in the lower part of the balloon. To catch what might issue in the form of vapour, in the current of air through the balloon, I placed a glass tube in which I always found some water condensed. It is very possible, however, that in both these modes of experiment the water may be converted into a kind of vapour very different from steam, and capable of being conveyed a great way through air, or even water, without condensation along with the air with which it is mixed; and on this account it may not be possible, in either of these modes, to collect *all* the water into which the two kinds of air may be converted. The nature of this kind of vapour into which water may be changed, and which is not readily condensed by cold, is very little understood, but well deserves the attention of philosophers.”

That the water collected in the balloon comes from the decomposition of the air, and not from the fresh air circulating through it, was evident from placing balls of hot iron in the place of the flame, and finding, that, though

the balloon was as much heated by them as by the flame of the burning of the inflammable air, and consequently there must have been the same current of the external air through it, no moisture was found in the balloon.

Of Phlogisticated Air.

The universal opinion in favour of the existence of that principle named *phlogiston*, first suggested by Stahl, gave rise, on the appearance of Dr. Priestley's discoveries, to a theory, concerning the action of this substance upon air and other bodies. As it has been observed, that air was diminished, in some cases at least, by burning, universally by respiration, and by some other processes, it was imagined, that phlogiston was a body of such a singular nature, that, when mixed with air, it always diminished, instead of enlarging, its bulk, as might be more naturally expected from the addition of any vapour whatever. It was also supposed by some, that phlogiston was not only entirely devoid of gravity, but that it was a principle of *positive levity*; so that the *absolute* weight of bodies was diminished by an union with it, and augmented when it was expelled, though their *specific* gravity was diminished. Various other surprising properties were attributed to phlogiston; such as that of giving elasticity to air, of constituting flame by a *chemical combination* with air, &c. Its emission into the atmosphere was supposed to be always attended with a diminution of air; and, therefore, all processes in which air was diminished and become noxious, such as that by liver of sulphur, a mixture of iron-filings and brimstone, &c. were called *phlogistic processes*. Respiration of animals was taken into the same account; but neither in this, nor in combustion, was it allowed that any kind of vital spirit was absorbed by the blood, or separated from the air by the burning body. On the contrary, it was strenuously argued, that all this was performed by the *emission* of phlogiston from the lungs or the inflamed substance, which depraved the air, and diminished it in bulk; and, as all air was supposed to contain phlogiston, it was likewise imagined, that in all cases, where air was mended, as by the growing of vegetables, or agitation in water, the emendation was accomplished, not by the emission of any thing into the atmosphere, but by the mere absorption of phlogiston. In other respects this substance was thought to be an exceedingly powerful principle in nature; the light of the sun itself and the electric fluid being said to be modifications of it, the different kinds of airs to be *phlogistic vapours*, &c. so that the whole system of nature seemed ready to be absorbed by it at once.

The formidable powers of this principle were first checked by Lavoisier, though the latter erred equally on the contrary side; and, not content with keeping the phlogistic principle within due bounds, would needs deny its existence altogether. We accordingly find in a Treatise published in 1782, he first impugns Dr. Priestley's theory of respiration, and denies that “the respiration of animals has the property of phlogisticating air in a manner similar to what is effected by the calcination of metals and many other chemical processes; and that it ceases not to be respirable till the instant when it becomes surcharged, or at least saturated, with phlogiston.”

In order to disprove this assertion, he introduced four ounces of mercury to fifty cubic inches of common air, proposing to calcine the metal by keeping it for twelve days in a heat almost equal to that which is necessary to make it boil. After the expiration of the appointed time, forty-five grains of precipitate *per se* were formed, and the air in the vessel was diminished about one-eighth of its volume. In this state it did not precipitate lime-water; but instantly extinguished candles, and killed animals immersed in it; no longer affording any red vapours, or being diminished by mixture with nitrous air. On distilling the precipitate produced, about as much dephlogisticated air was obtained as had been left by the common air in the calcination; and, by recombining this with the noxious air left in the vessel, he re-composed a fluid nearly of the same

same goodness with common air. Hence he draws the following conclusions:—1. That five-sixths of the air we breathe are mephitic, or incapable of supporting the respiration of animals, or the inflammation or combustion of bodies. 2. That the surplus, or only one-fifth of the volume of atmospheric air, is respirable. 3. That, in the calcination of mercury, this metallic substance absorbs the falubrious part, leaving only the mephitic portion of the air. 4. That by re-uniting these two portions which had been separated, we can recompound air similar to that of the atmosphere.

To determine the effects of respiration upon air, a live sparrow was placed under a glass receiver, filled with common air and inverted in mercury, containing thirty-one cubic inches. In a quarter of an hour it became agitated, and in fifty-five minutes died convulsed. Notwithstanding the heat of the animal, which necessarily, at first, rarefied the air in the receiver, there was a sensible diminution of its bulk; which, at the end of fifteen minutes, amounted to one-fortieth; but, instead of increasing afterwards, the diminution became something less in about half an hour; and, when the animal was dead, and the air in the receiver had recovered the temperature of the room where the experiment was made, the diminution did not appear to exceed one-sixtieth part. This air, which had been respired by the sparrow, though in many respects similar to that in which the mercury had been calcined, differed from it in this respect, that it precipitated lime-water, and, by introducing caustic fixed alkali to it, was reduced one-sixth in bulk by the absorption of fixed air; after which it appeared exactly the same with that produced by the calcination of mercury or other metals; and atmospheric air was recombined by mixing this with pure dephlogisticated air in the proportions already mentioned.

It appears from the experiments of Scheele and many other chemists, that the doctrine of phlogiston has been carried too far by our British philosophers, and that the air consists of two kinds of fluids; one friendly in the highest degree to animal life; the other altogether unfit for it. These two appear incapable of being converted directly into one another by any process, natural or artificial: for, though both are destructible, yet they are always converted into other substances; from which, indeed, either the one or the other may be extracted at pleasure.

The strongest arguments in favour of the transmutation of phlogisticated air into that of a purer kind, were drawn from the purification of noxious air by vegetation, and by agitation in water. In the former case, however, as has been observed, this seeming purification is no other than an exchange of the one air for the other; the vegetables absorbing the phlogisticated, and emitting the dephlogisticated air in its stead. With respect to the agitation in water, matters remained more dubious till the discovery made by Dr. Priestley, of the emission of pure air from the latter, and of the possibility of air within a jar being influenced by the atmosphere through a body of water twelve inches in depth. These remarkable facts were illustrated by the following experiments:—1. About three ounce-measures of air, phlogisticated by nitrous air, were agitated for a quarter of an hour in a vessel containing twenty ounces of water, which had been boiled for several hours, and which was still very warm. By this process it became diminished one-sixth, and considerably improved in quality. The next day the remainder was agitated for another quarter of an hour, and the water which was boiled at the same time, when it was also diminished in quantity and improved in quality. 2. An equal quantity of air, phlogisticated by means of iron-filings and brimstone, being agitated for twenty minutes, was diminished by one-fifth, and improved so far that a candle would burn in it. 3. After expelling all the air he could from a quantity of water by boiling, he put to it, in separate vials, air that had been phlogisticated with iron-filings and brimstone, as well as that which the heat had

expelled, leaving them with their mouths in water, and agitating them occasionally. On examining the vials in about two months, he found both the air that was confined by water, and that which had been expelled by heat, completely phlogisticated. 4. That water does imbibe the purer part of the atmosphere, in preference to that which is impure, is evident, he says, from an examination of it: for, if the water be clear, and free from any thing that is putrescent, the air expelled from it by heat is generally of the standard of one; whereas that of the atmosphere, when the nitrous air is the purest, is about 1.2.

Phlogisticated air is equally invisible with common air, and something more elastic. It is fatal to animal life, and friendly to that of vegetables. It seems to exist originally, in very large quantity, in our atmosphere, from whence it may be separated by combustion, by respiration, by putrefaction, and by every species of phlogistic process. Any other species of air may be converted into this by means of fire, dephlogisticated air alone excepted. Phlogisticated air is now generally believed to be a combination of the nitrous acid with phlogiston; and that, in its gradual progress towards this, which is its ultimate stage, it first assumes the character of phlogisticated nitrous acid; then of nitrous air, in which it readily parts with its phlogiston to the atmosphere, or rather to the dephlogisticated part of it; and, lastly, it becomes phlogisticated air, in which the union betwixt the principles is so strong, that it cannot be broken by simple exposure to dephlogisticated air without heat; though the experiments of Mr. Cavendish shew, that this may be done by means of the electric spark, which produces the most violent heat we can imagine.

It had been frequently observed, that common atmospheric air was always diminished by taking the electric spark in it; and this diminution was supposed to be occasioned by the phlogistication of the air, and separation of its fixed part; in consequence of which it was urged, that lime-water is precipitated by taking the electric spark over it in a small quantity of air. Mr. Cavendish, however, who has carefully examined this subject, denies that any fixed air is produced in this manner: and, by a set of very curious experiments, published in the 75th volume of the Philosophical Transactions, has clearly shewn that nitrous acid, and not fixed air, is the product of this operation.

As in some former experiments Mr. Cavendish had found, that, by deflagrating nitre with charcoal, the whole of the acid was converted into phlogisticated air, he concluded that this kind of air is nothing else than nitrous acid united to phlogiston; according to which, it ought to be converted into nitrous acid by being deprived of its phlogiston. "But (says he) as dephlogisticated air is only water deprived of phlogiston, it is plain, that adding dephlogisticated air to a body is equivalent to depriving it of phlogiston, and adding water to it; and therefore phlogisticated air ought also to be reduced to nitrous acid by being made to unite or form a chemical combination with dephlogisticated air; only the acid thus formed will be more dilute than if the phlogisticated air were simply deprived of phlogiston.

"This being premised, we may safely conclude, that, in the present experiments, the phlogisticated air was enabled, by means of the electrical spark, to unite to, or form a chemical combination with, the dephlogisticated air, and was thereby reduced to nitrous acid, which united to the soap-leys, and formed a solution of nitre; for, in these experiments, the two airs actually disappeared, and nitrous acid was formed in their room: and, as it has been shewn, from other circumstances, that phlogisticated air must form nitrous acid when combined with dephlogisticated air, the above-mentioned opinion seems to be sufficiently established. And a further confirmation is, that no diminution of air is perceived when the electric spark is passed either through pure dephlogisticated or, through perfectly phlogisticated air; which indicates a necessity for the combination

bination of the two, in order to produce nitrous acid. It was also found, by the last experiment, that the quantity of nitre produced was the same that would have been obtained from the soap-leys, had they been saturated with nitrous acid; which shews that the production of the nitre was not owing to any decomposition of the soap-leys.

"As far as the experiments hitherto published extend, we scarcely know more of the nature of the phlogificated part of the atmosphere, than that it is not diminished by lime-water, caustic alkalies, or nitrous air; that it is unfit to support fire, or maintain life in animals; and that its specific gravity is not much less than that of common air: so that, though the nitrous acid, by being united to phlogiston, is converted into air possessed of these properties; and, consequently, though it was reasonable to suppose, that part at least of the phlogificated air of the atmosphere consists of this acid united to phlogiston; yet it might be fairly doubted whether the whole is of this kind, or whether there are not, in reality, many different substances confounded by us under the name of phlogificated air. I therefore made an experiment to determine whether the whole of a given portion of the atmosphere could be reduced to nitrous acid, or whether there was not a part of a quite different nature from the rest, which would refuse to undergo that change. For this purpose, I diminished a mixture of dephlogificated and common air, till it was reduced to a small part of its original bulk; after which some dephlogificated air was added, and the spark continued till no further diminution took place. Having by these means condensed as much as I could of the phlogificated air, I let up some solution of liver of sulphur to absorb the dephlogificated air; after which only a small bubble of air remained unabsorbed, which certainly was not more than $\frac{1}{120}$ th of the bulk of the phlogificated air let up into the tube; so that, if there is any part of the phlogificated air of our atmosphere which differs from the rest, and cannot be reduced to nitrous acid, we may safely conclude that it is not more than $\frac{1}{120}$ th part of the whole."

Though these experiments had shewn, that the chief cause of this diminution of air is the conversion of the phlogificated kind into nitrous acid, it seemed not unlikely, that, when any liquor containing inflammable matter was in contact with the air in the tube, some of this matter might be burnt by the spark, and thereby diminish the air. In order to determine this, the electric spark was passed through dephlogificated air included between different liquors; and the result of the experiments was, that when dephlogificated air, containing only one-twentieth part of its bulk of phlogificated air, was confined between short columns of soap-leys, and the spark passed through it till no farther diminution could be perceived, the air lost $\frac{43}{200}$ ths of its bulk; which is not a greater diminution than might very likely proceed from the decomposition of the small quantity of phlogificated air contained in it, as the dephlogificated air might be easily mixed with a small quantity of common air while putting into the tube. When the same dephlogificated air was confined between columns of distilled water, the diminution was rather greater than before, and a white powder was formed on the surface of the quicksilver beneath: the reason of which, in all probability, was, that the acid produced in the operation corroded the quicksilver, and formed the powder; and that the nitrous air produced by that corrosion united to the dephlogificated air, and caused a greater diminution than would otherwise have taken place. When a solution of litmus was used instead of distilled water, the solution soon acquired a red colour; which grew paler and paler as the spark was continued, till it became quite colourless and transparent. The air was diminished by almost one-half, and might perhaps have been further diminished had the spark been continued. When lime-water was let up into the tube, a cloud was formed, and the air was further diminished by about

one-fifth; the remainder was good dephlogificated air. In this experiment, therefore, the litmus was, if not burnt, at least decomposed, so as to lose entirely its purple colour, and to yield fixed air; so that, though soap-leys cannot be decomposed by this process, yet the solution of litmus can, and so very likely might the solutions of many other substances. But there is nothing in any of these experiments which favours the opinion of the air being at all diminished by means of phlogiston communicated to it by the electric spark.

Of Fixed Air.

The discovery of this kind of air is as old as Van Helmont, who gave it the name of *gas silvestre*, from its being emitted in great quantity by burning charcoal. Subsequent discoveries shewed, that a fluid of the same kind was plentifully produced by fermenting liquors, by almost every kind of combustion, and was also naturally generated, in vast quantity, in mines and coal-pits, where it is known by the name of the *choak-damp*; that it exists in a concrete state in alkaline salts, chalk, limestone, the shells of marine animals, magnesia alba, &c. in a very large proportion, constituting one-half, and sometimes more, of their weight; and that it might always be extracted from the atmosphere, in unlimited quantity, by exposing certain substances to it. This fluid, being found so manifestly acid, has now obtained the name of *aerial acid*.

Fixed air is the heaviest of all permanently-elastic fluids, excepting those derived from the mineral acids. Mr. Kirwan determines it to be to common air as 1500 to 1000, the barometer being at 29.85, the thermometer at sixty-four, and the fixed air being extracted from calcareous spar by marine acid, whose specific gravity was 1.0145. When combined with calcareous earth, it is prodigiously concentrated; and, were it possible to exist by itself in that state, it would be the heaviest body known, gold and platinum excepted. To prove this, Mr. K. first ascertained the specific gravity of a piece of white marble; then expelled the fixed air from a known weight of it finely powdered, by means of diluted vitriolic acid; the bulk and weight of the obtained fixed air being ascertained. Next, he calcined a known quantity of the same sort of marble, by keeping it in a white heat for the space of fourteen hours; after which, being weighed again, and from the weight lost by this calcination, the weight of the fixed air, which must have escaped from it according to the above-mentioned experiment, being subtracted, the remainder is the weight of water contained in the marble; from which experiments it appears, that 100 grains of the marble contained 32.42 grains of fixed air, 11.66 grains of water, and 56.92 grains of pure calcareous earth.

"I next (says he) proceeded to discover the specific gravity of the lime. Into a brass box, which weighed 607.65 grains, and in the bottom of which a small hole was drilled, I stuffed as much as possible of the finely-powdered lime, and then screwed the cover on, and weighed it both in air and in water. When immersed in the latter, a considerable quantity of common air was expelled; when this ceased, I weighed it. The result of this experiment is as follows:

	Grains.
Weight of the box in air	607.65
Its loss of weight in water	73.75
Weight of the box and lime in air	1043.5
Weight of the lime singly in air	435.85
Loss of weight of the box and lime in water	256.5
Loss of weight of the lime singly	182.3

"Hence, dividing the absolute weight of the lime by its loss in water, its specific gravity was found to be 2.3908.

"From these data I deduced the specific gravity of fixed air in its fixed state; for 100 grains of marble consist of 55.92 of earth, 32.42 of fixed air, and 11.66 of water; and the specific gravity of the marble is 2.717. Now, the specific gravity of the fixed air, in its fixed state, is as its absolute weight, divided by its loss of weight in water;

ter; and its loss of weight in water is as the loss of 100 grains of marble, *minus* the losses of the pure calcareous earth and the water.

$$\text{Loss of 100 grs. of marble} = \frac{100}{2.717} = 36.8 \text{ grs.}$$

$$\text{Loss of 55.92 grs. of calcareous earth} = \frac{55.92}{2.39} = 23.39 \text{ grs.}$$

$$\text{Loss of 11.66 grs. of water} = \frac{11.66}{1.75} = 6.66 \text{ grs.}$$

$$\begin{aligned} \text{"Then the loss of the fixed air } 36.8 - 35.05 &= 1.75; \\ \text{consequently its specific gravity is } \frac{32.42}{1.75} &= 18.52." \end{aligned}$$

Fixed air differs considerably from other airs. Its acidity is manifest to the taste, and still more from its neutralising alkalies, so as to form crystals of a neutral or acidulous salt. It has a considerable power in checking the putrefaction of animal substances; though in this case it acts only by absorbing the putrid effluvia already emitted from the body, and becomes itself offensive while it sweetens the other. When taken into the lungs, it is equally poisonous with any other noxious air, and extinguishes flame as effectually; but, when mixed with dephlogisticated air, it may be inspired without danger, and even in its pure state may be copiously swallowed to effect the cure of diseases, whence it has now become an article of the *Materia Medica*. As an acid, it stands in the lowest rank, being expelled from alkalies by every other; though it separates oils, sulphur, and the colouring matter of Prussian blue, from the substances with which they are combined.

The compound nature of fixed air, and the principles from which it is formed, were first discovered by Mr. Kirwan; but Dr. Priestley was not convinced by the proofs he adduced, till after making some experiments of his own. The first was, by firing shavings of iron in dephlogisticated air; when he observed a considerable residuum of fixed air, though that in the receiver had been of the purest dephlogisticated kind, and iron could only have yielded inflammable air. The hypothesis of Mr. K. was still further confirmed by an experiment in which iron-filings, which could only have yielded inflammable air, were mixed with red precipitate, which is known to yield only pure dephlogisticated air. On heating these in a glass retort, they gave a great quantity of fixed air, in some portions of which nineteen-twentieths were absorbed by lime-water, and the residuum was inflammable; but when the red precipitate was mixed with powdered charcoal, which had been found to yield only inflammable air, the fixed air produced from it was so pure that only one-tenth part remained unabsorbed by water, which is as pure as that generally prepared from chalk and oil of vitriol. In some of these experiments it appeared, that three ounce-measures of dephlogisticated air went to the composition of two of fixed air: for one ounce of red precipitate gave sixty ounce-measures of dephlogisticated air; and, when mixed with two ounces of iron-filings, it gave about forty ounce-measures of fixed air that were actually absorbed by water, besides a residuum that was inflammable. The same proportion was obtained when half the quantity of materials was employed; but, on using an ounce of each, only twenty ounce-measures of fixed air, including the residuum, could be got.

In considering this subject farther, it occurred to Dr. Priestley, that his experiments, in which charcoal was used, lay open to an objection, that, since dry wood and imperfectly-made charcoal yield fixed air, it might be said that all the elements of fixed air are contained in charcoal. In order, therefore, to expel all the fixed air from charcoal, he made a quantity of it from dry oak, and, pounding it while hot, instantly mixed four measures of it with

one of red precipitate, and, putting them into an earthen retort, got, with a heat no greater than what was sufficient to revive the mercury, a large quantity of air, half of which was fixed. Afterwards the proportion of fixed air was less, and at last no fixed air at all was obtained; but, as the residuum was worse than the common atmosphere, he is thence inclined to believe, notwithstanding Mr. Cavendish's experiments, that phlogisticated air may be composed of phlogiston and dephlogisticated air. In another experiment he found a better proportion of charcoal and red precipitate. This was by mixing one ounce of precipitate with the same quantity of perfect charcoal hot from the retort in which it was made. Putting these into a coated retort, he expelled from them, by a strong heat, about thirty ounce-measures of air, the whole of which was the purest fixed air, leaving only about one-fortieth part unabsorbed by water, and this almost perfectly phlogisticated.

Having recollected that formerly he had obtained fixed air from nitrous acid and charcoal, he repeated the experiment with some of the same charcoal which had then been used; when fixed air was obtained, in the quantity sometimes only of one-fifth, and sometimes of one-half; to the formation of which he supposed the dephlogisticated air produced by heating the nitrous acid must have contributed. On account of the objections, however, which might be made to the use of charcoal, he next employed iron, which was liable to nothing of this kind; and on mixing an ounce of it with an ounce of charcoal, and then heating them in a glass retort, he obtained twenty ounce-measures of air, of which one-seventh remained unabsorbed by water. The residuum was of the standard of 1.52, but slightly inflammable. Repeating the experiment with half an ounce of iron-filings, he got twenty-six ounce-measures of air, of which the first part was pretty pure, but afterwards one-tenth remained unabsorbed by water; but, on mixing one ounce of precipitate with two ounces of filings, he got about forty ounce-measures of air, of the first portions of which only one-twentieth was unabsorbed by water, though towards the conclusion the residuum was greater. In this process he got in all thirty-six ounce-measures of pure fixed air, completely absorbed by water, besides about four other ounce-measures, which, he supposes, might have been absorbed in receiving the air, and transferring it into other vessels.

Fixed air was also produced from red precipitate mixed with brass-filings, with zinc, from turbithe-mineral with iron-filings, and from the black powder into which mercury mixed with lead is easily converted. In this last case the doctor supposes, that the fixed air was produced from the dephlogisticated kind absorbed by the metals and the phlogiston of the lead; and this is confirmed by an observation, that the fixed air always comes first in the process, when the phlogiston is most readily separated, but afterwards the produce becomes quite pure and dephlogisticated. In attempting, however, to increase the quantity of fixed air by heating this black powder in dephlogisticated air, he found only an augmentation of the quantity of dephlogisticated air, and that of the purest kind.

"Perhaps (says he) as decisive a proof as any of the real production of fixed air from phlogiston and dephlogisticated air, may be drawn from the experiments in which I always found a quantity of it when I burned sulphur in dephlogisticated air. In one of these experiments, to which I gave particular attention, six ounce-measures and a half of the dephlogisticated air were reduced to about two ounce-measures, and one-fifth of this was fixed air. When both the vitriolic acid and fixed air produced by this operation were absorbed by water, the remainder was very pure dephlogisticated air.

"I had always concluded, that no fixed air could be procured by the decomposition of inflammable air which had been produced by mineral acids, because I had not been able to do it with that which I had got by means of vitriolic

vitriolic acid; but I learned from Mr. Methrie, that this is peculiar to the vitriolic acid, the remains of which, diffused through the inflammable air procured by it, he conjectures, may actually decompose the fixed air produced in the process. For, as I have hinted before, when the inflammable air is produced from iron by means of spirit of salt, there is a very perceivable quantity of fixed air when it is united with dephlogisticated air. When I decomposed these two kinds of air in equal quantities, they were reduced to about 0.5 of a measure, and of this not more than about one-fortieth part was fixed air. This experiment ought, however, to be added to the other proofs of fixed air being produced by the union of dephlogisticated air and phlogiston.

"The last instance which I shall mention of the generation of fixed air from phlogiston and dephlogisticated air, is of a much more striking nature than any that I have yet recited. Having made what I call *charcoal of copper*, by passing the vapour of spirit of wine over copper that was red-hot, I heated a piece of it in different kinds of air. In common air, observing neither increase nor decrease in the quantity, I concluded, perhaps too hastily, that no change was made in it; for, when I repeated the experiment in dephlogisticated air, the charcoal burned very intensely; and, when part of it was consumed, (which, like common charcoal in the same process, was done without leaving any sensible residuum,) I found that no heat which I could apply afterwards had any farther effect on what was left of the charcoal. Concluding, therefore, that some change must be made in the quality of the air, I examined it, and found about nine-tenths to be the purest fixed air; and the residuum was such as would have been made by separating the absolutely-pure part of the dephlogisticated air, leaving all the impurities behind. Having ascertained this fact, I repeated the experiment, weighing the piece of charcoal very carefully before and after the process; and then found, that by the loss of one grain of charcoal, I reduced four ounce-measures of dephlogisticated air till one-ninth only remained unabsorbed by water; and again, with the loss of a grain and a half of the charcoal, I reduced six measures and a half of dephlogisticated air till five measures and a half were pure fixed air. In this process there was a diminution of bulk after the experiment, as might have been expected from the change of the air into one of a heavier kind, by means of a substance or principle that could not add much to the weight of it. In one of the experiments, 4.3 ounce-measures of dephlogisticated air were reduced about one-thirtieth part of the whole; and, in this case, when the fixed air was separated by water, there was a residuum of 0.75 of a measure of the standard of 1.0 , whereas the dephlogisticated air, before the experiment, had been of the standard of 0.2 .

"That dephlogisticated air actually enters into the composition of the fixed air, in this experiment, is evident from the weight of the latter, which far exceeds that of the charcoal dispersed in the process. For, in this last experiment, the weight of the fixed air produced was 4.95 grains. Consequently, supposing the charcoal to be wholly phlogiston, as it is very nearly so, fixed air may be said to consist of 3.45 parts of dephlogisticated air, and 1.5 of phlogiston; so that the dephlogisticated air is more than three times the proportion of phlogiston in it. I must not conclude, however, without observing, that, in one experiment, I never failed to produce fixed air; though it is not easy to see how one of its supposed elements, viz. dephlogisticated air, could enter into it. This is by heating iron in vitriolic acid air. In one of these experiments, four ounce-measures of the vitriolic acid air were reduced to 0.65 of an ounce-measure; and of the quantity lost three measures and a half were fixed air absorbed by lime-water, and the remainder weakly inflammable."

Pure fixed air is remarkably altered by the electric spark. Dr. Priestley, having taken the electric spark for about two hours in a small quantity of fixed air, found

that one-fourth of it remained immiscible with water; though, before it, only one-twentieth part had remained unabsorbed. The inside of the tube had become very black; which, in similar experiments with vitriolic acid air, he had observed to arise from the adhesion of a small quantity of mercury superaturated with phlogiston. Pursuing this experiment, by taking the electric spark three hours in a small quantity of fixed air, he observed that it was first increased, and then diminished about one-eighth of the whole; the inside of the tube being very black on the upper part, and below the mercury very yellow, for the space of one-fourth of an inch all round the tube; but this space had been above the mercury in the beginning of the operation. One third of the air remained unabsorbed by water; but so impure, that the standard of it was 1.8 , or almost completely phlogisticated. Varying the process, by using water impregnated with fixed air instead of mercury, the quantity of air was much augmented by that which came from the water; but thus the far greater part of it was incapable of being absorbed by lime-water; and, on this occasion he observed, that water impregnated with fixed air is a much worse conductor of electricity than the same fluid impregnated with mineral acids. On still varying the circumstances of the experiment, by using common water instead of that which had absorbed fixed air, he found that the quality of the residuum was evidently better than that of the original fixed air.

In order to discover whether the heat or light of the electric spark were the circumstances which effected the change, the doctor threw a strong light, by means of a lens, for some hours, on a quantity of pounded glass confined in some fixed air; but these and other trials proved unsatisfactory, though the quantity of air was increased after the operation. By heating iron, however, in fixed air, part of it was evidently converted into phlogisticated air. On heating turnings of malleable iron for some time in fixed air, one-tenth part of it was rendered immiscible with water; and, on repeating the process with the remainder, there was a residuum of one-fourth of the whole. There was also a small addition to the quantity of air after the first part of the process, but none after the second; nor could he, after a third and fourth process, render more than one-fourth immiscible with water. In two experiments, the residuum was inflammable, and burned with a blue flame.

With regard to the quantity of fixed air which may be expelled from different substances, Dr. Priestley observes, that from seven ounces of whiting, the purest calcareous substance we are acquainted with, he expelled by heat 630 ounce-measures of air; by which means the whiting was reduced to four ounces. One-third of this was somewhat phlogisticated, the standard being 1.36 and 1.38 . Repeating the experiment, he obtained 440 ounce-measures of air from six ounces of whiting; about half of which was fixed air, and the remainder of the standard of 1.4 . On moistening some calcined whiting with water impregnated with vitriolic acid air, he obtained ninety ounce-measures; of which the first portions were three-fourths fixed air, and the standard of the residuum 1.5 ; the latter had less fixed air, and the standard of the residuum was 1.44 . The whiting was rendered black and hard, but became soft and white with spirit of salt. Three ounces and a quarter of lime fallen in the air yielded 375 ounce-measures; of which about one-fifth was fixed air, and the standard of the residuum 1.4 . Four ounces of white lead had yielded 240 measures of air when the retort melted. The residuum of the first process was one-third, the standard 1.36 ; and of the last the standard was 1.28 , that with the common atmosphere being 1.23 . Two ounces and three-quarters of wood-ashes yielded, in a very strong heat, 430 ounce-measures of air; of the first portion of which one-tenth, of the second one-third; and of the third one-half, was fixed air. The standard of the residuum of the first portion was 1.6 ; and of the second 1.7 .

It extinguished a candle; so that the air came properly from the ashes, and not from any remaining particles of the charcoal mixed with them. After the process, the ashes weighed 839 grains; but, by exposure to the air for one day, the weight was increased to 842 grains; and, perhaps, with more heat than before, yielded fifty ounce-measures of air; of which about one-eighth was fixed air, and the standard of the residuum 1.38 and 1.41. A candle burned in this residuum, and the ashes were reduced to 789½ grains. Dr. Priestley afterwards subjected Homberg's pyrophorus to similar trials, and the results proved highly interesting, though they afforded no general conclusion.

Inflammable Air.

We owe the knowledge of the existence, and of some remarkable properties, of this air, to Mr. Cavendish, by whom they were first published in 1767. Its effects, however, had long before been fatally experienced by miners; in whose subterraneous habitations it is often collected in such quantities as to produce the most dreadful effects. It is produced in abundance from putrid animal and vegetable substances; and, in general, by all those which part with their phlogiston easily.

Being much lighter than common air, it always rises to the top of those places where it is generated; so that it cannot be confined except in some vaulted place, but always strives to ascend and mix with the atmosphere. By itself it will instantly put an end to animal life; but, mixed with atmospherical air, it may be breathed in much greater quantity than fixed air. Its great inflammability in this state, however, renders it very dangerous to bring lights, or even to strike a flint with steel, in places where it abounds. Yet this only happens when inflammable air is mixed with common atmospherical or with dephlogisticated air; in which latter case, the explosion is by many degrees more violent; but pure inflammable air extinguishes flame as effectually as fixed or phlogisticated air.

But, besides subterraneous places, this kind of air is found in ditches; over the surface of putrid waters; in burying-grounds; in all places where putrid animal and vegetable matters are accumulated. In hot climates, where putrefaction is most prevalent, if the mud at the bottom of a pond be well stirred, and a lighted candle brought to the surface of the water, a flame will instantly spread a considerable way over the water, from the ascension of the inflammable air. In colder climates, though the generation of inflammable air is not so plentiful, it may be easily collected in a jar filled with water, and inverted over a pond, the mud at the bottom being stirred with a stick.

The meteors and *ignes fatui*, which are seen in warm climates, have been supposed nothing more than streams of inflammable air fired in the atmosphere by electric explosions; but these appearances are accounted for in a more satisfactory way. There is hardly any inflammable substance out of which this air may not be extracted, yet the fluids which go by the general name of inflammable air, have scarcely any other property in common, besides those of inflammability, and being specifically lighter than atmospherical air. It is, however, necessary to make a proper distinction between an inflammable gas, properly so called, and that which is evidently made by combining an inflammable substance with common air; which being easily separated leaves that fluid in the state it was before. By heat alone, a considerable quantity of this kind of air may be extracted from most inflammable substances, and even from some of the metals. Dr. Priestley obtained it from a vast number of substances, by distilling them in a gun-barrel, to the extremity of which was luted a tobacco-pipe, with a flaccid bladder tied on the end. He observes, that the heat must be suddenly applied, in order to get a considerable quantity of air from these substances. "Notwithstanding (says he) the same care be taken in luting, and in every other respect, fix, or even ten, times

more air may be got by a sudden heat than by a slow one, though the heat that is last applied be as intense as that which was applied suddenly. In a trial of the metallic calces he had no success.

In the infancy of his experiments, Dr. Priestley imagined, that the inflammable air produced in this way came only from the metal; while Lavoisier, on the other hand, attempted to prove that it proceeded almost exclusively from the water. The method which the latter had followed, was to send the steam of boiling water through a red-hot iron tube; in doing which the intense heat acquired by the water occasioned the production of a great quantity of inflammable air. Dr. Priestley repeated his experiments not only with water, but with other fluids. Sending the vapour of two ounces of spirit of wine through a red-hot earthen tube, he obtained 1900 ounce-measures of inflammable air, which burned with a white lambent flame. It contained no fixed air; and thirty ounce-measures of it weighed eight grains less than an equal quantity of common air. He collected also 0.35 of an ounce-measure of water. In this experiment the weight of the water collected was 168 grains, of the inflammable air 633 grains, and that of the spirit of wine originally was 821 grains; so that as little was lost in the process as could be expected. Repeating the experiment with vitriolic ether, an ounce of it treated in the same manner in an earthen tube almost filled with pieces of broken earthen retorts and crucibles, one-tenth part of an ounce of water was collected, and 740 ounce-measures of inflammable air were procured, without any mixture of fixed air, burning with a white lambent flame like that of wood, and not exploding with dephlogisticated air. Twenty-nine ounce-measures of this weighed five grains less than an equal quantity of common air. Vapour of spirit of turpentine yielded inflammable air mixed with much black smoke, which soon collected on the surface of the water in the receiver. The smell of this air was exceedingly offensive, and its flame was much less luminous than that of the former. Its specific gravity was the same with that of the air procured from spirit of wine. Olive oil yielded a considerable quantity of air on being mixed with calcined whiting; the first portions burning with a large white flame, and the last with a lambent blue one.

In extracting air from solid substances, the steam of water was always necessary; and thus inflammable air was produced from a great number of different ones. From sulphur treated in this manner in an earthen tube, inflammable air was obtained of a nature similar to that from oil of vitriol and iron. From arsenic the produce was one-seventh of fixed air; but all the rest strongly inflammable, with a smell scarcely distinguishable from that of phosphorus. Twenty ounce-measures of this air weighed four grains and a half less than an equal quantity of common air. Both these experiments, however, were very troublesome, on account of the volatility of the matters, which sublimed and choked up the tubes. From two ounces of scales of iron, or *fining cinder*, which he has found to be the same thing, Dr. Priestley obtained 580 ounce-measures of air; one-tenth of the first part of which was fixed air, but afterwards it was all inflammable. Forty ounce-measures of this air weighed two grains more than an equal quantity of common air. From charcoal exposed to the red-hot steam of water, inflammable air was procured in great quantities. From ninety-four grains of perfect charcoal, that is, prepared with a strong heat so as to expel all fixed air from it, and 240 ounces of water, 840 ounce-measures of air were obtained, one-fifth part of which was fixed air; and the inflammable part appeared likewise, by decomposition, to have a quantity of fixed air intimately combined with it. Three ounces of bones burnt black, and treated in this manner in a copper-tube, yielded 840 ounce-measures of air; the water expended being 268 grains, and the bones losing 110 grains of their weight. This air, he observes, differs considerably from that of any other kind of inflammable

air; being in several respects a medium betwixt the air procured from charcoal and that from iron. It contains about one-fourth of its bulk of uncombined fixed air, but not quite one-tenth intimately combined with the remainder. The water that came over was blue, and pretty strongly alkaline; owing to the volatile alkali not having been totally expelled by the heat which had reduced the bones to blacknefs.

A variety of substances, said not to contain any phlogiston, were subjected to the same process, but without yielding any inflammable air. The experiments with iron, however, were the most satisfactory, as being subject to less variation than those with charcoal; and clearly evincing, that the air in the process does not come from the water alone, but from the iron also; or, as Dr. Priestley says, "only from the iron;" the weight of water expended, deducting the weight of air produced, being found in the addition of weight in the iron as nearly as could be expected in experiments of this kind. The quantity of inflammable air that may be procured by steam from any given quantity of iron, the doctor states thus: "960 grains of iron, when dissolved in acids, will yield about 800 ounce-measures of air; but, treated in this manner, it yielded 1054 measures, and then the iron had gained 329 grains in weight."

Inflammable air having been at first produced only from metals by means of acids, it was then supposed that part of the acid necessarily enters into its composition; but, as this hypothesis was proved to be ill grounded by the most decisive experiments, we shall not take up the reader's time farther than by quoting Dr. Priestley's concluding remarks on the subject:—"With respect to inflammable air (says he) I have observed, that when sufficient care is taken to free it from any acid vapour that may be accidentally contained in it, it is not in the smallest degree affected by a mixture of alkaline air. On the whole, therefore, I have at present no doubt, but that pure inflammable air, though it certainly contains water, does not necessarily contain any acid: yet an acid vapour may be easily diffused through it, and may perhaps, in many cases, be obstinately retained by it, as no kind of air seems to be capable of so great a variety of impregnations as inflammable air is."

We are indebted to Mr. Cavendish for the fact that water is necessary to the production of inflammable air, and to Dr. Priestley for the discovery that charcoal is perfectly destructible, or decomposed, *in vacuo*, and, by the heat of a burning lens, almost convertible into inflammable air; nothing remaining besides an exceedingly small quantity of white ashes, which are scarcely visible. The great weight of ashes produced by burning wood in the open air arises from what they attract from the atmosphere. The air got in this manner is wholly inflammable, and without containing the least particle of fixed air; but, in order to this, the charcoal must be made with such a heat as will expel all the fixed air from the wood; and it must be continued till it yield inflammable air only, which, in an earthen retort, is soon produced. Wood or charcoal is even perfectly destructible, that is, resolvable into inflammable air, in a good earthen retort, and a fire that would about melt iron. An ounce of charcoal made from oak generally gives about five ounce-measures of inflammable air in twelve minutes.

The proofs of the agency of water, in the production of inflammable air, Dr. Priestley communicates in the following words:—"Apprised of the influence of unperceived moisture in the production of inflammable air, and willing to ascertain it to my perfect satisfaction, I began with filling a gun-barrel with iron-filings in their common state, without taking any particular precaution to dry them, and I found that they gave air as they had been used to do, and continued to do so many hours: I even got ten ounce-measures of inflammable air from two ounces of iron-filings in a coated glass retort: at length, however, the production of inflammable air from the gun-barrel

ceased; but, on putting water to it, the air was produced again; and a few repetitions of the experiment convinced me, that I had been too precipitate in concluding that inflammable air is pure phlogiston. I then repeated the experiment with the charcoal, making the receiver the stand on which I placed the charcoal, and the charcoal itself as dry and hot as possible, and using cement instead of wet leather, in order to exclude the air. In these circumstances, I was not able, with the advantage of a good sun, and an excellent burning lens, to decompose quite so much as two grains of the piece of charcoal which gave me ten ounce-measures of inflammable air; and this, I imagine, was effected by means of so much moisture as was deposited from the air in its state of rarefaction, and before it could be drawn from the receiver. To the production of this kind of inflammable air, therefore, I was now convinced that water is as essential as to that from iron."

Of inflammable airs the doctor observes, that the difference most commonly perceived is, that some of them burn with a lambent flame, white, yellow, or sometimes blue; while another kind always burns with an explosion, making more or less of a report when a lighted candle is dipped into it. The inflammable air extracted from metals by means of acids is of this last kind; and that from wood, coal, or other inflammable substances, by means of heat, belongs to the former. It has also been observed, that these kinds of inflammable air have different specific gravities; the purest, or that which is extracted from iron, &c. being about ten times as light as common air; but some of the other kinds not more than twice as light.—This difference was for some time attributed to a quantity of fixed air intimately combined with the heavier kinds, so that it could not be discovered by lime-water, while the lightest contained no fixed air at all. In order to ascertain this point, he had recourse to decomposition; which was performed by mixing with the inflammable air to be tried, an equal quantity of common or dephlogisticated air, and then confining them in a strong glass vessel previously filled either with water or mercury; making afterwards an electric spark in some part of the mixture by means of wires inserted through the sides of the vessel, and nearly meeting within it. Thus he supposed that he might be able to determine the quantity of combined fixed air, and likewise the relative quantity of phlogiston contained in each of them. The former appeared by washing the air with lime-water after the explosion, and observing how much of them was absorbed; and the latter by examining the residuum with the test of nitrous air, and observing the purity of it. Finding, however, that in some cases more fixed air was found after the explosion than could have been contained in the inflammable air, he was thence led to observe the generation of fixed air from the principles mentioned on another occasion.

In prosecuting this subject, it was found that one measure of inflammable air produced by steam from metals, and one of dephlogisticated air, such as by mixture with two measures of nitrous air was reduced to 0.72 of a measure, were reduced by explosion to 0.6 of a measure; the residuum, by an equal quantity of nitrous air, was reduced to 0.87. With the same dephlogisticated air, the inflammable air from fining-cinder and charcoal was reduced only to 1.85 of a measure; but by washing in lime-water, to 1.2. The residuum examined by nitrous air appeared to be of the standard of 0.9. In another process, the diminution after the explosion was to 1.55, and that after washing in lime-water to 0.65, of a measure; in a third by explosion, to 1.6, and by washing to 0.66; and in a fourth the first diminution was to 1.6, and the second to 0.6. In this last experiment there was a generation of an entire measure of fixed air; and that this had not been contained originally in any latent state in the original fluid, was evident from the specific gravity of the inflammable air made use of. This, indeed, was one of the heaviest kinds of the fluid: but forty ounce-measures of it weighed only two grains more than an equal bulk of common air; whereas,

had all the fixed air found in the residuum been contained in the original air, it must have been at least one half heavier. "Indeed (says the doctor) if any quantity of inflammable air, of about the same specific gravity with common air (which is the case with that species of it I am now considering), yield so much as seven-tenths of its bulk of fixed air in consequence of its explosion with dephlogisticated air, it is a proof that at least part of that fixed air was generated in the process, because seven-tenths of such fixed air would weigh more than the whole measure of inflammable air."

Numerous experiments, evincing still farther the generation of fixed air in the decomposition of inflammable air, are described by Dr. Priestley, and with various results, according to the processes used, and the different substances employed in procuring the latter. From the whole of them it was evident, that at least part of the fixed air found after the explosion was produced by its means. But the following seem proofs no less convincing that fixed air may be converted into the inflammable kind, or at least that the elements of fixed air may remain in inflammable air in such a manner as to be imperceptible. On heating in an earthen retort a quantity of flaked lime, which had long been kept close corked in a bottle, it gave air, of which one-fifth was generally fixed air; but in the gun-barrel the same lime yielded no fixed air, but a great quantity of inflammable air of the explosive kind, like that which is got from iron alone by means of water. As this total disappearance of the fixed air appeared extraordinary, the doctor was induced to repeat it several times with all possible care: and the following was the result of his experiments: Three ounces of flaked lime, which had for some time been exposed to the open air, heated in an earthen tube, yielded fourteen ounce-measures of air, of which only two and a half remained unabsorbed by water; the residuum was slightly inflammable, but not perfectly phlogisticated. Three ounces of the same lime, heated in a gun-barrel, gave twenty ounce-measures of air, all of which was inflammable, and no part fixed. It was expected, however, that the fixed air would have appeared on the decomposition of this inflammable air with the dephlogisticated kind: but after this process it appeared to be exactly such inflammable air as is procured from metals by the mineral acids, or by steam; the diminution of the two kinds of air being exactly the same: and, though some fixed air was found in the residuum, it was no more than is usually met with in the decomposition of inflammable air procured by means of spirit of salt.—Supposing that the two kinds of air might incorporate, when one of them was generated within the other, a gun-barrel was filled with fixed air, and the closed end of it put into a hot fire. Inflammable air was instantly produced; but, when the fixed air was separated from it, it burned like inflammable air with which no other kind had ever been mixed.

On heating iron-turnings in five ounce-measures of fixed air, the quantity of it was increased about one ounce-measure, and there remained one and $\frac{3}{4}$ unabsorbed by water. The experiment was repeated with the same result; and it was farther observed, that, though the inflammable air procured in this manner did not appear by the test of lime-water to contain any fixed air, yet, when it was decomposed by firing it with an equal quantity of dephlogisticated air, the residuum contained one-third of fixed air. The diminution was to 1.45. Hence the doctor conjectures, that though, in some cases, the fixed air appears to be generated by the decomposition of dephlogisticated and inflammable air, yet that inflammable air, when thus produced in contact with fixed air, may combine with it, so as to be properly contained in it, and in such a manner that it cannot be discovered by lime-water.

Inflammable air, when produced in the driest way possible, is exceedingly light, as has been already observed; but Dr. Priestley has found, that, by standing on water, a very considerable increase is made in its specific gravity; so that, from being ten or twelve times lighter than at-

mospherical air, it soon becomes only seven times lighter. This great propensity to unite with water is also taken notice of by Mr. Kirwan; who tells us, that the bulk of inflammable air obtained over water with the assistance of heat towards the end, was one-eighth greater than when produced over mercury; but that the weight of it in the former case was only eight or nine times less than common air.—"From eighty-five cubic inches of inflammable air obtained over water, I extracted," says he, "by oil of vitriol exposed to it for fifty-five hours, two grains of water; and, though undoubtedly there is an error in all these experiments, yet there can be little doubt but this inflammable air contained one-half its weight of water. The inflammable air, by the subtraction of its water, lost its smell, but continued as inflammable as ever; and therefore there is no reason to think that it was decomposed, or that water is any way essential to it."

This conclusion is directly contrary to that of Dr. Priestley, that water is an essential ingredient in the composition of inflammable air; nor do the experiments of the latter seem to have had any weight with him. On the other hand, Dr. P. informs us, that "inflammable air seems now to consist of water and inflammable air; which, however, seems extraordinary, as the two substances are hereby made to involve each other; one of the constituent parts of water being inflammable air, and one of the constituent parts of inflammable air being water; and therefore, if the experiments would favour it (but I do not see that they do so), it would be more natural to suppose, that water, like fixed air, consists of phlogiston and dephlogisticated air, in some different mode of combination."

"There is an astonishing variety in the different kinds of inflammable air, the cause of which is very imperfectly known. The lightest, and therefore probably the purest, kind, seems to consist of phlogiston and water only. But it is probable that oil, and that of different kinds, may be held in solution in several of them, and be the reason of their burning with a lambent flame, and also of their being so readily resolved into fixed air when they are decomposed by dephlogisticated air; though why this should be the case I cannot imagine."

"When inflammable and dephlogisticated air are burned together, the weight of the water produced is never, I believe, found quite equal to that of both kinds of air. May not the light, therefore, emitted from the flame, be part of the phlogiston of the inflammable air united to the principle of heat? And, as light accompanies the electric spark, may not this also be the real occasion of some phlogistic matter, though it is not easy to find the source of it."

The French chemists, who deny the existence of phlogiston, are of opinion, that inflammable air is a simple un-compounded element. See PHLOGISTON.

It has been proved by experiment, that inflammable air is absorbed by water in considerable quantity, and that, by the application of heat, it may be expelled again in equal quantity. Plants in general grow tolerably well in inflammable air, and the willow plant has been observed to absorb great quantities of it. Its inflammability is not diminished by the putrefaction of animal substances, nor does their putrefaction seem to be retarded by it. Animals confined in it are killed almost as soon as in fixed air: but insects, which can live a considerable time in phlogisticated air, live also a considerable time in this. The Abbé Fontana, having filled a large bladder with inflammable air, began to breathe it. The first inspiration produced a great oppression in his lungs, the second made him look very pale, and the third was scarcely accomplished when he fell on his knees through weakness. Birds and small quadrupeds, inclosed in small vessels of this air, died after a very few inspirations. Lastly, inflammable air possesses a smaller share of refractive power than common air: as appears from Mr. Wurtz's experiment with an hollow triangular prism filled with it.

The inflammability of this air has given occasion to various projects, such as lamps, &c. which may be lighted

by the electric spark. Very pretty artificial fires are also made, with glass tubes bent in various directions, and pierced with a great number of small apertures. The inflammable gas is pressed forward into these tubes, from a bladder, and the inflammable air, issuing out of all the small apertures, is set on fire by a lighted taper. None of these contrivances, however, has proved of any use; and the scheme of Mr. Volta, for substituting its explosive force instead of gunpowder, is found insufficient.

Sulphurated Inflammable Air.

This was discovered by Dr. Priestley at the time he was engaged in transmitting steam through red-hot tubes containing some solid material. Having treated manganese in this manner, by stopping one end of the heated tube with a cork before the steam was applied, he received forty ounce-measures of air, of which one-sixth was fixed air, and the rest of the standard of 1.7, lambently inflammable. Having then opened the other end of the tube in order to admit the steam, air was produced more copiously than before. Of fifty ounces of this air, one-seventh was fixed, and the rest, of the standard of 1.8, explosively inflammable. The last portions were very turbid; and the smell, especially that of the last portion, was very sulphureous, tinging the water of a very dark colour, by depositing in it a quantity of blackish water. However, the air itself became presently transparent; but on looking at the jar in about ten minutes after, it was quite black and opaque; so that nothing could be seen in the inside of it. Filling afterwards another jar with the same kind of air, in order to observe the progress of this uncommon phenomenon, he found, that when the water was well subsided, black specks began to appear in different places, and, extending themselves in all directions, at length joined each other, till the whole jar was become perfectly black, and the glass opaque. When this was done, he transferred the air into another jar; and it soon produced a similar effect upon this, though it never became so black as the jar in which it had been first received. It also frequently happened, that only the lower part of the jar would become black, as if the matter with which it was loaded had kept subsiding, though invisibly, in the mass of air, and occupied only the lower regions, leaving the upper part entirely free from it. On exposing to the open air the vessels thus turned black, the colour presently disappeared, and a yellow or brown incrustation was left upon it.—Other specimens of manganese produced no air of this kind; but iron that had been melted in vitriolic acid air yielded it readily. Dissolving this with a considerable quantity of fresh metal in diluted vitriolic acid, he found that the water in which the air was received became very black, and deposited more sediment than in the experiment with manganese. On burning a quantity of it, this kind of air appeared to contain some vitriolic acid; but, on decomposing it with dephlogisticated air, the diminution was exactly the same as when common inflammable and dephlogisticated air were used; only there was a small quantity of fixed air produced, which is never the case with common inflammable air from vitriolic acid and iron.

Of Alkaline Air.

This was first procured by Dr. Priestley, who obtained it by mixing one part of pounded sal-ammoniac with three parts of flaked lime. When pure, it is instantly fatal to animal life, and extinguishes flame; though, when mixed with atmospheric air, it is slightly inflammable. A candle dipped into this air is extinguished; but, just before the flame goes out, it is enlarged by another flame of a pale yellow, and sometimes a weak flame spreads for a considerable way, or even through the whole body of the alkaline air. Electric sparks taken in it appear of a red colour, augment its bulk, and by degrees turn the whole into inflammable air. It is readily absorbed by water, and dissolves ice almost as fast as a hot fire. On confining some water impregnated with alkaline air in a glass tube,

and exposing it to a strong heat for some days, a white pellicle or incrustation formed on its surface. Bits of linen, charcoal, and sponge, admitted into alkaline air, diminished it, and acquired a very pungent smell; especially the sponge, a bit of which about the size of an hazle-nut absorbed an ounce-measure. It is remarkable that copper, which is so easily corroded by the common volatile alkalies, is not affected by alkaline air. Its specific gravity Mr. Kirwan determines to be to that of common air as 600 to 1000; though this differs considerably according to the moisture it contains.

In prosecuting his experiments on alkaline air, Dr. Priestley concluded that it contains phlogiston, both from its being convertible into inflammable air by electric explosions, and likewise from its reviving the calces of metals. In attempting to ascertain the proportion of lead revived in alkaline air, he found six grains of lead in three ounce-measures, sixteen and a half in three and a half measures, thirteen in two and a half, and twelve in three and three quarters; but the experiment on which he laid the greatest stress, was that in which twenty-six grains and a half of lead were revived in seven and a half ounce-measures of alkaline air. In this proportion, 100 ounce-measures of alkaline air would revive 352 grains of lead; but an equal quantity of inflammable air from iron would have revived 480 grains of metal. This deficiency appeared somewhat surprising, since alkaline air is resolved into more than twice its bulk of the inflammable kind; though possibly inflammable air from iron may contain more phlogiston than that into which alkaline air is resolvable.—On heating red precipitate in alkaline air, the mercury was revived as in other cases, and a considerable quantity of water produced, though none appeared on reviving it with common inflammable air.

In examining the phenomena which attend the conversion of alkaline air into the inflammable kind, the doctor was induced to believe that it was occasioned by heat alone, without the concurrence of light. The effects of the former were first perceived on heating some ochre of iron in alkaline air; when, though the matter turned black, as in an incipient reduction of the metal, he found a considerable increase of quantity, instead of decrease, in the air, as he had expected; and, on examining the quality of it, he found that it contained no fixed air, but was entirely inflammable. In all his experiments, however, with a burning-glass, as a strong light was concerned, he heated a quantity of alkaline air in a green glass retort, receiving in a glass tube, filled with water, all the air that could be expelled from it by heat. At first it was all absorbed by the water, being merely alkaline air expelled by the rarefaction; but, when the bulb of the retort became red-hot, he found that the bubbles driven out were not wholly absorbed, and at last none of them were so. These were altogether inflammable; so that no doubt remained of the change being produced by heat alone, without any intervention of light.

It was farther observed, that, whenever the alkaline air was changed into inflammable by means of bits of retorts or crucibles containing clay, they always became black during the process. He therefore supposed, that something might be deposited from the air upon the clay. "Indeed (says he), if this was not the case, I do not see why the clay should become black; though, perhaps, part of the same phlogiston which forms the inflammable air may be attracted by the red-hot clay, without there being any proper decomposition of the air. That this is the case seems probable from an experiment in which I used porcelain instead of common earthen ware; which did not become black in the process, though inflammable air was produced."

In some of Dr. Priestley's experiments, he had observed that iron which had long rusted in nitrous air gave out a strong smell of volatile alkali. This extraordinary phenomenon, however, was only perceived where the nitrous air and iron had been in contact for a very long time; but he

he found that it was much sooner produced by making use of a weak solution of copper; by putting iron into which, he obtained that species of nitrous air, called *dephlogistated*.

Of Nitrous Air.

This kind of air is plentifully obtained in all cases where the nitrous acid is combined with phlogiston. Thus, when it is mixed with metals, or animal or vegetable substances, nitrous air is produced in great quantities; but very sparingly when treated with metallic calces, earths, or other matters, which are said to contain little or no phlogiston. All the metals, except gold, platina, and regulus of antimony, which are not soluble in the pure nitrous acid, yield nitrous air on being treated with it; and, even from these, when dissolved in aqua regia, some quantity of this air may be obtained. Every metal, however, does not yield it in equal quantity, with equal facility, or equally good. Silver, copper, iron, brass, bismuth or nickel, when put into nitrous acid, yield this air in considerable quantity. Mercury yields it but slowly without the application of heat, though no great degree of it is necessary. Copper and iron, especially the latter, require the acid to be cautiously applied on account of the violent emission of fumes. Gold, platina, and regulus of antimony, when put in aqua regia, yield nitrous air pretty readily; but lead yields it in smaller proportion than any other metal; and zinc does the same among the semi-metals, the elastic fluid produced from it being mostly phlogisticated air.

In the production of this kind of air, great differences are perceived by a diversity in the strength of the acid. Thus, if we dissolve copper in strong nitrous acid, no nitrous air is produced, though the same materials will yield air in great quantity by the mere affusion of water to dilute the acid. This is very properly explained by Doctor Priestley, from the property that the nitrous acid has of attracting phlogiston, which is evident from what happens in the solution of mercury. When strong spirit of nitre is poured upon this metal, the solution soon begins, and is very rapid, yet not a single bubble of elastic fluid is produced; but in a short time the acid next to the mercury is changed of an orange-colour, which is an indication of its having acquired phlogiston, probably from the nitrous air which is decomposed the moment it is formed, and before its particles are united into visible bubbles. The bubbles of air indeed break through the coloured acid, but they disappear the moment they come in contact with the pale-coloured acid. As soon as the whole quantity of acid has assumed the orange-colour, nitrous air escapes from it in considerable quantity; but the mixture of water deprives the acid of its power of decomposing nitrous air. The strong and pale-coloured nitrous acid ought to be diluted with at least two or three parts of water to one of the acid, for the easy production of nitrous air from copper and mercury. For common experiments, except the latter be used, no other degree of heat is necessary than that produced by the effervescence.

Nitrous air is equally as invisible as common air, except at first, when it is somewhat coloured, owing to a little superfluous nitrous acid, or to some earthy particles carried up with it. Its smell resembles that of nitrous acid, or, indeed, is the very same; because, in passing through the common air to our nostrils, it is decomposed, and converted into nitrous acid. The same is to be said of its taste; though M. Fontana, who tasted it without any contact of external air, affirms that it has no taste whatever. Though nitrous air extinguishes flame, it may be brought into such a state that a candle will burn in it with an enlarged flame; and it becomes what Dr. Priestley calls *dephlogistated nitrous air*, of which hereafter.

Nitrous air is the most fatal of any to animal life. Even insects, which can bear phlogisticated and inflammable air, generally die the moment they are put into it. Frogs, snails, and other animals which do not respire very fre-

quently, die in a few minutes, and seldom recover even when taken out of this noxious fluid before they are dead. Plants perish very soon in nitrous air, and even in common air saturated with nitrous air; but Dr. Priestley informs us of one instance to the contrary, where the superfluous nitrous air was let out under water, so that no part of it was decomposed in contact with the water.

By agitation in nitrous air, water may be made to imbibe one-tenth of its bulk; and afterwards the nitrous air may be expelled again by boiling, though not in the same quantity as it was absorbed; but for this purpose the water should be previously deprived of its air. Dr. Priestley obtained about one-fourth part, sufficiently pure, and without any mixture of fixed air. Nitrous air is absorbed by strong vitriolic acid nearly in the same quantity as by water; the acid acquiring a purple colour, by reason of the phlogiston contained in the air. The strong nitrous acid absorbs it in great quantity; and becomes smoking, orange-coloured, and afterwards green, on account of the phlogiston contained in it. Marine acid imbibes but a small quantity, and very slowly, acquiring at the same time a light-blue colour. Both nitrous air and common air phlogisticated by it are meliorated by agitation in nitrous acid.

Nitrous air is absorbed in considerable quantity by the concentrated vegetable acid. A solution of vitriolated iron imbibes it in much greater quantity than water, and acquires a black colour; which, however, soon goes off by exposure to the common air. Its taste also becomes acid. Very little is absorbed by caustic alkalies. Olive-oil slowly absorbs a considerable quantity, but oil of turpentine much more. By a little agitation, it will imbibe more than ten times its quantity of nitrous air; acquiring at the same time a yellowish or orange colour, and becoming a little glutinous. The part not absorbed appears to be converted into phlogisticated air. Ether and spirit of wine absorb it very quickly, but no nitrous air is obtained by the application of heat after they have absorbed it. It is greatly diminished by oil of turpentine, liver of sulphur, and pyrophorus; all of which leave it in a phlogisticated state. It is also diminished and phlogisticated by being kept in a bladder, alternately exposed to moisture and dryness. Nitrous acid air has the same effect.

One of the most remarkable properties of nitrous air is its diminution with dephlogisticated air; by which means it becomes a test of the quantity of that kind of air contained in the atmosphere. With pure dephlogisticated air, the diminution is almost to nothing, at the same time that some quantity of nitrous acid is reproduced by the decomposition of the nitrous air; but, as our atmosphere is always mixed with a considerable quantity of phlogisticated air, on which nitrous air has no effect, the diminution in this case is never so considerable. Upon this principle the *Eudiometer* is constructed.

Another very remarkable property of nitrous air is its strong antiseptic power; inasmuch that animal matter may be preserved by it for many months. It becomes however very offensive both to the nostrils and palate, though the smell is not altogether that of putrefaction. The specific gravity of nitrous air, as well as of other kinds, has been ascertained by Mr. Kirwan. As it corrodes metals, he endeavoured to find its weight by comparing the loss sustained by the materials which produce it. Thus he found, that fourteen grains of the materials produced 38.74 inches of nitrous air; and, consequently, by proper calculation, that the specific gravity of nitrous air is to that of atmospheric air as 1195 to 1000.

With regard to its constituent principles, all those who regard phlogiston as a distinct substance have believed, that the former is a compound of nitrous acid and phlogiston. By the opposite party, it is supposed to be a substance entirely simple, and one of the constituent parts of the nitrous acid. This opinion seems in part now to be entertained by Dr. Priestley himself, notwithstanding his former sentiments on the subject. "I had no doubt on

this subject (says he) until I read the work of Mr. Metherie; who asserts, that nitrous air contains no proper nitrous acid, but only one of the elements of it; the other being dephlogisticated air, which had before been considered by M. Lavoisier as the principle of all acidity. Among other observations in support of his assertion, Mr. Metherie has the following:—1. Nitrous air burnt together with inflammable air produces no nitrous acid. 2. Though nitrous air be obtained from a solution of mercury in the nitrous acid, almost all the acid is found in the solution. 3. Nitrous air absorbed by marine acid does not make aqua regia. 4. He is of opinion, that a small portion of the nitrous acid, being decomposed, furnishes a pure air, so altered, that, uniting with inflammable air, it changes it into nitrous air. To ascertain the matter more fully, the doctor proceeded to try various experiments on the decomposition of nitrous air, particularly that of burning Homberg's pyrophorus; but without success, or obtaining the smallest particle of nitrous acid.—His conclusions from the whole are these: Water seems to be a necessary ingredient in nitrous as well as inflammable air; at least, without a quantity of water, nitrous air cannot be formed. For example, copper will be dissolved in strong nitrous acid without producing any nitrous air, just as iron may be dissolved in concentrated vitriolic acid without producing inflammable air.

"That nothing is necessary to the formation of nitrous air besides phlogisticated nitrous acid and water, is evident from the production of it by the impregnation of pure water with phlogisticated nitrous vapour formed by the rapid solution of bismuth. Nitrous air is also produced by pouring a highly-coloured or phlogisticated nitrous acid into pure water, in which no metal or earthy matter is any way concerned.

"I have formerly observed, how readily nitrous air is diminished by taking the electric spark in it. This experiment I have frequently repeated, in order more particularly to ascertain the quantity and quality of the residuum. In one experiment, the electric spark was taken in a quantity of nitrous air till it could be no more diminished, when it was reduced in bulk in the proportion of ten and a half to twenty-four. Letting it stand all night upon the mercury, it was increased in the proportion of eleven and a quarter to twenty-four; seemingly by the acid uniting to the mercury and generating more nitrous air, since it had that smell. No water appeared after the process; and the water admitted to it acquired no acid taste, but an astringent one like that of water impregnated with nitrous air. There was a white powder formed, as in the former experiments. To try if it were possible to make water imbibed the acid from the nitrous air, the electric spark was taken in it, with a small quantity of water over the mercury. But even this water did not acquire any acid taste, but only an astringent one."

The doctor concludes this subject with a conjecture, that the phlogiston, and neither the heat nor light of the electric spark, contributes to the decomposition of the nitrous air.

Of Dephlogisticated Nitrous Air.

This species of air differs from common nitrous air in being able to support flame, though it still continues fatal to animal life. Common nitrous air may be converted into the dephlogisticated. When zinc is dissolved in nitrous acid, if the air be taken at different times, that which comes about the latter end of the process will be of this kind, and not only support the burning of a candle, but cause the flame to enlarge greatly by the addition of a weaker and blueish flame round the former; and this with a crackling noise, as if the candle were burning in dephlogisticated air. It may also be obtained in procuring nitrous air from iron, though this metal is uncertain: but tin yields a considerable quantity of it. By exposing iron to nitrous air, it may be so far dephlogisticated as to

admit a candle to burn in it, but the experiments made with that metal have proved remarkably uncertain and inconclusive.

In describing the component parts of this kind of air, Dr. Priestley observes, that water is absolutely necessary to its composition, or rather to the decomposition of the common nitrous air by iron. He had decomposed it before, either by previously filling the vessels that were to contain the nitrous air with water or with mercury; though it had always required a much longer time when the latter was made use of. The reason of its being formed at all in this last way, was a small quantity of moisture adhering to the inside of the vessel containing the mercury.

To try the influence of water, he put a number of very clean small needles into a vial, and, filling it up with mercury, introduced the nitrous air: but it continued six or eight months without alteration. Introducing a few drops of water, a diminution of about one-third of the air took place, and the remainder appeared to be phlogisticated. In another experiment with iron-shavings, one-half was absorbed, and the remainder supported the flame of a candle better than common air, though a mouse died in it; and yet this air had continued several months in the same state with regard to its quantity and quality.

Though this kind of air is produced by the contact of iron and nitrous air, the doctor had never been able to ascertain the quantity of nitrous air which a given quantity of iron can decompose; and, though iron soon becomes so much affected by this process that it crumbles into powder, it still seems equally capable of decomposing a fresh quantity. Having made a comparative experiment, by putting together one quantity of nitrous air with fresh iron and another with rust, he found that in both the air was diminished to about one-third, and a candle burned in both equally well; but neither of them had the properties of fresh nitrous air in any degree.

As the process for obtaining dephlogisticated nitrous air by means of iron is very tedious, the doctor endeavoured to find another which might be attended with less inconvenience. This he accomplished by dissolving turnings of iron in a dilute solution of copper in nitrous acid (the same that remains after the production of nitrous air), mixing it again with an equal quantity of water. Without this precaution, he tells us, that, though the iron will at first be acted upon very slowly, yet the mixture will at length grow so hot as actually to boil, and the process will be exceedingly troublesome: however, it will be necessary, previous to any attempt to dissolve the iron, to heat the solution of copper, in order to expel all the nitrous air and superfluous nitrous acid. Without this precaution a quantity of common nitrous air will be produced.

Water absorbs dephlogisticated nitrous air almost as readily as fixed air; taking up about one-half its bulk of air. After being thus saturated, the whole quantity of dephlogisticated nitrous air may be expelled pure by heat. It resembles fixed air also in this farther property, that all the air which has been actually incorporated with the water will not be imbibed by water again. But the proportion of this part is three or four times greater than the corresponding part of fixed air; and is also much more phlogisticated. Water very soon parts with it on being exposed to the atmosphere. Neither acid nor alkali can be discovered in it. Its specific gravity is less than that of common air. On heating red precipitate in it, pure dephlogisticated air was produced without affecting, or being affected by, the nitrous air. Malleable iron occasioned the quantity of it to be enlarged, and the whole phlogisticated, without any mixture of fixed air. By heating bits of clean crucibles or retorts in this kind of air, it seemed to approach in quality to common atmospherical air. By the electric spark it became immiscible with water, and was brought to the standard of 1.45; so that there seemed to be no doubt of its being respirable. Yet this kind of air, though a candle burns so well in it, will

not kindle pyrophorus, though the nitrous air from which it is produced instantly sets it on fire.

Of Vitriolic, Nitrous, Marine, and other, Acid Airs.

Of Vitriolic Acid Air. This is always a combination of vitriolic acid with phlogiston, and consequently may be produced from any mixture of that acid in its highly concentrated state with phlogistic matter. Hence all the metals yield it, gold and platina excepted, on boiling them with strong vitriolic acid, which itself will produce it when rendered black by any phlogistic matter. To expel this kind of air the flame of a candle is sufficient. It is the heaviest of all except fluor acid air, being to common air as 2265 to 1000. Dr. Priestley asserts, that a quantity of vitriolic acid thus impregnated with phlogiston will yield many times more air than an equal quantity of the strongest spirit of salt. When the vitriolic acid air is produced in great plenty, the top of the vial in which it is generated is commonly filled with white vapours. The air has also the same appearance as it is transmitted through the glass tube; and it is sometimes discolourable in the recipient. It is most equably produced by using strong vitriolic acid and charcoal; but the production of this kind of air is mostly attended with that of inflammable, and sometimes fixed or phlogisticated, air. With ether about one-half of the first produce is inflammable; but the quantity lessens as the process goes on. Copper, silver, and lead, when heated in vitriolic acid, yield the purest vitriolic acid air; but lead yields only a small quantity, and requires a great heat. It is procured in the greatest abundance from the fumes of burning sulphur, and is then called the *volatile vitriolic* or *sulphureous acid*.

Of Nitrous Acid Air. This is the pure nitrous acid by itself, without any addition of phlogiston. It is procured by heating the strong spirit of nitre in a vial, and receiving the vapour in glass vessels filled with quicksilver. It is difficult, or rather impossible, to preserve it for a length of time, by means of any fluid. Water absorbs it immediately, and quicksilver is corroded, and produces nitrous air.

The most remarkable property of this vapour is, that its colour may be more or less heightened by the mere circumstance of heat; the intensity of colour diminishing as it becomes cool. "It seems probable (says Dr. Priestley), that if this vapour was not confined, but had room to expand itself, it would become colourless with heat. This at least is the case when it is combined with water. The phenomena I refer to are very common in the processes for making dephlogisticated air, in which I first observed them. But the same things are observable in the process for producing any other kind of air in which much spirit of nitre is made use of; and likewise constantly in the common process for making spirit of nitre itself. It is, that, when the heat is moderate, the vapour within the glass tube or retort is red; but that, as the heat increases, it becomes transparent." The doctor having observed that red lead impregnated with nitrous vapour lost its red colour and became white, "I put (says he) a small quantity of this white minium into a glass tube closed at one end; then, holding it to the fire, make it emit the red vapour till the whole tube is filled with it; and, having the other end of the drawn out ready for closing, as soon as the vapour begins to issue out of that end I apply my blow-pipe and seal it. By this means I conclude that the tube is filled with a pure red vapour, without any mixture of nitrous air, and perhaps common air also."

Of Marine Acid Air. The marine acid, by heat, may be resolved into a permanently-elastic and transparent invisible vapour, which, not acting on quicksilver, is more easily preserved than nitrous acid air. It is easily and cheaply obtained by filling a vial, fitted with a glass tube and stopper, with common salt, and then pouring a small quantity of vitriolic acid upon it; which, by the assistance of heat, will disengage the acid principle, or the marine acid air, from the salt. A vial thus prepared will suffice,

for common experiments, many weeks; especially if fresh vitriolic acid be occasionally put to it. It only requires a little more heat at the last than at the first. After all the air is expelled, it is so weak as barely to corrode iron. The gas itself is to common air as five to three; a cubic inch weighing 0.654 grains. It is very fatal to animal life, but less so than pure nitrous air. On dipping a candle into it, the flame is extinguished; but the moment before it goes out, and when it is afterwards lighted again, it burns with a green or light-blue flame, like that of common salt thrown into a fire. Its diminution by the electric spark is barely perceptible. Ice is dissolved by it as fast as by a red-hot iron. It is partly absorbed by almost every substance containing phlogiston, and the remaining part becomes inflammable. Oil of olives absorbs it very slowly, and oil of turpentine very fast; by which they both become almost black, and the remainder of the air is inflammable. Essential oil of mint absorbs marine air pretty fast, becoming brown, consistent, and so heavy as to sink in water; and its smell is in great measure altered. Ether absorbs it very fast, the mixture becoming first turbid, then yellow, and at last brown. The air over the ether is strongly inflammable. A small bit of phosphorus smoked and gave light in this acid air; and the elastic fluid was but little diminished in twelve hours. About four-fifths of the gas were absorbed by water, and the rest was inflammable. This change was also effected by a number of other substances; some of which, however, required a considerable time to produce their effect.

Of Fluor Acid Air. Mr. Scheele first obtained this kind of air by distilling the spar called fluor with vitriolic acid. Dr. Priestley, who made several experiments upon the subject, was of opinion that this new acid was only the vitriolic disguised by its connection with the fluor. He even supposed that he had produced it by pouring vitriolic acid on other phosphoric spars: both these opinions, however, he has now retracted, and believes the fluor acid to be one of a peculiar kind. Its most remarkable property is the great attraction it has for siliceous earth, so that it even corrodes and makes holes in the retorts, in which it is distilled. Some curious etchings on glass have been performed by it.

Of the Vegetable and another Acid Air. By the help of heat alone, the concentrated vegetable acid emits a permanently-elastic and aerial fluid. This has the properties of the acid of vinegar; but, like it, is weaker than the mineral acid airs, though similar in its general characters. Water imbibes it as readily as any of the other acid airs; olive-oil absorbs it in considerable quantity, losing at the same time its yellowish colour. Common air is phlogisticated by it, as by the liquid vegetable acid. As the vegetable acid, however, from which this air had been obtained, was distilled with oil of vitriol, it may rather be vitriolic than vegetable acid air.

A new kind of acid air was obtained by Dr. Priestley from distilling to dryness a solution of gold in marine acid impregnated with nitrous acid vapour, which makes the best kind of aqua regia. The produce was an acid air partaking both of the nature of the nitrous and marine acids; but more of the latter, as it extinguished a candle, which exhibited a most beautiful deep blue flame, and on being dipped into the same jar went out more than twenty times successively, making a very pleasing experiment. The quantity of this acid air is very great; and the residuum sometimes dephlogisticated, sometimes phlogisticated, and at other times nitrous, air.

To the article CHEMISTRY we refer for other particulars relative to the different kinds of air here spoken of.

Of Hepatic Air.

This species of air was first obtained by Mr. Bergman, from an ore of zinc called *Pseudogalena nigra Dannemorensis*. It was produced, but in small quantity, from vitriolic acid poured on this mineral. Spirit of salt yielded it in much larger quantity; but nitrous acid produced only
nitrous

nitrous air. Marine acid poured on hepar sulphuris extricates it however in vast quantity. It is also produced naturally from putrefying matter. The smell of the pure gas is intolerable; and it has a disagreeable effect on silver, lead, copper, &c. which it renders quite black. It is suddenly fatal to animal life, turns syrup of violets green, and is inflammable, burning with a very light blue flame. It is decomposed by vitriolic and nitrous air, by dephlogificated air, and by the contact with atmospheric air, in which case it deposits a small quantity of sulphur; being indeed, as is supposed by Mr. Bergman and Mr. Kirwan, no other than sulphur in an aerial form. Its specific gravity, compared with atmospheric air, is as 1106 to 1000. It combines readily with water, and gives the smell to the sulphureous medicinal waters. Its great attraction for some of the metals and their calces makes it the basis of some kinds of SYMPATHETIC INK.

Of Atmospherical Air.

As the two component parts of our atmosphere, viz. dephlogificated and phlogificated air, have already been treated of, little remains to be determined, except the proportion in which they exist in the common air. Mr. Scheele constructed an eudiometer, with which he examined the goodness of the common air in Stockholm every day for a whole year, and found the diminution never to exceed $\frac{10}{30}$, nor to fall short of $\frac{8}{33}$; so that upon a medium it may be estimated at $\frac{9}{35}$. During the months of January and February it was $\frac{9}{33}$. The 23d of March it was $\frac{8}{33}$, though the cold increased, and the barometer stood higher. The 19th of April it was $\frac{10}{33}$, though the barometer and thermometer did not vary, and so stood till the 21st. In May and June it stood between $\frac{9}{33}$ and $\frac{10}{33}$. The 30th of July it stood at $\frac{10}{33}$. From the 3d to the 15th of September at $\frac{9}{33}$. The 6th of October at $\frac{10}{33}$, during a high storm; but after it stood between $\frac{8}{33}$ and $\frac{9}{33}$, till the 4th of November, when it fell to $\frac{8}{33}$, and continued between $\frac{8}{33}$ and $\frac{9}{33}$ to the 20th, when it rose to $\frac{9}{33}$. The 21st it fell to $\frac{8}{33}$, and stood between $\frac{8}{33}$ and $\frac{9}{33}$ till the 8th of December, when it rose to $\frac{9}{33}$; and from thence to the 31st it stood between $\frac{8}{33}$ and $\frac{9}{33}$.

As the pure dephlogificated part of the atmosphere is consumed by phlogistic processes, such as that of fermenting brimstone and iron-filings, which formed the materials of this eudiometer, it must be considered as an exact test of the proportion of dephlogificated air contained in the atmosphere. The small variation in the quantity shews, that the processes in nature which destroy this air are nearly balanced by those which produce it; though it must appear surprising, that both these fluids, so extremely different, should be produced at all seasons of the year in a proportion nearly equal; nor is it less surprising that two fluids of unequal specific gravity should remain incorporated together without any tendency to separate, which it is certain they never do, either in the atmosphere itself, or when confined in vessels in any quantity whatever.

As phlogificated air is somewhat lighter than dephlogificated, it will hardly be supposed, that the upper parts of the air contain a greater proportion of dephlogificated air than those near the earth, which however is proved by the eudiometer.

Of the Artificial Production of Airs of different Kinds.

Fixed Air, or Aërial Acid. The artificial methods of producing this are principally three, viz. by fermentation, by heat, and by acids.

By fermentation. When vegetable or animal substances, especially the former, are fermented, they yield a great quantity of fixed air. In breweries, on the surface of the fermenting liquor, there is always a stratum of fixed air reaching as high as the edge of the vat. The case is the same whatever substance it is that undergoes the vinous fermentation, though the quantity of fixed air produced is not the same in all cases, nor even in the same substance at different times. From forty-two cubic inches of beer

Dr. Hales obtained 639 cubic inches of air in thirteen days. From a quantity of sugar undergoing the vinous fermentation, Mr. Cavendish obtained so much fixed air, that out of 100 parts of the former fifty-seven appeared to have been volatilized and converted into fixed air. As the briskness and agreeable pungent acidulous taste of all fermented liquors depends on the quantity of fixed air remaining in them, whenever they become vapid and flat, we are able to restore their flavour by impregnating them again with fixed air, either naturally or artificially produced.

Dr. Priestley made several experiments in order to determine the quantity of fixed air contained in several sorts of wine, and found that

1½ oz. measure of	Madeira	contained of pure fixed air	$\left\{ \begin{array}{l} \frac{1}{100} \\ \frac{2}{8} \\ \frac{1}{4} \\ \frac{1}{12} \\ \frac{1}{20} \\ 2 \text{ oz. measures,} \\ 3\frac{1}{2} \text{ ditto.} \end{array} \right\}$	of an ounce measure.
	Port of six years old			
	Hock of five years			
	Barrelled claret			
	Tokay of 16 years			
	Champaigne of 2 years			
	Bottled cyder 12 years			

During the acetous fermentation also, liquors emit a vapour, great part of which is fixed air, though the nature of its other component parts has not yet been thoroughly ascertained.

Fixed air is likewise produced, though in no great quantity, by putrefaction. In this case, however, a great part of the elastic fluid consists of inflammable and phlogificated air, and the fixed air itself seems to be intimately connected with a putrid offensive effluvia. The elastic fluid produced by vegetables putrifying in a moderate degree of heat, is almost all fixed air. These yield almost all the permanently-elastic fluid in a few days, but animal bodies continue to emit it for several weeks.

By heat. In every combustion, except that of sulphur or of metals, a quantity of fixed air is generated. During its extrication from atmospherical air, the latter is supposed to be considerably diminished; but Lavoisier and Scheele have now rendered that opinion doubtful. If charcoal be burned by a lens when contained in a glass receiver inverted in water, after the apparatus is cooled, the water will have mounted a small way into the receiver. The diminution, however, is limited, and depends on several circumstances. Dr. Hales has observed, that in equal receivers, the air suffers a greater diminution by burning large candles than small ones; and likewise that, when equal candles are made use of, the diminution is greater in small than in large receivers. The cause of this phenomenon probably is, that the air contained in the receiver cannot all come into contact with the flame of the candle; whence, as soon as the air which is nearest the flame becomes contaminated, the candle is extinguished. This diminution has been stated by different philosophers in different degrees. M. Lavoisier has observed, that by the combustion of phosphorus, air may be diminished of about one-fifth or one-sixth. This accurate philosopher has also observed, that the acid of phosphorus thus formed acquires the weight lost by the diminished air; finding that about three inches of air were absorbed by every one grain of phosphorus, when the experiment was tried with a receiver inverted in water; but, when in quicksilver, the absorption was constantly between $2\frac{1}{4}$ and $2\frac{3}{4}$ inches for each grain. Mr. Cavalló often repeated the experiment of burning phosphorus in a glass tube inverted in water, by applying the closed part of the tube, wherein the phosphorus was contained, to a pretty strong fire, when he always observed that the utmost diminution of the inclosed air effected by this means was full one-fifth.

In these experiments of burning combustible bodies in a quantity of air, and measuring the diminution, we should be aware of two causes of mistake, viz. the absorption of air by the coaly residuum of the burned matter, which sometimes is very considerable, or by the fluid in which the receiver is inverted, and the production of elastic flu-

id from the burning substances; thus gunpowder generates a great quantity of elastic fluid when inflamed, &c.

Even the electric spark separates fixed air from common atmospheric air; for when a number of these sparks are taken in a small quantity of common air over lime-water, a diminution will take place, the lime will be precipitated, and, if we put a blue vegetable juice instead of the lime-water, it will be turned red by the acidity of the fixed air deposited upon it.

The calcination of metals, as already observed, phlogisticates, and consequently diminishes, common air; but does not produce any fixed air, since the lime-water, over which the calcination is made, does not become turbid; and, when metallic calces are exposed to a sufficient heat, they generally yield some fixed air: so that it seems the fixed air which is formed in the act of the calcination of metals is absorbed by the calx. Some fixed air may be obtained from red lead, by no greater degree of heat than that of the flame of a candle applied to the vial that holds it.

The calcareous earths, when acted upon by acids, yield a vast quantity of fixed air. Dr. Priestley, in his experiments on the production of dephlogisticated air from various substances, when moistened with nitrous acid, and afterwards exposed to a sufficient degree of heat, generally found that some fixed air was produced together with the dephlogisticated air; but often obtained fixed air only, without any dephlogisticated air being mixed with it, or fixed and nitrous air together. But in those experiments he mostly used a gun-barrel, so that, as he justly observes, the iron might have contributed to the formation of the fixed air. In fact, when he tried substances of the same sort, first in a gun-barrel and then in glass vessels, he obtained more fixed air in the former than in the latter case.

Most minerals contain fixed air, which may be extracted to a certain degree by means of heat. Mr. Krenger, from a greenish fusible spar, which was luminous in the dark, obtained a permanently-elastic fluid, which, like fixed air, crystallized a solution of fixed alkali. The malachite also contains a vast quantity of fixed air, as pure as that extracted from chalk by vitriolic acid. From almost every metallic ore and earthy mineral some fixed air may be obtained, as well from chalk, lime-stone, marble, marine-shells, fixed and volatile alkali, and from magnesia, by means of a violent fire, or of acids.

By acids. Calcareous substances produce abundance of fixed air, especially when acted upon by any of the strongest acids, such as the vitriolic, which is both the cheapest and fittest for the purpose. The phenomena attending the production of fixed air from calcareous substances, &c. are the following:—1. When mixed with acids, they effervesce; and produce a permanently-elastic fluid, namely, fixed air. 2. They retain the fixed air very obstinately; so that a strong fire is necessary to expel it from magnesia, and the strongest is not sufficient to expel it entirely, either from fixed alkalies or calcareous earths. When these substances are treated with acids, they yield their fixed air, because they have a stronger attraction to those acids than to the fixed air. 3. Calcareous earths, which are insoluble in water, when deprived of the fixed air become soluble in it. Thus lime-stone is not, but lime (viz. lime-stone deprived of its fixed air) is, soluble in water. And, if substances deprived of their fixed air are put in a situation to recover it, they again become insoluble in water. 4. Alkalies, both fixed and volatile, when deprived of their fixed air, become more caustic, and more powerful solvents, incapable of crystallization, and of effervescing with acids. But if to those alkalies, and also earths rendered more caustic, their fixed air be restored, they acquire at once all the properties they had before, viz. they become more mild, effervesce with acids, recover their weight, &c. Dr. Black, to whose accurate and satisfactory experiments on this subject chemistry is greatly indebted, gives the epithet of *mild* to those substances when combined with fixed air, and of *caustic* when deprived of it; as caustic calcareous earth, caustic fixed alkali, &c.

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Easy Methods of obtaining Fixable Air for occasional Experiments, &c.

By fermentation. Mix together equal parts of brown sugar and good yeast of beer, to which add about twice the bulk of water. This mixture being put into a vial, to which a bent tube with a cork may be adapted, will yield a considerable quantity of fixed air, which may be received into a vial filled with quicksilver or water, as in the following process.

By acids. Let a glass tube be bent, and fix a cork to one of its extremities, so as to fit the neck of a common vial. Fill a similar vial, or any glass receiver, with water, and invert it in a basin about half filled with water. Next put some chalk or marble, grossly powdered, into the bottle, so as to fill about a fourth of it, and add water enough to cover the chalk; then pour in as much vitriolic acid as will make about one-fifth of the whole fluid. Apply immediately the cork, with the tube, to the bottle, and let the extremity of the tube pass through the water of the basin into the neck of the bottle, which must be kept up with the hand, or other convenient support, as it cannot rest upon the bottom of the basin. The mixture in the bottle will immediately begin to effervesce and grow hot, and the fixed air will be copiously emitted, and passing through the bent tube, and afterwards through the water, will ascend to the top of the inverted bottle. In proportion as the elastic fluid collects, the water will gradually descend, and at last be quite expelled, and the bottle thus filled with fixed air may be corked under water, and kept for use. That fixed air will extinguish flame may be easily proved by passing a lighted taper into any open jar in which it is contained; and that it is very freely absorbed by water will appear on tasting that through which the bubbles have arisen in the above process. The flavour will be brisk and agreeably acidulous. In this state, too, it changes the blue infusion of some vegetable substances into red; so that, if a weak solution of heliotrope be mixed with it, the liquor acquires a reddish appearance. It also corrodes iron, and some other metals, much more easily than common water. But the greatest and most useful property of this acidulated water, or water impregnated with fixed air, is its being a powerful antiseptic. As most of the mineral waters are medicinal principally on account of their being thus impregnated, and also containing some small portion of metal or salt dissolved; they may be imitated by impregnating common water with fixed air, and then adding that quantity of salt or of metal, that, by analysis, the original mineral waters are found to contain. For these purposes, indeed, a well-contrived glass apparatus is sold in the shops.

Fixed air has long been considered a very powerful remedy in putrid diseases. Sir John Pringle and Dr. Macbride have shewn experimentally, that fixed air is discharged by such substances as form our common food; and both ascribe the preservation of the body from putrefaction in a great measure to the fixed air, which in digestion is disengaged from the aliment, and incorporates with the fluids of the body.

The same property also renders it useful for several economical purposes. Mr. Henry found, that fixed air can preserve fruit for a considerable time; and Dr. Macbride observes, that not only good meat was preserved incorrupt for a considerable time, when exposed to fixed air, but that the putrefaction of substances actually putrid was impeded by this means; and even that those substances were restored from the putrescent to the sound state. Milk acquires an acidulous taste by being impregnated with fixed air, and is thereby preserved for some days; which affords a very easy expedient of preserving milk in those places where it cannot be had new very often.

To produce Inflammable Air. The process for making this sort of gas may be conducted in the same way as for fixed air, only substituting for the chalk about the same proportion of iron filings or grossly powdered zinc. If the

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capacity

capacity of the bottle which contains this air be nearly equal to four ounce-measures, and the flame of a candle be applied to its mouth, it will burn quietly for about half a minute, the flame gradually descending lower and lower, in proportion as the inflammable gas is consumed. Hence we see, that inflammable air, like all other combustible substances, burns only when in contact with common air; so that, if the bottle be closed, the flame is put out immediately, because the air is intercepted. But, if the inflammable air be put in such a situation as to expose a very great surface to the common air, it is plain, that by this means its combustion will be accelerated, so as to go off with an explosion, caused by the sudden rarefaction of the air. This circumstance has given occasion to the very entertaining experiment with what has been called the electrical pistol. This instrument consists of a hollow brass ball with a narrow mouth, into which a mixture of inflammable and atmospheric air is introduced, and the mouth of the pistol afterwards corked very firmly. Through the end immediately opposite to the mouth, a glass tube is passed, and through that a piece of wire, which, being bent downwards, approaches within a straw's breadth of the inner surface of the ball. Along this wire an electric spark is conveyed, which, setting the inflammable air on fire, occasions a loud explosion, and forces the cork out of the mouth of the pistol with considerable violence.

By taking electric sparks in any kind of oil, spirit of wine, ether, or spirit of sal ammoniac, Dr. Priestley obtained inflammable air. The oil, or other liquor, was confined in a glass tube by quicksilver, and a wire was cemented in the upper part of the tube, through which the sparks, being sent, went to the quicksilver through the oil. After a few sparks had been taken, a quantity of inflammable air was generated. This elastic fluid does not lose its inflammability by being passed several times from one vessel into another through water.—Alkaline air, by taking electric explosions in it, is changed into inflammable air.

If iron is put into a strong vitriolic acid, the quantity of elastic fluid produced is very little, except heat be applied. But this elastic fluid is vitriolic acid air, mixed with a small proportion only of inflammable air, which is always less when the acid is more concentrated.—Zinc, treated after the same manner, produces the like effects, except that it gives more elastic fluid, without the application of heat, than iron does; and the greatest part of the produced elastic fluid is inflammable.—In order to obtain the greatest quantity of inflammable air from iron or zinc, the vitriolic acid must be diluted with five or six parts of water. Dr. Priestley found, that eleven grains of iron yielded eight and a quarter ounce-measures of inflammable air. According to Mr. Cavendish, one ounce of zinc, dissolved either in the vitriolic or marine acid, yields a quantity of inflammable air equal to the bulk of 356 ounces of water; one ounce of iron, dissolved by means of vitriolic acid, yields a quantity of inflammable air equal to the bulk of 412 ounces of water; and one ounce of tin yields half as much inflammable air as iron does.—The solutions of iron, tin, copper, lead, and zinc, in the marine acid, produce marine acid air, and inflammable air, but in various quantities. The proportion of the former to the latter is as one to eight in iron, as one to six in tin, as three to one in copper and lead, and as one to ten in zinc. Regulus of antimony, dissolved in marine acid, with the application of heat, yields a small quantity of elastic fluid, which is weakly inflammable.

Dr. Priestley obtained inflammable air, not only by dissolving various substances in marine acid, but also by exposing divers bodies to marine acid air, which is probably the purest part of the marine acid. Having admitted iron filings to this acid air, they were dissolved by it pretty fast; half of the elastic fluid disappeared, and the rest was rendered unabsorbable by water, and inflammable. The same effect was produced by almost every substance which contains phlogiston.—It seems in fact, as if this acid air, having a great affinity with phlogiston, separates it from

all those substances which contain it even in small quantity and from that combination becomes inflammable.

By means of nitrous acid, inflammable air may be obtained from various substances containing phlogiston; but it is always mixed with nitrous air, and sometimes also with fixed and common or phlogisticated air. If two parts of spirit of wine, mixed with one part of nitrous acid, are put into a vial with a ground stopple and tube, and the flame of a candle be applied to it, so as to heat it gradually, the inflammable air will be produced very readily; the inflammability of which is, however, not very permanent, for by a little washing in water it may be annihilated.

To produce Nitrous Air. This permanently-elastic fluid is never found naturally, like fixed or inflammable air; but is entirely artificial.—Silver, copper, brass, iron, mercury, bismuth, nickel, &c. when mixed with nitrous acid, yield nitrous air in great quantity. Some of them, especially mercury, require the aid of heat; for some, the flame of a candle applied to the vial is sufficient: but others, especially copper and iron, do not want any heat. Gold, platinum, and regulus of antimony, when put in aqua regia, yield nitrous air pretty readily. Among the metals, lead yields it in the smallest quantity. Among the semi-metals, zinc gives the weakest nitrous air, when dissolved in nitrous acid. The elastic fluid produced from it is mostly phlogisticated air. From four pennyweights and seventeen grains of zinc, dissolved in spirit of nitre diluted with an equal quantity of water, Dr. Priestley obtained about twelve ounce-measures of very weak nitrous air. He also obtained nitrous air even from some flowers of zinc.

The quantity of nitrous air that may be obtained from metals is difficult to ascertain, on account of the necessary diversity of the strength of the acid, the peculiar nature of the metal, and the method of performing the experiments. The following table of the produce of nitrous air from various metals is taken from Dr. Priestley, who nevertheless intimates that it is far from being accurate.

dwt.	grs.		
6	0	of silver yielded	17½ ounce-measures.
5	19	of quicksilver,	4½
1	2½	of copper,	14½
2	0	of brass.	21
0	20	of iron,	16
1	5	of bismuth,	6
0	12	of nickel,	4

The degree of strength of the acid occasions great diversity in the production of nitrous air. Copper dissolved in strong nitrous acid will not produce the least quantity of nitrous air; but, when dissolved in nitrous acid diluted with two or three parts of water, it produces a great quantity.

For the generality of experiments, no degree of external heat is required, except mercury be used. Copper or brass, in flat scales, two or three grains in weight, and about a quarter of a square inch in surface, when dissolving in diluted nitrous acid, yields nitrous air very equably; but, if iron be used, the pieces of it should be larger and fewer; in short, it should present a much less surface to the diluted acid; otherwise the increase of heat in the process, and the rapid production of elastic fluid, render the operation both difficult and hazardous.

As nitrous air is most used to try the goodness of respirable air, it is of great consequence to make it always of one uniform degree of purity. Accordingly, brass yields nitrous air of a more uniform quality than iron: copper excels brass; but pure mercury is still superior to copper: and indeed this is the metal which, considering its nature, uniformity of substance, and easy solution, is upon the whole the most useful for this purpose.

To make Nitrous Air. The whole process is the same as that described for *Fixed Air*. Fill about one third of the bottle with copper, brass, or quicksilver, then add as much water as will cover the metal filings, or in proportion if quicksilver is used; and lastly, the nitrous acid, in quantity

ity about one-third, or half of the water. The air will then pass through the tube into the inverted bottle, as in other instances.

In order to observe the property this elastic fluid possesses of diminishing the bulk of common air, let a glass tube, closed at one end, and about nine inches long, be filled with, and inverted in, water; then take an half-ounce vial, and, plunging it under the inverted tube, let all the air enter and go to the top of it, the water subsiding accordingly. Let a mark be made, by sticking a bit of wax on the tube, just opposite to the surface of the water, which will mark how much of the tube is filled by that given measure of air. Repeat this four or five times, marking the tube as the water descends each time. Now, if three measures of common air be conveyed into this tube, when filled with water and inverted, they will fill a space of it as far as the third mark. The same thing will happen if three measures of nitrous instead of common air be put into it; but if two measures of common air and one measure of nitrous air, or one measure of the former and two of the latter, be successively introduced, they will fill a space much shorter than the third mark. The moment these two kinds of air come in contact, a reddish cloud is perceived, which soon vanishes; and the water, which at first nearly reached the third mark, rises gradually into the tube, and becomes stationary after about two or three minutes; which shews that the diminution is effected gradually. See EUDIO-METER.

To procure Dephlogificated Air. The easiest way of procuring this air is to put some red-lead into the apparatus, together with some strong vitriolic acid, but without any water. Let the red-lead fill about a quarter of the bottle, and the vitriolic acid be about the same quantity; then apply the bent tube to the bottle, and proceed as above. Without heat, however, this mixture will not give any dephlogificated air, or but an inconsiderable quantity; for which reason the flame of a wax-taper must be applied under the bottom of the bottle. In this manner the red-lead will yield a quantity of elastic fluid, the greatest part of it dephlogificated air, but not the whole, a portion of fixed air being generated at the same time. In order to separate the fixed air, the inverted bottle, as the air is emitted from the red-lead, must be shaken in the basin for impregnating water with fixed air; by which means the water will absorb the whole quantity of fixed air, and leave the dephlogificated air in a pure state.

Animals will live much longer in this kind of air than in an equal quantity of common air; whence it is supposed that the breathing of it must contribute to longevity much more than the common atmosphere. Dr. Priestley however conjectures, that dephlogificated air might perhaps wear out the system much sooner than common air, in the same manner as it consumes fuel much faster than common air. In Cavallo's Treatise on Air, it is said that "a man makes in general about fifteen inspirations in a minute, and takes in about thirty cubic inches of aerial fluid. But the air which has been once inspired is not thereby much injured, and it may be respired again and again; so that, upon a very moderate calculation, and as appears from experiments often repeated, we may safely assert, that a person can breathe 400 cubic inches of good ordinary atmospheric air, at least thirty times, without any inconvenience, i. e. it would serve for two minutes; after which the air, though much depraved, is still in a state of being breathed, but then it would occasion some uneasiness. Now, supposing the dephlogificated air employed to be four times more pure than common air, 400 cubic inches of dephlogificated air would serve for at least 120 respirations, or eight minutes.

"But supposing that thirty inches of common air are completely phlogificated by a single inspiration, and changed for such as is quite fresh, which indeed is the case in common respiration, then 450 cubic inches of common air will be requisite for one minute's respiration, and 27,000 for one hour; and, as dephlogificated air is supposed to

be four times as good, the same quantity of it will serve for four hours. Indeed, if we could depend on the assertions of Mr. Fontana, that by adding lime-water to absorb the fixed air produced by respiration, an animal can live thirty times as long as without it, no doubt a much smaller quantity would serve."

But this cannot be true; because, though the fixed air should be absorbed as soon as produced, the remaining quantity would still be contaminated by phlogiston. Nay, Dr. Priestley, who repeated Fontana's experiments, asserts, that animals *will not* live longer in dephlogificated air when in contact with lime-water, than when no lime-water is used. How a difference so enormous can take place, between philosophers in other respects so accurate, we cannot determine. It is plain, however, that if 27,000 inches of common air are necessary for a person in one hour, the same quantity of dephlogificated air cannot be breathed longer than four hours, nor even so long with any real advantage. Mr. Cavallo indeed allows only 12,000 inches for four hours; but, though this might sustain life, it would not be superior to the atmosphere, and perhaps much less salubrious.

A very ready method of procuring dephlogificated air in large quantity, is by means of nitre; which must be put into a retort or other vessel, so as to fill half or nearly three quarters of its belly; then a bent glass tube is luted to the neck of the earthen vessel, in such a manner as not to let any elastic fluid escape. The best lute or cement for this is a mixture of whiting and drying oil. The retort being put into the furnace, must be surrounded with lighted charcoal, which is to be renewed as it wastes, and the belly of the retort must be kept quite red, or rather white-hot, for three hours at least. The air is then to be received into large glass jars, as usual. The retorts made of those metals which are usually employed for this purpose, viz. iron and copper, phlogificate the air as soon as produced. The expence at present necessary in London for the production of 12,000 cubic inches of dephlogificated air (viz. the price of one pound of nitre, of an earthen retort or other vessel, and of charcoal), amounts to about 4s. or 4s. 6d.

Another method of preparing dephlogificated air is by blowing common air through melted nitre. In this process the phlogiston of the atmosphere is consumed, by detonating with the acid of the nitre, and therefore issues much more pure than before. This method appears at first much easier than the former; but, as it is impossible to mix atmospheric air so exactly with the melted nitre that their particles may come uniformly in contact with each other, it is plain the former method must be preferable; not to mention that the nitre will be apt to concrete into lumps by the cold blast.

To procure Vitriolic Acid Air. Some concentrated vitriolic acid must be put into the bottle, along with some substance capable of furnishing phlogiston. Olive-oil answers very well. The acid should be about three or four times as much as the oil, and both together should fill about one-third or half of the bottle. The elastic fluid may then be produced by applying the flame of a wax taper, as directed above.

To procure Marine Acid Air. Put some common salt into the bottle, so as to fill about one-fourth part of it, and upon this pour a small quantity of concentrated vitriolic acid; then apply the bent tube, and pass the air through quicksilver into the receiver.

To procure Nitrous Acid Air. This may be obtained from heated nitrous acid, the vapour of which acquires a permanent elasticity. The great difficulty, however, is to find a fluid capable of confining this acid air during the process, as its being absorbed by water is one of the properties by which it differs from nitrous air. It acts upon quicksilver, and also upon oils; and hence its examination cannot but be very imperfect. When water has absorbed a good quantity of this elastic fluid, it acquires the properties of nitrous acid; and, when heated, it yields a large quantity

quantity of nitrous air, viz. a quantity many times greater than that which water is wont to imbibe of it by agitation, or by any known means. When nitrous acid is combined with essential oils, a considerable effervescence and heat are produced, nearly as when the nitrous acid itself is poured upon those oils.

Fluor Acid Air. Put some of those minerals called *fluors*, or *fusible spars*, pulverized, into the bottle, and upon it pour some concentrated vitriolic acid; then adapt the bent tube, &c. The fluor acid air is at first produced

without the help of heat; but in a short time it will be necessary to apply the flame of a candle to the bottle, by which means a considerable quantity of this elastic fluid is obtained.

Alkaline Air. Let the usual bottle be about half filled with volatile spirit of sal ammoniac; and, after applying the bent tube, &c. let the flame of a candle be brought under the bottle, by which means the alkaline air will be produced copiously.

A E R

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AEROMANCY, *f.* [from *αἰρ* and *μαντις*.] A species of divination performed by means of air, wind, &c. See **DIVINATION**.

AEROMETRY, *f.* [from *αἰρ* and *μετρον*.] The science of measuring the air. It comprehends not only the doctrine of the air itself, considered as a fluid body; but also its pressure, elasticity, rarefaction, and condensation. But the term is at present not much in use, this branch of natural philosophy being more frequently called pneumatics. See **PNEUMATICS**.

AERONAUT, *f.* a person who attends and guides an air-balloon. See **AEROSTATION** and **AIR-BALLOON**.

AERONAUTICA, *f.* [from *αἰρ*, and *ναυικος*, derived from *ναυς*, ship.] The art of sailing in a vessel or machine through the atmosphere, sustained as a ship in the sea.

AEROPHOBIA, *f.* [from *αἰρ*, air, and *φοβος*, fear.] According to Cælius Aurelianus, some phrenetic patients are afraid of a lucid, and others of an obscure, air, and these he calls aerophobi. So that,

AEROPHOBIA, *f.* is a symptom of the phrenitis.

AEROPHYLACEA, *f.* a term used by naturalists for caverns or reservoirs of air, supposed to exist in the bowels of the earth. Kircher speaks much of aerophylacea, or huge caverns, replete with air, disposed under ground; from whence, through numerous occult passages, that element is conveyed either to subterraneous receptacles of water, which, according to him, are hereby raised into springs or rivers, or into the funds of subterraneous fire, which are hereby fed and kept alive for the reparation of metals, minerals, and the like.

AEROSCOPY, *f.* [*αἰρ* and *σκοπεω*.] The observation of the air.

AEROSIS, *f.* an imaginary resolution of the blood into vapour, supposed necessary to the support of the vital spirits, and said to be brought about by the ventilation of the air during inspiration, in the manner that the flame of fuel is kindled by blowing it.

A E R O S T A T I O N

Is a science but very lately introduced into public notice. The word, in its primitive sense, denotes the science of suspending weights in the air; but, in its modern acceptance, it signifies *aërial navigation*, or the art of navigating through the atmosphere. Hence also the machines which are employed for this purpose are called *aerostats*, or *aerostatic machines*; and, from their globular shape, *air-balloons*.

The romances of almost every nation have recorded instances of persons being carried through the air, both by the agency of spirits and by mechanical inventions; but, till the time of the celebrated Lord Bacon, no rational principle appears ever to have been thought of by which this might be accomplished. Before that time, indeed, Friar Bacon had written upon the subject; and many had been of opinion, that, by means of artificial wings, fixed to the arms or legs, a man might fly as well as a bird: but these opinions were thoroughly refuted by Borelli in his Treatise *De Motu Animalium*, where, from a comparison between the power of the muscles which move the wings of a bird, and those which move the arms of a man, he demonstrates that the latter are utterly insufficient to strike the air with such force as to raise him from the ground. It cannot be denied, however, that wings of this kind, if properly constructed, and dexterously managed, might be sufficient to break the fall of a human body from an high place, so that some adventurers in this way might

possibly come off with safety; though by far the greatest number of those who have rashly adopted such schemes, have either lost their lives or limbs in the attempt.

In the year 1672, Bishop Wilkins published a Treatise, intitled, "The Discovery of the New World;" in which he mentions, though in a very indistinct and confused manner, the two principles on which the air is navigable; quoting, from Albertus de Saxonia and Francis Mendoca, "that the air is in some part of it navigable; and upon this static principle, any brass or iron vessel (suppose a kettle), whose substance is much heavier than that of water, yet being filled with the lighter air, it will swim upon it and not sink. So suppose a cup or wooden vessel upon the outward borders of this elementary air, the capacity of it being filled with fire, or rather ethereal air, it must necessarily, upon the same ground, remain swimming there, and of itself can no more fall than an empty ship can sink." This idea, however, he did not by any means pursue, but rested his hopes entirely upon mechanical motions, to be accomplished by the mere strength of a man, or by springs, &c. and which have been demonstrated incapable of answering any useful purpose.

The only person who brought his scheme of flying to any kind of rational principle was the Jesuit Francis Lana, cotemporary with Bishop Wilkins. He, being acquainted with the real weight of the atmosphere, justly concluded, that, if a globular vessel were exhausted of air, it would weigh

weigh less than before; and, considering that the solid contents of vessels increase in much greater proportion than their surfaces, he supposed that a metalline vessel might be made so large, that, when emptied of its air, it would be able not only to raise itself in the atmosphere, but to carry up passengers along with it; and he made a number of calculations necessary for putting the project in execution. But, though the theory was here unexceptionable, the means proposed were certainly insufficient to accomplish the end: for a vessel of copper, made so thin as was necessary to make it float in the atmosphere, would be utterly unable to resist the external pressure; which being demonstrated by those skilled in mechanics, no attempt was made on that principle.

In the year 1709, however, as we were informed by a letter published in France in 1784, a Portuguese projector, Friar Guffman, applied to the king for encouragement to his invention of a flying machine. The principle on which this was constructed, if indeed it had any principle, seems to have been that of the paper kite. The machine was constructed in form of a bird, and contained several tubes through which the wind was to pass, in order to fill a kind of sails, which were to elevate it; and, when the wind was deficient, the same effect was to be performed by means of bellows concealed within the body of the machine. The ascent was also to be promoted by the electric attraction of pieces of amber placed in the top, and by two spheres inclosing magnets in the same situation.

These childish inventions shew the low state of science at that time in Portugal, especially as the king, in order to encourage him to farther exertions in such an useful invention, granted him the first vacant place in his college of Barcelos or Santarem, with the first professorship in the university of Coimbra, and an annual pension of 600,000 reis during his life. Of this De Guffman, it is also related, that, in the year 1736, he made a wicker basket of about seven or eight feet diameter, and covered with paper, which raised itself about 200 feet in the air, and the effect was generally attributed to witchcraft.

In the year 1766, Mr. Henry Cavendish ascertained the weight and other properties of inflammable air, determining it to be at least seven times lighter than common air. Soon after which, it occurred to Dr. Black, that, perhaps a thin bag filled with inflammable air might be buoyed up by the common atmosphere; and he thought of having the allantois of a calf prepared for this purpose: but his other avocations prevented him from prosecuting the experiment. The same thought occurred some years afterwards to Mr. Cavallo; and he has the honour of being the first who made experiments on the subject. He first tried bladders; but the thinnest of these, however well scraped and prepared, were found too heavy. He then tried Chinese paper; but that proved so permeable, that the vapour passed through it like water through a sieve. His experiments, therefore, made in the year 1782, proceeded no farther than blowing up soap-bubbles with inflammable air, which ascended rapidly to the ceiling, and broke against it.

But while the discovery of the art of aerostation seemed thus on the point of being made in Britain, it was all at once announced in France, and that from a quarter whence nothing of the kind was to have been expected. Two brothers, Stephen and John Montgolfier, natives of Annonay, and masters of a considerable paper-manufactory there, had turned their thoughts towards this project as early as the middle of the year 1782. The idea was first suggested by the natural ascent of the smoke and clouds in the atmosphere; and their design was to form an artificial cloud, by inclosing the smoke in a bag, and making it carry up the covering along with it. Towards the middle of November that year, the experiment was made at Avignon, with a fine silk bag of a parallelopiped shape. By applying burning paper to the lower aperture, the air was rarefied, and the bag ascended in the atmosphere, and

struck rapidly against the ceiling. On repeating the experiment in the open air, it rose to the height of about seventy feet.

An experiment on a more enlarged scale was now projected; and a new machine, containing about 650 cubic feet, was made, which broke the cords that confined it, and rose to the height of about 600 feet. Another of thirty-five feet in diameter rose about 1000 feet high, and fell to the ground three quarters of a mile from the place where it ascended. A public exhibition was next made on the fifth of June, 1783, at Annonay, where a vast number of spectators assembled. An immense bag of linen, lined with paper, and containing upwards of 23,000 cubic feet, was found to have a power of lifting about 500lbs. including its own weight. The operation was begun by burning chopped straw and wool under the aperture of the machine, which immediately began to swell; and after being set at liberty ascended into the atmosphere. In ten minutes it had ascended 6000 feet; and, when its force was exhausted, it fell to the ground at the distance of 7663 feet from the place from whence it set out.

Soon after this, one of the brothers arrived at Paris, where he was invited by the academy of sciences to repeat his experiments at their expense. In consequence of this invitation, he constructed, in a garden in the Faubourg of St. Germain, a large balloon on an elliptical form. In a preliminary experiment, this machine lifted up from the ground eight persons who held it, and would have carried them all off if more had not immediately come to their assistance. Next day the experiment was repeated in presence of the members of the academy; the machine was filled by the combustion of fifty pounds of straw made up in small bundles, upon which about twelve pounds of chopped wool were thrown at intervals. The usual success attended this exhibition. The machine soon swelled; endeavoured to ascend; and immediately after sustained itself in the air, together with the charge of between 400 and 500 pounds weight. It was evident that it would have ascended to a great height; but, as it was designed to repeat the experiment before the king and royal family at Versailles, the cords by which it was tied down were not cut. But, in consequence of a violent rain and wind which happened at this time, the machine was so far damaged, that it became necessary to prepare a new one for the time that it had been determined to honour the experiment with the royal presence; and such expedition was used, that this vast machine, of near sixty feet in height, and forty-three in diameter, was made, painted with water-colours both within and without, and finely decorated, in no more than four days and four nights. Along with this machine was sent a wicker-cage, containing a sheep, a cock, and a duck, which were the first animals ever sent through the atmosphere. The full success of the experiment was prevented by a violent gust of wind which tore the cloth in two places near the top before it ascended. However, it rose to the height of 1440 feet; and, after remaining in the air about eight minutes, fell to the ground at the distance of 10,200 feet from the place of its setting out. The animals were not in the least hurt.

The great power of these aerostatic machines, and their very gradual descent in falling to the ground, had originally shewed that they were capable of transporting people through the air with all imaginable safety; and this was further confirmed by the experiment already mentioned. As M. Montgolfier, therefore, proposed to make a new aerostatic machine of a firmer and better construction than the former, M. Pilatre de Rozier offered himself to be the first aerial adventurer.

This new machine was constructed in a garden in the Faubourg of St. Antoine. It was of an oval shape, about forty-eight feet in diameter, and seventy-four in height; elegantly painted on the outside with the signs of the zodiac, cyphers of the king's name, and other ornaments. A proper gallery, grate, &c. were appended in the manner afterwards described; so that it was easy for the

the person who ascended to supply the fire with fuel, and thus keep up the machine as long as he pleased. The weight of the whole apparatus was upwards of 1600lbs. The experiment was performed on the 15th of October, 1785. M. Pilatre having placed himself in the gallery, the machine was inflated, and permitted to ascend to the height of eighty-four feet, where he kept it afloat for about four minutes and a half; after which it descended very gently: and such was its tendency to ascend, that it rebounded to a considerable height after touching the ground. Two days after, he repeated the experiment with the same success as before; but, the wind being strong, the machine did not sustain itself so well as formerly. On repeating the experiment in calmer weather, he ascended to the height of 210 feet. His next ascent was 262 feet; and, in the descent, a gust of wind having blown the machine over some large trees of an adjoining garden, M. Pilatre suddenly extricated himself from so dangerous a situation, by throwing straw and chopped wool on the fire, which raised him at once to a sufficient height. On descending again, he once more raised himself to a proper height by throwing straw on the fire. Some time after, he ascended in company with M. Girond de Vilette to the height of 330 feet; hovering over Paris at least nine minutes in sight of all the inhabitants, and the machine keeping all the while perfectly steady.

These experiments had shewn, that the aerostatic machines might be raised or lowered at the pleasure of the persons who ascended: they had likewise discovered, that the keeping them fast with the ropes was no advantage; but, on the contrary, this was attended with inconvenience and hazard. On the 21st of November, 1783, therefore, M. Pilatre determined to undertake an aerial voyage in which the machine should be fully set at liberty. Every thing being got in readiness, the balloon was filled in a few minutes; and M. Pilatre placed himself in the gallery, counterpoised by the Marquis d'Arlandes, who occupied the other side. It was intended to make some preliminary experiments on the ascending power of the machine: but the violence of the wind prevented this from being done, and even damaged the balloon essentially; so that it would have been entirely destroyed had not timely assistance been given. The extraordinary exertions of the workmen, however, repaired it again in two hours, and the adventurers set out. They met with no inconvenience during their voyage, which lasted about twenty-five minutes; during which time they had passed over a space of above five miles. From the account given by the Marquis d'Arlandes, it appears, that they met with several different currents of air; the effect of which was, to give a very sensible shock to the machine, and the direction of the motion seemed to be from the upper part downwards. It appears also, that they were in some danger of having the balloon burnt altogether; as the marquis observed several round holes made by the fire in the lower part of it, which alarmed him considerably, and indeed not without reason. However, the progress of the fire was easily stopped by the application of a wet sponge, and all appearance of danger ceased in a very short time.

This voyage of M. Pilatre and the Marquis d'Arlandes may be said to conclude the history of those aerostatic machines which are elevated by means of fire; for, though many other attempts have been made upon the same principle, most of them have either proved unsuccessful, or were of little consequence. They have therefore given place to the other kind, filled with inflammable air; which, by reason of its smaller specific gravity, is both more manageable, and capable of performing voyages of greater length, as it does not require to be supplied with fuel like the others. This was invented a very short time after the discovery had been made by M. Montgolfier. This gentleman had indeed designed to keep his method in some degree a secret from the world; but, as it could not be concealed, that a bag filled with any kind of fluid lighter than the common atmosphere would rise in it, in-

flammable air was naturally thought of as a proper succedaneum for the rarefied air of M. Montgolfier. The first experiment was made by two brothers, Messrs. Roberts, and M. Charles, a professor of experimental philosophy. The bag which contained the gas was composed of lute-string, varnished over with a solution of the elastic gum called *caoutchouc*; and that with which they made their first essay was only about thirteen English feet in diameter. Many difficulties occurred in filling it with the inflammable air, chiefly owing to their ignorance of the proper apparatus; inasmuch, that, after a whole day's labour from nine in the morning, they had got the balloon only one third part full. Next morning they were surprised to find that it had fully inflated of itself during the night: but, upon inquiry, it was found, that they had inadvertently left open a stop-cock connected with the balloon, by which the common air, gaining access, had mixed itself with the inflammable air; forming a compound still lighter than the common atmosphere, but not sufficiently light to answer the purposes of aerostation. Thus they were obliged to renew their operation; and, by six o'clock in the evening of the next day, they found the machine considerably lighter than the common air; and, in an hour after, it made a considerable effort to ascend. The public exhibition, however, had been announced only for the third day after; so that the balloon was allowed to remain in an inflated state for a whole day; during which they found it had lost a power of ascent equal to about three pounds, being one-seventh part of the whole. When it was at last set at liberty, after having been well filled with inflammable air, it was thirty-five pounds lighter than an equal bulk of common air. It remained in the atmosphere only three quarters of an hour, during which it had traversed fifteen miles. Its sudden descent was supposed to have been owing to a rupture which had taken place when it ascended into the higher regions of the atmosphere.

The success of this experiment, and the aerial voyage made by Messrs. Rozier and Arlandes, naturally suggested the idea of undertaking something of the same kind with a balloon filled with inflammable air. The machine used on this occasion was formed of gores of silk, covered over with a varnish made of *caoutchouc*, of a spherical figure, and measuring twenty-seven feet and a half in diameter. A net was spread over the upper hemisphere, and was fastened to an hoop which passed round the middle of the balloon. To this a sort of car, or rather boat, was suspended by ropes, in such a manner as to hang a few feet below the lower part of the balloon; and, in order to prevent the bursting of the machine, a valve was placed in it; by opening of which some of the inflammable air might be occasionally let out. A long silken pipe communicated with the balloon, by means of which it was filled. The boat was made of basket-work, covered with painted linen, and beautifully ornamented; being eight feet long, four broad, and three and a half deep; its weight 130 pounds. At this time, however, as at the former, they met with great difficulties in filling the machine with inflammable air, owing to their ignorance of the most proper apparatus. But at last, all obstacles being removed, the two adventurers took their seats at three quarters after one in the afternoon of the first of December, 1783. Persons skilled in the mathematics were conveniently stationed with proper instruments to calculate the height, velocity, &c. of the balloon. The weight of the whole apparatus, including that of the two adventurers, was found to be 604½ pounds, and the power of ascent when they set out was twenty pounds; so that the whole difference betwixt the weight of this balloon and an equal bulk of common air was 624 pounds. But the weight of common atmosphere displaced by the inflammable gas was calculated to be 77½ pounds, so that there remains 147 for the weight of the latter; and this calculation makes it only five times and a quarter lighter than common air.

At the time the balloon left the ground, the thermometer stood at 9° of Fahrenheit's scale, and the quick-

silver in the barometer at 30.18 inches; and, by means of the power of ascent with which they left the ground, the balloon rose till the mercury fell to twenty-seven inches, from which they calculated their height to be about 600 yards. By throwing out ballast occasionally as they found the machine descending by the escape of some of the inflammable air, they found it practicable to keep at pretty near the same distance from the earth during the rest of their voyage; the quicksilver fluctuating between 27.0 and 27.65 inches, and the thermometer between 53° and 57°, the whole time. They continued in the air for the space of an hour and three quarters, when they alighted at the distance of twenty-seven miles from Paris; having suffered no inconvenience during their voyage, nor experienced any contrary currents of air, as had been felt by Messrs. Pilatre and Arlandes. As the balloon still retained a great quantity of inflammable gas, M. Charles determined to take another voyage by himself. M. Robert accordingly got out of the boat, which was thus lightened by 130 pounds, and of consequence the acrostatic machine now had nearly as much power of ascent. Thus he was carried up with such velocity, that in twenty minutes he was almost 9000 feet high, and entirely out of sight of terrestrial objects. At the moment of his parting with the ground, the globe had been rather flaccid; but it soon began to swell, and the inflammable air escaped from it in great quantity through the silken tube. He also frequently drew the valve, that it might be the more freely emitted, and the balloon effectually prevented from bursting. The inflammable gas, being considerably warmer than the external air, diffused itself all round, and was felt like a warm atmosphere; but in ten minutes the thermometer indicated a variation of temperature as great as that between the warmth of spring and the ordinary cold of winter. His fingers were benumbed by the cold, and he felt a violent pain in his right ear and jaw, which he ascribed to the dilatation of the air in these organs as well as to the external cold. The beauty of the prospect which he now enjoyed, however, made amends for these inconveniences. At his departure the sun was set on the valleys; but the height to which M. Charles was got in the atmosphere rendered him again visible, though only for a short time. He saw, for a few seconds, vapours rising from the valleys and rivers. The clouds seemed to ascend from the earth, and collect one upon the other, still preserving their usual form; only their colour was grey and monotonous for want of sufficient light in the atmosphere. By the light of the moon he perceived that the machine was turning round with him in the air; and he observed that there were contrary currents which brought him back again. He observed also, with surprise, the effects of the wind, and that the streamers of his banners pointed upwards; which, he says, could not be the effect either of his ascent or descent, as he was moving horizontally at the time. At last, recollecting his promise of returning to his friends in half an hour, he pulled the valve, and accelerated his descent. When within 200 feet of the earth, he threw out two or three pounds of ballast, which rendered the balloon again stationary; but, in a little time afterwards, he gently alighted in a field about three miles distant from the place whence he set out; though, by making allowances for all the turnings and windings of the voyage, he supposes that he had gone through nine miles at least. By the calculations of M. de Maumier, he rose at this time not less than 10,500 feet high; a height somewhat greater than that of Mount *Ætna*. A small balloon, which had been sent off before the two brothers set out on their voyage, took a direction opposite to that of the large one, having met with an opposite current of air, probably at a much greater height.

The subsequent aerial voyages differ so little from that just now related, that any particular description of them seems to be superfluous. It had occurred to M. Charles, however, in his last flight, that there might be a possibility of directing the machine in the atmosphere; and this

was soon attempted by M. Jean Pierre Blanchard, a gentleman who had, for several years before, amused himself with endeavours to fly by mechanical means, though he had never succeeded in the undertaking. As soon as the discovery of the acrostatic machines was announced, however, he resolved to add the wings of his former machine to a balloon, and made no doubt that it would then be in his power to direct himself through the air at pleasure. In his first attempt he was frustrated by the impetuosity of a young gentleman, who insisted, right or wrong, on ascending along with him. In the scuffle which ensued on this occasion, the wings and other apparatus were entirely destroyed; so that M. Blanchard was obliged to commit himself to the direction of the wind; and in another attempt it was found, that all the strength he could apply to the wings was scarcely sufficient to counteract the impression of the wind in any degree. In his voyage, he found his balloon, at a certain period, acted upon by two contrary winds; but, on throwing out four pounds of ballast, he ascended to a place where he met with the same current he had at setting out from the earth. His account of the sensations he felt during this voyage was somewhat different from that of M. Charles; having, in one part of it, found the atmosphere very warm, in another cold; and having once found himself very hungry, and at another time almost overcome by a propensity to sleep. The height to which he arose, as measured by several observations with mathematical instruments, was thought to be very little less than 10,000 feet; and he remained in the atmosphere an hour and a quarter.

The attempts of M. Blanchard to direct his machine through the atmosphere were repeated in the month of April, 1784, by Messrs. Morveau and Bertrand, at Dijon, who raised themselves in an inflammable air-balloon to the height, as it was thought, of 13,000 feet; passing through a space of eighteen miles in an hour and twenty-five minutes. M. Morveau had prepared a kind of oars for directing the machine through the air; but they were damaged by a gust of wind, so that only two of them remained serviceable; by working these, however, they were able to produce a sensible effect on the motion of the machine.

In a third aerial voyage performed by M. Blanchard, he seemed to produce some effect by the agitation of his wings, both in ascending, descending, moving sideways, and even in some measure against the wind; however, this is supposed, with some probability, to have been a mistake, as, in all his succeeding voyages, the effects of his machinery could not be perceived.

The success of Messrs. Charles and Robert in their former experiments encouraged them soon to repeat them, with the addition of some machinery to direct their course. Having enlarged their former balloon to an oblong spheroid, forty-six feet and three-quarters long and twenty-seven and a half in diameter, they made it to float with its longest part parallel to the horizon. The wings were made in the shape of an umbrella without the handle, to the top of which a stick was fastened parallel to the aperture of the umbrella. Five of these were disposed round the boat, which was near seventeen feet in length. The balloon was filled in three hours, and, with the addition of 450 pounds of ballast, remained in *equilibrium* with the atmosphere. About noon, on the 19th of September, 1784, they began to ascend very gently in consequence of throwing out twenty-four pounds of ballast, but were soon obliged to throw out eight pounds more in order to avoid running against some trees. Thus they rose to the height of 1400 feet, when they perceived some thunder-clouds near the horizon. On this they ascended and descended, to avoid the danger, as the wind blew directly towards the threatening clouds; but, from the height of 600 feet to that of 4200 above the surface of the earth, the current was quite uniform and in one direction. During their voyage they lost one of their oars; but found, that by means of those which remained they considerably accelerated

accelerated their course. From the account of their voyage, it would seem that they had passed safely through the thunder-clouds; as we are informed, that, about forty minutes after three, they heard a loud clap of thunder; and, three minutes after, another much louder; at which time the thermometer sunk from 77° to 59° . This sudden cold, occasioned by the approach of the clouds, condensed the inflammable air so that the balloon descended very low, and they were obliged to throw out forty pounds of ballast; yet, on examining the heat of the air within the balloon, they found it to be 104° , when that of the external atmosphere was only 63° . When they had got so high that the mercury in the barometer stood only at 23.94 inches, they found themselves becalmed; so that the machine did not go even at the rate of two feet in a second, though it had before gone at the rate of twenty-four feet in a second. On this they determined to try the effect of their oars to the utmost; and, by working them for thirty-five minutes, and, marking the shadow of the balloon on the ground, they found, in that time, that they had described the segment of an ellipsis whose longest diameter was 6000 feet. After having travelled about 150 miles, they descended, only on account of the approach of night, having still 200 pounds of ballast left.

Their conclusion, with regard to the effect of their wings, is as follows:—"Those experiments shew, that far from going against the wind, as is said by some persons to be possible in a certain manner, and some aeronauts pretend to have actually done, we only obtained, by means of two oars, a deviation of twenty-two degrees: it is certain, however, that if we could have used our four oars we might have deviated about forty degrees from the direction of the wind, and, as our machine would have been capable of carrying seven persons, it would have been easy for five persons to have gone, and to have put in action eight oars, by means of which a deviation of about eighty degrees would have been obtained.

"We had already observed (say they), that, if we did not deviate more than twenty-two degrees, it was because the wind carried us at the rate of twenty-four miles an hour; and it is natural to judge, that, if the wind had been twice as strong as it was, we should not have deviated more than one-half of what we actually did; and, on the contrary, if the wind had been only half as strong, our deviation would have been proportionably greater."

Having thus related all that has been done with regard to the conducting of aerostatic machines through the atmosphere, we shall now relate the attempts that have been made to lessen their expence, by falling upon some contrivance to ascend without throwing out ballast, and to descend without losing any of the inflammable air. The first attempt of this kind was made by the Duke de Chartres; who, on the 15th of July, 1784, ascended with the two brothers, Charles and Robert, from the Park of St. Cloud. The balloon was of an oblong form, made to ascend with its longest diameter horizontally, and measured fifty-five feet in length and twenty-four in breadth. It contained within it a smaller balloon filled with common air; by blowing into which with a pair of bellows, and thus throwing in a considerable quantity of common air, it was supposed that the machine would become sufficiently heavy to descend, especially as, by the inflation of the internal bag, the inflammable air in the external one would be condensed into a smaller space, and thus become specifically heavier. The voyage, however, was attended with such circumstances as rendered it impossible to know what would have been the event of the scheme. The power of ascent with which they set out, seems to have been very great; as, in three minutes after parting with the ground, they were lost in the clouds, and involved in such a dense vapour that they could see neither the sky nor the earth. In this situation they seemed to be attacked by a whirlwind, which, besides turning the balloon three times round from right to left, shocked and beat it so about, that they were rendered incapable of using any of the means pro-

posed for directing their course, and the silk stuff of which the helm had been composed was even torn away. No scene can be conceived more terrible than that in which they were now involved. An immense ocean of shapeless clouds rolled one upon another below them, and seemed to prevent any return to the earth, which still continued invisible, while the agitation of the balloon became greater every moment. In this extremity they cut the cords which held the interior balloon, and of consequence it fell down upon the aperture of the tube that came from the large balloon into the boat, and stopped it up. They were then driven upwards by a gust of wind from below, which carried them to the top of that stormy vapour in which they had been involved. They now saw the sun without a cloud; but the heat of his rays, with the diminished density of the atmosphere, had such an effect on the inflammable air, that the balloon seemed every moment ready to burst. To prevent this they introduced a stick through the tube, in order to push away the inner balloon from its aperture; but the expansion of the inflammable air pushed it so close, that all attempts of this kind proved ineffectual. It was now, however, become absolutely necessary to give vent to a very considerable quantity of the inflammable air; for which purpose the Duke de Chartres himself bored two holes in the balloon, which tore open for the length of seven or eight feet. On this they descended with great rapidity; and would have fallen into a lake, had they not hastily thrown out sixty pounds of ballast, which enabled them just to reach the water's edge.

The success of the scheme for raising or lowering aerostatic machines by means of bags filled with common air being thus rendered dubious, another method was thought of. This was to put a small aerostatic machine with rarefied air under an inflammable-air balloon, but at such a distance that the inflammable air of the latter might be perfectly out of the reach of the fire used for inflating the former; and thus, by increasing or diminishing the fire in the small machine, the absolute weight of the whole would be considerably diminished or augmented. This scheme was unhappily put in execution by the celebrated M. Pilatre de Rozier, and another gentleman named M. Romaine. Their inflammable-air balloon was about thirty-seven feet in diameter, and the power of the rarefied-air one was equivalent to about sixty pounds. They ascended without any appearance of danger or sinister accident; but had not been long in the atmosphere when the inflammable-air balloon was seen to swell very considerably, at the same time that the aeronauts were observed, by means of telescopes, very anxious to get down, and busied in pulling the valve and opening the appendages to the balloon in order to facilitate the escape of as much inflammable air as possible. A short time after this the whole machine was on fire, when they had then attained the height of about three quarters of a mile from the ground. No explosion was heard; and the silk which composed the air-balloon continued expanded, and seemed to resist the atmosphere, for about a minute; after which it collapsed, and the remains of the apparatus descended along with the two unfortunate travellers so rapidly, that both of them were killed. M. Pilatre seemed to have been dead before he came to the ground; but M. Romaine was alive when some persons came up to the place where he lay, though he expired immediately after.

These are the most remarkable attempts that have been made to improve the science of aerostation; though a great number of other expeditions through the atmosphere have taken place. But of all the voyages which had been hitherto projected or put in execution, the most daring was that of M. Blanchard and Dr. Jeffries across the Straits of Dover, which separate England from France. This took place on the 7th of January, 1785, being a clear frosty morning, with a wind, barely perceptible, at N. N. W. The operation of filling the balloon began at ten o'clock, and, at three quarters after twelve, every thing was ready

AEROSTATION.

1. Montgolfier's Balloon. 2. Blanchard's. 3. Charles & Robert's. 4. Lunardi's.
5. Baldwin's View over the City of Chester from Lunardi's Balloon.

ready for their departure. At one o'clock M. Blanchard desired the boat to be pushed off, which now stood only two feet distant from that precipice so finely described by Shakespeare in his tragedy of King Lear. As the balloon was scarcely sufficient to carry two, they were obliged to throw out all their ballast except three bags of ten pounds each; when they at last rose gently, though making very little way on account of there being so little wind. At a quarter after one o'clock, the barometer, which on the cliff stood at 29.7 inches, was now fallen to 27.3, and the weather proved fine and warm. They had now a most beautiful prospect of the south coast of England, and were able to count thirty-seven villages upon it. After passing over several vessels, they found that the balloon, at fifty minutes after one, was descending, on which they threw out a sack and a half of ballast; but, as they saw that it still descended, and that with much greater velocity than before, they now threw out all the ballast. This still proving ineffectual, they next threw out a parcel of books they carried along with them, which made the balloon ascend, when they were about midway betwixt France and England. At a quarter past two, finding themselves again descending, they threw away the remainder of their books, and, ten minutes after, they had a most enchanting prospect of the French coast. Still, however, the machine descended; and, as they had now no more ballast, they were fain to throw away their provisions for eating, the wings of their boat, and every other moveable they could easily spare. "We threw away (says Dr. Jeffries) our only bottle, which, in its descent, cast out a steam like smoke, with a rushing noise; and, when it struck the water, we heard and felt the shock very perceptibly on our car and balloon." All this proving insufficient to stop the descent of the balloon, they next threw out their anchors and cords, and at last stripped off their clothes, fastening themselves to certain slings, and intending to cut away the boat as their last resource. They had now the satisfaction, however, to find that they were rising; and, as they passed over the high lands between Cape Blanc and Calais, the machine rose very fast, and carried them to a greater height than they had been at any former part of their voyage. They descended safely among some trees in the forest of Guignes, where there was just opening enough to admit them.

It would be tedious as well as unnecessary to recount all the other aerial voyages that have been performed in this and other countries; we shall therefore conclude with an account of the ingenious Mr. Baldwin's excursion from Chester.

On the 8th of September, 1785, at forty minutes past one, P. M. Mr. Baldwin ascended from Chester in M. Lunardi's balloon. After travelling, in a variety of different directions, he first alighted, at twenty-eight minutes after three, about twelve miles from Chester, in the neighbourhood of Frodsham; then, re-ascending and pursuing his excursion, he finally landed at Rixton Moss, five miles N. N. E. of Wavington, and twenty-five miles from Chester. Mr. Baldwin has published his Observations and Remarks made during his voyage, and the following are some of the most important and curious:—"The sensation of ascending is compared to that of a strong pressure from the bottom of the car upwards against the soles of his feet. At the distance of what appeared to him seven miles from the earth, though by the barometer scarcely a mile and a half, he had a grand and most enchanting view of the city of Chester and its adjacent places below. The river Dee appeared of a red colour; the city very diminutive; and the town entirely blue. The whole appeared a perfect plain, the highest building having no apparent height, but reduced all to the same level, and the whole terrestrial prospect appeared like a coloured map. Just after his first ascent, being in a well-watered and maritime part of the country, he observed a remarkable and regular tendency of the balloon towards the sea; but shortly after, rising into another current of air, he escaped

the danger: this upper current, he says, was visible to him at the time of his ascent, by a lofty sound stratum of clouds flying in a safe direction. The perspective appearance of things to him was very remarkable. The lowest bed of vapour that first appeared as cloud was pure white, in detached fleeces, increasing as they rose: they presently coalesced, and formed, as he expresses it, a sea of cotton, tufting here and there by the action of the air in the undisturbed part of the clouds. The whole became an extended white floor of cloud, the upper surface being smooth and even. Above this white floor he observed, at great and unequal distances, a vast assemblage of thunder-clouds, each parcel consisting of whole acres in the densest form: he compares their form and appearance to the smoke of pieces of ordnance, which had consolidated as it were into masses of snow, and penetrated through the upper surface or white floor of common clouds, there remaining visible and at rest. Some clouds had motions in slow and various directions, forming an appearance truly stupendous and majestic. He endeavours to convey some idea of the scene by a figure in the annexed plate of aerostation, which represents a circular view he had from the car of the balloon, himself being over the centre of the view, looking down on the white floor of clouds, and seeing the city of Chester through an opening, which discovered the landscape below, limited by surrounding vapour to less than two miles in diameter. The breadth of the outer margin defines his apparent height in the balloon (viz. four miles) above the white floor of clouds. Mr. Baldwin also gives a curious description of his tracing the shadow of the balloon over tops of volumes of clouds. At first it was small, in shape and size like an egg; but soon increased to the magnitude of the sun's disc, still growing larger, and attended with a most captivating appearance of an iris encircling the whole shadow at some distance round it, the colours of which were remarkably brilliant. The regions did not feel colder, but rather warmer, than below. The sun was hottest to him when the balloon was stationary. The discharge of a cannon, when the balloon was at a considerable height, was distinctly heard by the aeronaut; and a discharge from the same piece, when at the height of thirty yards, so disturbed him as to oblige him for safety to lay hold firmly of the cords of the balloon. At a considerable height he poured down a pint bottle-full of water; and, as the air did not oppose a resistance sufficient to break the stream into small drops, it mostly fell down in large drops. In the course of the balloon's track it was found much affected by the water (a circumstance observed in former aerial voyages). At one time the direction of the balloon kept continually over the water, going directly towards the sea, so much as to endanger the aeronaut; the mouth of the balloon was opened, and he in two minutes descended into an under-current blowing from the sea: he kept descending, and landed at Bellair Farm in Rinsley, twelve miles from Chester. Here he lightened his car by thirty-one pounds, and, instantly re-ascending, was carried into the anterior part of the country, performing a number of different manœuvres. At his greatest altitude he found his respiration free and easy. Several bladders which he had along with him cracked and expanded very considerably. Clouds and land, as before, appeared on the same level. By way of experiment, he tried the upper valve two or three times, the neck of the balloon being close; and remarked, that the escape of the gas was attended with a growling noise like millstones, but not near so loud. Again, round the shadow of the balloon, on the clouds, he observed the iris. A variety of other circumstances and appearances he met with, is fancifully described; and at fifty-three minutes after three he finally landed."

The frequency of aerial voyages, accompanied with particular details of trifling and uninteresting circumstances, and apparently made with a view to promote the interest of particular persons, regardless of any advance-

ment in knowledge, have now sunk the science of aerostation so low in the opinion of most people, that, before giving any account of the most proper method of constructing these machines, it may seem necessary to premise something concerning the uses to which they may possibly be applied. These, according to Mr. Cavallo, are the following.

"The small balloons, especially those made of paper, and raised by means of spirit of wine, may serve to explore the direction of the winds in the upper regions of the atmosphere, particularly when it is a calm below: they may serve for signals in various circumstances, in which no other means can be used; and letters or other small things may be easily sent by them, as for instance from ships that cannot safely land on account of storms, from besieged places, islands, or the like. The larger aerostatic machines may answer all the above-mentioned purposes in a better manner; and they may, besides, be used as a help to a person who wants to ascend a mountain, a precipice, or to cross a river; and perhaps one of those machines, tied to a boat by a long rope, may be, in some cases, a better sort of sail than any that is used at present. The largest sort of machines, which can take up one or more men, may evidently be subservient to various æconomical and philosophical purposes. Their conveying people from place to place with great swiftness, and without trouble, may be of essential use, even if the art of guiding them in a direction different from that of the wind should never be discovered. By means of those machines the shape of certain seas and lands may be better ascertained; men may ascend to the tops of mountains they never visited before; they may be carried over marshy and dangerous grounds; they may by that means come out of a besieged place, or an island; and they may, in hot climates, ascend to a cold region of the atmosphere, either to refresh themselves, or to observe the ice, which is never seen below; and in short, they may be thus taken to several places, to which human art hitherto knew of no conveyance.

"The philosophical uses, to which these machines may be subservient, are numerous indeed; and it may be sufficient to say, that hardly any thing which passes in the atmosphere is known with precision, and that principally for want of a method of ascending into it. The formation of rain, of thunder-storms, of vapours, hail, snow, and meteors in general, require to be attentively examined and ascertained. The action of the barometer, the refraction and temperature of the air in various regions, the descent of bodies, the propagation of sound, &c. are subjects which all require a series of observations and experiments, the performance of which could never have been properly expected before the discovery of aerostatic machines."

To those uses we may add the gratification of curiosity and pleasure as a very strong inducement to the practice of an art, in which, with any tolerable degree of caution, there appears not to be the smallest danger. Every one who has tried the experiment testifies, that the beauty of the prospect afforded by an ascent, or the pleasure of being conveyed through the atmosphere, cannot be exceeded. No one has felt the least of that giddiness consequent upon looking from the top of a very high building or of a precipice, nor have they any of the sickness arising from the motion of a vessel at sea. Many have been carried by balloons at the rate of thirty, forty, or even fifty, miles an hour, without feeling the least inconvenience, or even agitation of the wind; the reason of which is, that, as the machine moves with nearly the velocity of the wind itself, they are always in a calm, and without uneasiness. Some have apprehended danger from the electricity of the atmosphere; and have thought that a stroke of lightning, or the smallest electric spark, happening near a balloon, might set fire to the inflammable air, and destroy both the machine and the adventurers. Mr. Cavallo has suggested several considerations for diminishing apprehensions of this kind. Balloons have been already raised in every season of the year, and even when thunder has been heard, with-

out injury. In case of danger, the aeronauts may either descend to the earth, or ascend above the region of the clouds and thunder-storms. Besides, as balloons are formed of materials that are not conductors of electricity, they are not likely to receive strokes, especially as by being encompassed with air they stand insulated. Moreover, inflammable air by itself, or unmixed with a certain quantity of common air, will not burn; so that, if an electric spark should happen to pass through the balloon, it would not set fire to the inflammable air unless a hole were made in the covering.

The general principles of aerostation are so little different from those of hydrostatics, that it may seem superfluous to insist much upon them. It is a fact universally known, that when a body is immersed in any fluid, if its weight be less than an equal bulk of that fluid, it will rise to the surface; but, if heavier, it will sink; and, if equal, it will remain in the place where it is left. For this reason smoke ascends into the atmosphere, and heated air in that which is colder. The ascent of the latter is shewn in a very easy and satisfactory manner by bringing a red-hot iron under one of the scales of a balance, by which the latter is instantly made to ascend; for, as soon as the red-hot iron is brought under the scale, the hot air being lighter than that which is colder, ascends, and strikes the bottom, which is thus impelled upwards, and the opposite scale descends, as if a weight had been put into it.

Upon this simple principle depends the whole theory of aerostation; for it is the same thing whether we render the air lighter by introducing a quantity of heat into it, or inclosing a quantity of gas specifically lighter than the common atmosphere in a certain space; both will ascend, and for the same reason. A cubic foot of air, by the most accurate experiments, has been found to weigh about 554 grains, and to be expanded by every degree of heat, marked on Fahrenheit's thermometer, about $\frac{1}{500}$ part of the whole. By heating a quantity of air, therefore, to 500 degrees of Fahrenheit, we shall just double its bulk when the thermometer stands at fifty-four in the open air, and in the same proportion we shall diminish its weight; and if such a quantity of this hot air be inclosed in a bag, that the excess of the weight of an equal bulk of common air weighs more than the bag with the air contained in it, both the bag and air will rise into the atmosphere, and continue to do so until they arrive at a place where the external air is naturally so much rarefied that the weight becomes equal; and here the whole will float.

The power of hot air in raising weights, or rather that by which it is itself impelled upwards, may be shewn in the following manner: Roll up a sheet of paper into a conical form, and, by thrusting a pin into it, prevent it from unrolling. Fasten it by its apex under one of the scales of a balance by means of a thread, and, having properly counterpoised it by weights, put it into the opposite scale; apply the flame of a candle underneath, you will instantly perceive the cone to arise, and it will not be brought into equilibrium with the other but by a much greater weight than those who have never seen the experiment would believe. If we try this experiment with more accuracy, by getting proper receptacles made which contain determinate quantities of air, we shall find that the power of the heat depends much more on the capacity of the bag which contains it than could well be supposed. Thus, let a cubical receptacle be made of a small wooden frame covered with paper capable of containing one foot of air, and let the power of a candle be tried with this as above directed for the paper cone. It will then be found that a certain weight may be raised; but a much greater one will be raised by having a receptacle of the same kind which contains two cubic feet; a still greater by one of three feet; a yet greater by one of four feet, &c. and this even though the very same candle be made use of; nor is it known to what extent even the power of this small flame might be carried.

From these experiments it appears, that in the aerostatic

tic machines constructed on Montgolfier's plan, it must be an advantage to have them as large as possible; because a smaller quantity of fire will then have a greater effect in raising them, and the danger from that element, which in this kind of machines is chiefly to be dreaded, will be in a great measure avoided. On this subject it may be remarked, that as the cubical contents as a globe, or any other figure of which balloons are made, increase much more rapidly than their surfaces, there must ultimately be a degree of magnitude at which the smallest imaginable heat would raise any weight whatever. Thus, supposing any aerostatic machine capable of containing 500 cubic feet, and the air within it to be only one degree hotter than the external atmosphere; the tendency of this machine to rise, even without the application of artificial heat, would be near an ounce. Let its capacity be increased sixteen times; and the tendency to rise will be equivalent to a pound, though this may be done without making the machine sixteen times heavier than before. It is certain, however, that all aerostatic machines have a tendency to produce or preserve heat within them, which would by no means be imagined by those who have not made the experiment. When Messrs. Charles and Robert made their longest aerial voyage of 150 miles, they had the curiosity to try the temperature of the air within their balloon, in comparison with that of the external atmosphere; and at this time they found, that, when the external atmosphere was 63° , the thermometer within the balloon stood at 104° . Such a difference of temperature must have given a machine of the magnitude which carried them a considerable ascending power independent of any other cause, as it amounted to forty-one grains on every cubic foot; and therefore in a machine containing 50,000 such feet would have been almost 200 pounds. Hence we may easily account for what happened at Dijon, and is recorded by Mr. Morveau. "A balloon, intended to be filled with inflammable air, being completed, was, by way of trial, filled with common air, and in that state exposed to the atmosphere. Now it was observed, and indeed a similar observation had been made before, that the air within the balloon was much hotter than the circumambient air: the thermometer in the former stood at 120° ; whereas in the latter, even when the sun shone upon it, the thermometer stood at 84° . This shewed a considerable degree of rarefaction within the balloon; and consequently it was suspected, that, by means of this rarefaction alone, especially if it were to increase a little, the balloon might ascend. On the 30th of May, about noon, the wind, being rather strong, agitated the balloon so that two men were employed to take care of it; but, notwithstanding all their endeavours, it escaped from its confinement; and, lifting up about sixty-five pounds weight of cords, equatorial circle, &c. rose many feet high, and, passing over some houses, went to the distance of 250 yards, where at length it was properly secured."

This difference between the external and internal heat, being so very considerable, must have a great influence upon aerostatic machines, and will undoubtedly influence those filled with inflammable air as well as the other kind. Nor is it unlikely, that the short time which many aerial voyagers have been able to continue in the atmosphere may have been owing to the want of a method of preserving this internal heat. It may naturally be supposed, and indeed it has always been found, that balloons, in passing through the higher regions of the atmosphere, acquire a very considerable quantity of moisture; not only from the rain or snow they sometimes meet with, but even from the dew and vapour which condense upon them. On this an evaporation will instantly take place; and, as it is the property of this operation to produce a very violent cold, the internal heat of the balloon must be soon exhausted in such a manner as to make it become specifically heavier than the common atmosphere, and consequently descend in a much shorter time than it would have done by the mere loss of air. To this in all probability we are to ascribe the de-

scant of the balloon which carried Messrs. Blanchard and Jeffries; and which seemed so extraordinary to many people, that they were obliged to have recourse to an imaginary attraction in the waters of the ocean, in order to solve the phenomenon. This supposition is rejected by Mr. Cavallo; who explains the matter, by remarking, that, in two former voyages made with the same machine, it could not long support two men in the atmosphere; so that we had no occasion to wonder at its weakness on this occasion. "As for its rising higher (says he) just when it got over the land, that may be easily accounted for. In the first place, the travellers threw out their clothes just about that time; secondly, in consequence of the wind's then increasing, the balloon travelled at a much greater rate than it had done whilst over the sea; which increase of velocity lessened its tendency to descend: besides which, the vicissitudes of heat and cold may produce a very considerable effect; for, if we suppose that the air over the land was colder than that over the sea, the balloon, coming into the latter from the former, continued to be hotter than the circumambient air for some time after; and consequently, it was comparatively much lighter when in the cold air over the land than when in the hotter air over the sea; hence it floated easier in the former than it did in the latter case."

It seems indeed very probable, that there was something uncommon in the case of M. Blanchard's balloon while passing over the sea; for, as it rose higher after reaching the land than in any former period of the voyage, and likewise carried them to the distance over land more than half of that which they had passed over water, we can scarcely avoid supposing, that it had a tendency to descend when over the water more than when over land, independent of any loss of air. Now, it does not appear that the air over the sea is at all warmer than that above land; on the contrary, there is every reason to believe, that the superior reflective power of the land renders the atmosphere above it warmer than the sea can do: but it is very natural to suppose, that the air above the sea is more moist than that above land; and consequently, by letting fall its moisture upon the balloon must have occasioned an evaporation that would deprive the machine of its internal heat, which it would partly recover after it entered the warmer and drier atmosphere over land.

We shall now proceed to the construction of aerostatic machines; of which the smaller are only for amusement, or some slight experiments, and are very easily made. As in all of them, however, it is of the utmost consequence to have the weight as little as possible, the shape becomes an object of great consideration. For this purpose a spherical figure has been mathematically demonstrated to be the best; as capable of containing a greater quantity under a smaller surface than any other. Thus a perfect sphere contains less surface in proportion to its solidity than a spheroid; a spheroid less than a cylinder; the latter less than a cube; and a cube still less than a parallelopiped. In all cases, therefore, where we can fill the whole capacity of the balloon with air equally light, the spherical figure is undoubtedly to be preferred; and this holds good with regard to all inflammable-air balloons, whether their size be great or small; but in the rarefied-air ones, where the under part must necessarily be much colder than the upper, the globular shape seems not so proper. An inverted cone, or truncated pyramid, with the smaller part undermost, seems then to be most proper, as it allows the heated air (which has a great tendency to expand as well as to ascend) to collect in the wide part at the top, while the useless surface in the lower part, and which, in any other figure, would contain only the colder and heavier air, is thus thrown aside. In fact it has been found, that aerostatic machines, raised by means of rarefied air, when made of the shape of a parallelopiped, or even one deviating still more from the shape of a globe, have answered the purpose as well as they could have been supposed to do, had ever so much care been taken in forming them.

them exactly to that shape. The very first machine made by M. Montgolfier was in form of a parallelopiped; and, though it contained only forty cubic feet, shewed a very considerable power of ascent. A very large one, seventy four feet high, which M. Montgolfier had designed to exhibit before the royal family, had the middle part of it prismatic for about the height of twenty-five feet; its top was a pyramid of twenty-nine feet; and its lower part was a truncated cone of near twenty feet. It weighed 1000 pounds; and, notwithstanding its shape, in a very short time manifested a power of ascent equal to 500 pounds. Another aerostatic machine of a small size, but of the figure of a parallelopiped, being suffered to ascend with thirty sheets of oiled paper fixed in a wire frame, and set on fire, rose to a great height, and in twenty-two minutes could not be seen. It seems therefore, that, with regard to the shape of these machines, it is by no means necessary to adhere rigidly to that of a sphere; but that any oblong form answers very well.

For experimental purposes, both the inflammable and rarefied air-balloons may be made of paper; the former being made of that kind called *thin post*, varnished over with linseed-oil; the latter either of that or any other kind, without varnish. In order to avoid the danger of burning, however, it has been proposed to impregnate the paper of which these small rarefied-air balloons are made with solution of sal-ammoniac, allum, or some other salt; but this does not seem to be necessary. Those filled with inflammable air have been made of gold-beaters skin or peeled bladders; but the cheaper material of paper is undoubtedly preferable.

For aerostatic machines of a larger size, the material universally employed is varnished silk; and, for those of the rarefied-air kind, linen painted over with some size colour, or lined with paper. The best varnish for an inflammable-air balloon is that made with bird-lime, and recommended by Mr. Faujas de Saint-Fond, in a treatise published on the subject. The following is his method of preparing it: "Take one pound of bird-lime, put it into a new proper earthen pot that can resist the fire, and let it boil gently for about one hour, viz. till it ceases to crackle; or, which is the same thing, till it is so far boiled, as that a drop of it being let fall upon the fire will burn: then pour upon it a pound of spirit of turpentine, stirring it at the same time with a wooden spatula, and keeping the pot at a good distance from the flame, lest the vapour of this essential oil should take fire. After this, let it boil for about six minutes longer; then pour upon the whole three pounds of boiling oil of nuts, linseed, or poppy, rendered drying by means of litharge; stir it well, let it boil for a quarter of an hour longer, and the varnish is made. After it has rested for twenty-four hours, and the sediment has gone to the bottom, decant it into another pot; and, when you want to use it, warm, and apply it with a flat brush upon the silk stuff, whilst that is kept well stretched. One coat of it may be sufficient; but, if two are necessary, it will be proper to give one on each side of the silk, and to let them dry in the open air while the silk remains extended."

Mr. Cavallo gives the following method of preparing this varnish, which he prefers to that of M. de St. Fond:—"In order to render linseed-oil drying, boil it with two ounces of saccharum saturni and three ounces of litharge, for every pint of oil, till the oil has dissolved them, which will be accomplished in half an hour; then put a pound of bird-lime and half a pint of the drying oil into a pot (iron or copper pots are the safest for this purpose), the capacity of which may be equal to about one gallon, and let it boil very gently over a slow charcoal fire till the bird-lime ceases to crackle, which will be in about half or three quarters of an hour; then pour upon it two pints and a half more of drying oil, and let it boil for one hour longer, stirring it very frequently with an iron or wooden spatula. As the varnish, whilst boiling, and especially when it is nearly done, swells very much, care should be had to re-

move, in those cases, the pot from the fire, and to replace it when the varnish subsides, otherwise it will boil over. Whilst the stuff is boiling, the operator should, from time to time, examine whether the varnish has boiled enough; which is thus known:—Take some of it upon the blade of a knife, and then, after rubbing the blade of another knife upon it, separate the knives; and when, on this separation, the varnish begins to form threads between the two, you may conclude that it is done; and, without losing time, it must be removed from the fire. When it is almost, though not quite, cold, add about an equal quantity of spirit of turpentine: mix it well together, and let it rest till the next day; when, having warmed it a little, strain and bottle it. If it is too thick, add some more spirit of turpentine. When this varnish is laid upon the silk, the stuff should be made perfectly dry, and stretched; so that the varnish, which ought to be used lukewarm, may fill up the pores of the stuff. The varnish should be laid once very thin upon one side of the stuff; and, about twelve hours after, two other coats of it should be laid on, one on each side; and, twenty-four hours after, the silk may be used, though, in cold weather, it may be left to dry some time longer."

Much has been said in France of their elastic gum-varnish, and its composition kept a secret; but Mr. Baldwin, after many expensive trials, declares to the world what he considers as the secret; and it is merely this: "Take any quantity of caoutchouc, as two ounces averdupois; cut it into small bits with a pair of scissors; put a strong iron ladle (like that used by plumbers) over a common pitcoal or other fire. The fire must be gentle, glowing, and without smoke. When the ladle is hot, much below a red heat, put a single bit into the ladle. If black smoke issues, it will presently flame and disappear, or it will evaporate without flame: the ladle is then too hot. When the ladle is less hot, put in a second bit, which will produce a white smoke. This white smoke will continue during the operation, and evaporate the caoutchouc: therefore no time is to be lost; but little bits are to be put in, a few at a time, till the whole are melted. It should be continually and gently stirred with an iron or brass spoon. Two pounds or one quart of the best drying oil (or of raw linseed-oil, which, together with a few drops of neat's-foot oil, has stood a month, or not so long, on a lump of quick-lime, to make it more or less drying), is to be put into the melted caoutchouc, and stirred till hot, and the whole poured into a glazed vessel, through a coarse gauze or fine sieve. When settled and clear, which will be in a few minutes, it will be fit for use either hot or cold." Mr. Baldwin is not at liberty, he observes, to publish the art of laying on the varnish; but says, that it consists in making no intestine motion in the varnish, which would create minute bubbles; that therefore brushes are improper. Mr. Blanchard's method of making elastic gum-varnish for the silk of a balloon, is the following: "Dissolve elastic gum (caoutchouc) cut small in five times its weight of spirit of turpentine, by keeping them some days together; then boil one ounce of this solution in eight ounces of drying linseed-oil for a few minutes; lastly, strain it. It must be used warm." The pieces of silk for the balloon must be cut out of a proper size, according to the dimensions, after the varnish is sufficiently dry. They may be joined by laying about half an inch of the edge of one piece over the edge of the other, and sewing them by a double stitching. Mr. Blanchard uses expeditiously the following method. He lays about half an inch of the edge of one piece flat over the edge of the other, and passes a hot iron over it; in doing which a piece of paper ought to be laid both under and over the silk. The joining may be rendered more secure by running it with a silk thread, and sticking a ribband over it. The ribbands laid over seams may be stuck with common glue, provided the varnish of the silk is properly dried. When the glue is quite dry, the ribbands should be varnished over, to prevent their being unglued by the rain.

The best method of cutting the pieces of silk that are to form a balloon, is to describe a pattern of wood or stiff card-paper, and then to cut the silk upon it. In cutting the pieces after such pattern, care should be taken to leave them about three-quarters of an inch all round larger than the pattern, which will be taken up by the seams in joining.

To the upper part of the balloon there should be adapted, and well fitted in, a valve opening inwards; to which should be fastened a string passing through a hole made in a small piece of round wood fixed in the lowest part of the balloon opposite to the valve, the end of this string fastened in the car below, so that the aeronaut may open the valve when occasion requires. The action of this valve is effected by a round brass plate, having a round hole about two or three inches diameter, covered on both sides with strong smooth leather. On the inside there is a shutter of brass, covered with leather, which serves to close the hole, being about two inches larger in diameter than the hole. It is fastened to the leather of the plate, and by a spring, which need not be very strong, it is kept against the hole. The elasticity of the gas itself will help to keep it shut. To this shutter the string is fastened, by which it is occasionally opened for the escape of the gas. A small string or other security should be fixed to the shutter and the plate, so as not to admit the shutter to be opened beyond a certain safe distance. To the lower part of the balloon two pipes should be fixed, made of the same stuff as the envelope; six inches diameter for a balloon of thirty feet, and proportionably larger for balloons of a greater capacity. They must be long enough for the car. For balloons of eighteen feet and less diameter, one neck or pipe will be sufficient. These pipes are the apertures through which the inflammable gas is introduced into the balloon.

The car or boat is best made of wicker-work, covered with leather, and well painted or varnished over; and the proper method of suspending it, is by ropes proceeding from the net which goes over the balloon. This net should be formed to the shape of the balloon, and fall down to the middle of it, with various cords proceeding from it to the circumference of a circle about two feet below the balloon; and from that circle other ropes should go to the edge of the boat. This circle may be made of wood, or of several pieces of slender cane bound together. The meshes of the net may be small at top, against which part of the balloon the inflammable air exerts the greatest force; and increase in size as they recede from the top. A hoop has sometimes been applied round the middle of the balloon to fasten the net. This, though not absolutely necessary, is best made of pieces of cane bound together, and covered with leather.

With regard to the rarefied-air machines, Mr. Cavallo recommends first to soak the cloth in a solution of sal ammoniac and common size, using one pound of each to every gallon of water; and, when the cloth is quite dry, to paint it over in the inside with some earthy colour, and strong fire or glue. When this paint has dried perfectly, it will then be proper to varnish it with oily varnish, which might dry before it could penetrate quite through the cloth. Simple drying linseed oil will answer the purpose as well as any, provided it be not very fluid.

It now only remains to give some account of the method by which aerostatic machines may be filled with their proper gas, in order to give them their power of ascending into the atmosphere; and here we are enabled to determine with much greater precision concerning the inflammable air-balloons than the others. With regard to them, a primary consideration is, the most proper method of procuring the inflammable air. It may be obtained in various ways, as has been shewn under the article AEROLGY. But the most advantageous methods are, by applying acids to certain metals; by exposing animal, vegetable, and some mineral, substances, in a close vessel to a

strong fire; or by transmitting the vapour of certain fluids through red-hot tubes.

In the first of these methods, iron, zinc, and vitriolic acid, are the materials most generally used. The vitriolic acid must be diluted by five or six parts of water. Iron may be expected to yield in the common way 1700 times its own bulk of gas; or one cubic foot of inflammable air to be produced by four ounces and a half of iron, the like weight of oil of vitriol, and twenty-two ounces and a half of water. Six ounces of zinc, an equal weight of oil of vitriol, and thirty ounces of water, are necessary for producing the same quantity of gas. It is more proper to use the turnings or chippings of great pieces of iron, as of cannon, &c. than the filings of that metal, because the heat attending the effervescence will be diminished; and the diluted acid will pass more readily through the interstices of the turnings when they are heaped together, than through the filings, which stick closer to one another. The weight of the inflammable air thus obtained by means of acid of vitriol, is, in the common way of procuring it, generally one-seventh part of the weight of common air; but, with the necessary precautions for philosophical experiments, less than one-tenth of the weight of common air. Two other sorts of elastic fluids are sometimes generated with the inflammable air. These may be separated from it by passing the inflammable air through water in which quick-lime has been dissolved. The water will absorb these fluids, cool the inflammable air, and prevent its over-heating the balloon when introduced into it.

Inflammable air may be obtained at a much cheaper rate by the action of fire on various substances; but the gas which these yield is not so light as that produced by the effervescence of acids and metals. The substances proper to be used in this way are, pit-coal, asphaltum, amber, rock-oil, and other minerals; wood, and especially oak, camphor-oil, spirit of wine, ether, and animal substances, which yield air in different degrees, and of various specific gravities; but pit-coal is the preferable substance. A pound of this exposed to a red heat yields about three cubic feet of inflammable air, which, whether it be passed through water or not, weighs about one-fourth of the weight of common air. Dr. Priestley found that animal or vegetable substances will yield six or seven times more inflammable air when the fire is suddenly increased than when it is gently raised, though it be afterwards made very strong. Mr. Cavallo observes, that the various substances above enumerated generally yield all their inflammable air in about one hour's time. The general method is, to inclose the substances in iron or earthen vessels, and thus expose them to a strong fire sufficient to make the vessels red-hot: the inflammable air proceeding from the aperture of the vessel is received into a tube or refrigeratory, and, passing through the tube or worm, is at last collected in a balloon or other vessel. A gun-barrel has often been used for essays of this kind. The substance is put into it so as to fill six or eight inches of its lowest part, the remainder filled with dry sand: a tube, adapted to the mouth of the barrel, is brought into a basin of water under an inverted receiver; and, the part of the barrel containing the substance being put into the fire and made red-hot, the inflammable air is collected in the inverted receiver. As the gun-barrel cannot serve for producing a large quantity of inflammable air, Mr. Cavallo recommends, as the most advantageous shape, the following contrivance:—Let the vessel be made of clay, or rather of iron, in the shape of a Florence flask, somewhat larger, and whose neck is longer and larger. Put the substance to be used into this vessel, so as to fill about four-fifths or less of its cavity. If the substance is of such a nature as to swell much by the action of the fire, lute a tube of brass, or first a brass and then a leaden tube, to the neck of the vessel; and let the end of the tube be rounded, so that going into the water of a tub, it may

terminate under a fort of inverted vessel, to the upper aperture of which the balloon is adapted. Things thus prepared, if the lower part of the vessel be put into the fire, and made red-hot, the inflammable air produced will come out of the tube, and, passing through the water, will at last enter into the balloon. Previous to the operation, as a considerable quantity of common air remains in the inverted vessel, which it is more proper to expel, the vessel should have a stop-cock, through which the common air may be sucked out, and the water ascend as high as the stop-cock. Care must be taken that the fire used in this process be at a sufficient distance, otherwise it may happen to fire the inflammable air.

Another method of obtaining inflammable air was lately discovered by M. Lavoisier, and also by Dr. Priestley. M. Lavoisier made the steam of boiling water pass through the barrel of a gun, kept red-hot by burning coals. Dr. Priestley uses, instead of the gun-barrel, a tube of red-hot brass, upon which the steam of water has no effect, and which he fills with the pieces of iron which are separated in the boring of cannon. By this method he obtains an inflammable air, the specific gravity of which is to that of common air as one to thirteen. In this method, not yet indeed reduced to general practice, a tube about three-quarters of an inch in diameter, and about three feet long, is filled with iron-turnings; then the neck of a retort, or close boiler, is luted to one of its ends, and the worm of a refrigeratory is adapted to its other extremity. The middle part of the tube is then surrounded with burning coals, so as to keep about one foot in length of it red-hot, and a fire is always made under the retort or boiler sufficient to make the water boil with vehemence. In this process a considerable quantity of inflammable air comes out of the worm of the refrigeratory. It is said that iron yields one half more air by this means than by the action of vitriolic acid.

For filling large balloons, a greater apparatus is necessary; and the only materials that can, with any certainty of success, be employed for producing the proper gas, are, oil of vitriol, and iron filings or turnings.

It has indeed been recommended to use zinc instead of iron-filings, because white vitriol, the salt produced by the union of the vitriolic acid and zinc, is much more valuable than the green fort produced by the union of the same acid with iron. But though this is undoubtedly the case, it will as certainly be found, upon trial, that the superior price of the zinc will be more than an equivalent for all the advantage that can be derived from the additional price of the white vitriol. For a balloon of thirty feet diameter, Mr. Cavallo recommends 3900 pounds of iron-turnings, as much oil of vitriol, and 19,500 pounds of water. These proportions, however, appear too great with respect to the acid and metal, and too little with respect to the water. Oil of vitriol will not exert its power upon iron unless it be diluted with five or six times its quantity of water; in which case, a much smaller quantity of both acid and metal will serve. M. Lunardi, who from the number of his voyages had certainly much practical knowledge in aerostation, filled his balloon with about 2000 pounds of iron, as much vitriolic acid, and 12,000 pounds of water. The iron was placed in his vessels in layers, with straw between them, in order to increase the surface. His apparatus was not materially different from that of Mr. Cavallo, and is represented in the plate, where there are two tubs, about three feet in diameter and nearly two feet deep, inverted in large tubs filled with water. In the bottom of each of the inverted tubs a hole is made, and a tube of tin adapted, which is about seven inches in diameter, and seven or eight long. To these tubes the silken ones of the balloon are tied. Round each of the tubs, five, six, or more, strong casks are placed; in the top of each two holes are made, and to one of these holes a tin tube is adapted, and so shaped, that, passing through the water, it may terminate with its aperture under the inverted tub. The other hole of these casks serves for

the introduction of materials, and is stopped with a wooden plug. When the balloon is to be filled, put the net over it, and let it be suspended in the centre; and, having expelled all the common air from it, let the silken tubes be fastened round the tin ones, and, the materials being put into the casks, the inflammable air, passing into the balloon, will soon disengage, and render it capable of supporting itself; after which the rope may be slipped off. As the balloon continues to be filled, the net is adjusted properly round it, and the boat, being placed between the two sets of casks, is fastened to the hoop, with every thing else that is required to be sent up, as ballast, instruments, &c. At last, when the balloon is little more than three-quarters full, the silken tubes are separated from the tin ones of the inverted tubs, and, their extremities being tied up, are placed in the boat. Lastly, the aeronauts being seated in the boat, the lateral ropes are slipped off, and the machine is abandoned to the air. This apparatus was at last reduced by M. Lunardi to its utmost simplicity, by using only two large casks, and suffering the vapour to go into the balloon without passing through water. Thus his balloon was filled in less than half an hour, when, by the former method, it had required two hours at least. The sinking of his casks in the ground was also an additional convenience, as it created no confusion, and rendered the materials much more easily conveyed into them.

With regard to the rarefied-air balloons, the method of filling them is as follows:—A scaffold, the breadth of which is at least two-thirds of the diameter of the machine, is elevated about six or eight feet above the ground. From the middle of it descends a well, rising about two or three feet above it, and reaching to the ground, furnished with a door or two, through which the fire in the well is supplied with fuel. The well should be constructed of brick or of plastered wood, and its diameter should be somewhat less than that of the machine. On each side of the scaffold are erected two masts, each of which has a pulley at the top, and rendered firm by means of ropes. The machine to be filled is to be placed on the scaffold, with its neck round the aperture of the well. The rope, passing over the pulleys of the two masts, serves, by pulling its two ends, to lift the balloon about fifteen feet or more above the scaffold. The machine is kept steady, and held down, whilst filling, by ropes passing through loops or holes about its equator; and these ropes may easily be disengaged from the machine, by slipping them through the loops when it is able to sustain itself. The proper combustibles to be lighted in the well, are those which burn quick and clear, rather than such as produce much smoke; because it is hot air, and not smoke, that is required to be introduced into the machine. Small wood and straw have been found to be very fit for this purpose. Mr. Cavallo observes, as the result of many experiments with small machines, that spirits of wine are upon the whole the best combustible; but its price may prevent its being used for large machines. As the current of hot air ascends, the machine will soon dilate, and lift itself above the scaffold and gallery which was covered by it. The passengers, fuel, instruments, &c. are then placed in the gallery. When the machine makes efforts to ascend, its aperture must be brought, by means of the ropes annexed to it, towards the side of the well a little above the scaffold; the fire-place is then suspended in it, the fire lighted in the grate, and, the lateral ropes being slipped off, the machine is abandoned to the air. It has been determined by accurate experiments, that only one-third of the common air can be expelled from these large machines; and therefore the ascending power of the rarefied air in them can be estimated as only equal to half an ounce avoirdupois for every cubic foot.

The conduct of balloons, when constructed, filled, and actually ascending in the atmosphere, is an object of great importance in the practice of aerostation. The method generally used for elevating or lowering the balloons with rarefied air, has been the increase or diminution of the fire;

fire; and this is entirely at the command of the aeronaut, as long as he has any fuel in the gallery. The inflammable-air balloons have been generally raised or lowered by diminishing the weight in the boat, or by letting out some of the gas through the valve: but the alternate escape of the air in descending, and discharge of the ballast for ascending, will by degrees render the machine incapable of floating; for in the air it is impossible to supply the loss of ballast, and very difficult to supply that of inflammable air. These balloons will also rise or fall by means of the rarefaction or condensation of the inclosed air, occasioned by heat and cold. It has been proposed to aid a balloon in its alternate motion of ascent and descent, by annexing to it a vessel of common air, which might be condensed for lowering the machine, and rarefied again, by expelling part of it, for raising the machine. But a vessel adapted to this purpose must be very strong; and, after all, the assistance afforded by it would not be very considerable. M. Maunier, in order to attain this end, proposes to inclose one balloon filled with common air in another filled with inflammable air; as the balloon ascends, the inflammable air is dilated, and of course compresses the internal balloon containing the common air; and, by diminishing its quantity, lessens its weight. If it should be necessary to supply this loss, he says it may be easily done by a pair of bellows fixed in the gallery. Others have proposed to annex a small machine with rarefied air to an

inflammable-air balloon by ropes, at such a distance that the fire of the former might not affect the inflammable air of the latter: the whole apparatus, thus combined, of balloons formed on the two principles of heated and inflammable air, might be raised or lowered by merely increasing or diminishing the fire in the lower balloon.

Wings or oars are the only means of this sort that have been used with some success; and, as Mr. Cavallo observes, they seem to be capable of considerable improvement. Although great effects are not to be expected from them, when the machine goes at a great rate, the best methods of moving those wings are by the human strength applied similarly to the oars of a waterman. They may be made in general of silk stretched between wires, tubes, or sticks; and, when used, must be turned edgewise when they are moved in the direction in which the machine is intended to be impelled, but flat in the opposite direction. Other contrivances have been made to direct aerostatic machines, but they have mostly been invented to effect a power upon them as upon a ship. It appears, however, that they can have no effect when a machine is only moved by the wind alone, because the circumambient air is at rest in respect to the machine. The case is quite different with a vessel at sea, because the water on which it floats stands still while the vessel goes on; but it must be time and experience that can realise the expectations suggested by these contrivances.

Æ S

-AERSHOT, a town in the Netherlands, in the duchy of Brabant, and capital of the duchy of Aerthot. It is seated on the river Demur, ten miles east of Malines or Mechlin, and eight north of Louvain. Lat. 51. 15. N. lon. 5. 4. E.

ÆRUGINOUS, *adj.* an epithet given to such things as resemble or partake of the nature of the rust of copper. In medicine, the word is often applied to what is discharged by vomitings of this colour, and also to the bile.

ÆRUGO, *f.* in natural history, properly signifies the rust of copper, whether natural or artificial. The former is found about copper-mines, and the latter, called *verdegrijs*, made by corroding copper-plates with acids. See *VERDEGRIS*.

ÆRUSCATORES, *f.* in antiquity, a kind of strolling beggars, not unlike gypsies, who drew money from the credulous by fortune-telling, &c. It was also a denomination given to griping exactors, or collectors of the revenue. The Galli, or priests of Cybele, were called *æruscatores magnæ matris*; and *μυρταρυφισται*, on account of their begging or collecting alms in the streets.

ÆS UXORIUM, *f.* in antiquity, a sum paid by bachelors, as a penalty for living single to old age. This tax for not marrying seems to have been first imposed in the year of Rome 350, under the censorship of M. Furius Camillus and M. Posthumus.

ÆS PER ET LIBRAM was a formula in the Roman law, whereby purchases and sales are ratified. Originally the phrase seems to have been only used in speaking of things sold by weight, or by the scales; but it afterwards was used on other occasions.

ÆS FLAVUM, yellow copper; among the Romans, an appellation given to the coarser kinds of brass.

ÆS CALDARIUM, a term used by the German mineralists, for a substance which sometimes occurs to those who work upon cobalt, and is used for the making the fine blue colour called *smalt*.

ÆS USTRUM, a chemical preparation, made of thin leaves of copper, sulphur, and nitre, placed *stratum super stratum* in a crucible, and set in a charcoal fire till all the

Æ S C

sulphur is consumed; after which, the copper is taken out of the crucible, and reduced to powder. Some quench the leaves of copper in vinegar, and repeat the calcination. Its principal use is in colouring glass, to which it gives a beautiful tincture. It was formerly used in surgery, for destroying fungous flesh. If the burnt copper is made red-hot, and quenched in the oil nine times, then powdered, it takes the name of *saffron of copper*.

ÆSCHINES, a Socratic philosopher, the son of Charinus, a sausage-maker. He was continually with Socrates; which occasioned this philosopher to say, that the sausage-maker's son was the only person who knew how to pay a proper regard to him. It is said that poverty obliged him to go to Sicily to Dionysius the Tyrant; and that he met with great contempt from Plato, but was extremely well received by Aristippus; to whom he shewed some of his dialogues, and received from him a handsome reward. He would not venture to profess philosophy at Athens, Plato and Aristippus being in such high esteem; but he set up a school to maintain himself. He afterwards wrote orations for the Forum. Phrynichus, in Photius, ranks him amongst the best orators, and mentions his orations as the standard of the pure Attic style. Hermogenes has also spoken very highly of him. He also wrote several Dialogues, of which there are only three extant: 1. Concerning Virtue, whether it can be taught. 2. Eryxias, or Erasistratus; concerning Riches, whether they are good. 3. Axiochus; concerning Death, whether it is to be feared. M. Le Clerc has given a Latin translation of them, with notes and several dissertations, intitled *Sylva Philologica*.

ÆSCHYLUS, the tragic poet, was born at Athens. Authors differ in regard to the time of his birth, some placing it in the 65th, others in the 70th, Olympiad; but, according to Stanly, who relies on the Arundelian marbles, he was born in the 63d Olympiad. He was the son of Euphorion, and brother to Cynegirus and Aminias, who distinguished themselves in the battle of Marathion, and the sea-fight of Salamis, at which engagements Æschylus was likewise present. In this last action, accord-

ing to Diodorus Siculus, Aminias, the younger of the three brothers, commanded a squadron of ships, and behaved with so much conduct and bravery, that he sunk the admiral of the Persian fleet, and signalized himself above all the Athenians. To this brother our poet was, upon a particular occasion, obliged for saving his life. Ælian relates, that Æschylus being charged by the Athenians with certain blasphemous expressions in some of his pieces, was accused of impiety, and condemned to be stoned to death: they were just going to put the sentence in execution, when, Aminias, with a happy presence of mind, throwing aside his cloak, shewed his arm without a hand, which he had lost at the sea-fight of Salamis in defence of his country. This sight made such an impression on the judges, that, touched with the remembrance of his valour, and with the friendship he shewed for his brother, they pardoned Æschylus. He wrote a great number of tragedies, of which there are but seven remaining: and, notwithstanding the sharp censures of some critics, he must be allowed to have been the father of the tragic art. In the time of Theopis, there was no public theatre to act upon; the strollers driving about from place to place in a cart. Æschylus furnished his actors with masks, and dressed them suitably to their characters. He likewise introduced the buskin, to make them appear more like heroes. The ancients gave Æschylus also the praise of having been the first who removed murders and shocking fights from the eyes of the spectators. M. Le Fevre has observed, that Æschylus never represented women in love in his tragedies; which, he says, was not suited to his genius; but, in representing a woman transported with fury, he was incomparable. He was killed in the sixty-ninth year of his age, by an eagle letting fall a tortoise on his head as he was walking in the fields. He had the honour of a pompous funeral from the Sicilians, who buried him near the river Gela; and the tragedians of the country performed plays and theatrical exercises at his tomb. The best edition of his Plays is that of London, 1663, fol. with a Latin translation and a learned commentary by Thomas Stanley.

ÆSCHYNOMENE, *f.* [αἰσχynomαι, Gr. on account of its retreating from the touch.] In botany, a genus of the diadelphia decandria class, ranking in the natural order of papilionaceæ or leguminosæ. The generic characters are—*Calyx*: perianthium one-leaved, bell-shaped, subbilabiate; lips equal, upper bifid, lower three-toothed. *Corolla*: papilionaceous; banner subcordate, scarcely gaping, large; wings subovate, obtuse, shorter than the banner; keel lunate, acuminate, the length of the wings. *Stamina*: filaments ten, single and nine-cleft; antheræ small. *Pistillum*: germ oblong, villous, columnar; style subulate, rising; stigmas simple, rather obtuse. *Pericarpium*: legume long, flat, jointed, rough, one-celled, opening at the truncate joints. *Seeds*: solitary, between the joints, kidney-shaped.—*Essential Character*. *Calyx* bilabiate; legume with truncate one-seeded joints.

Species. 1. *Æschynomene grandiflora*, or great-flowered æschynomene: stem aborescent, flowers very large, legumes siliform. This is a shrub from ten to fifteen feet in height. It is a native of the East Indies, and is cultivated in gardens in Jamaica. By the French it is called *Pois du Duc de Choiseul*. The seeds are agreeable to domestic birds.

2. *Æschynomene arborea*, or arborescent æschynomene: stem arborescent, smooth, joints of the legumes semicordate, smooth. This species grows to the height of six or seven feet, with a single stem; the leaves are smooth, and come out towards the top of the stalk, forming there a sort of head; they are composed of many pinnas, placed alternately on the mid-rib. The flowers come out from the wings of the leaves, two or three together, are of a copper-colour and large.

3. *Æschynomene coccinea*, or scarlet-flowered æschynomene: stem aborescent, leaves pinnate; leaflets numerous, linear, obtuse, dusky; legumes compressed, equal. This

is a smaller and lower tree than the first sort; but the head and leaves are more dense. It is a native of the East Indies, and of the islands Otaheite and Huaheine in the South Seas.

4. *Æschynomene aspera*, or rough-stalked æschynomene: stem herbaceous, rugged; joints of the legumes rugged in the middle. It rises to the height of four or five feet, with a single herbaceous stem. A native of the East Indies.

5. *Æschynomene Americana*, or hairy æschynomene: stem herbaceous, hispid; joints of the legumes semicordate; leaflets acuminate, bractes ciliate. This species is somewhat sensitive; during the night, and at the approach of rain, the leaves fold together. It is a native of Jamaica, on the south side of the island, in dry pastures.

6. *Æschynomene Indica*, or Indian æschynomene: stem herbaceous, smooth; legumes smooth, swelling on one side, obtuse; leaflets obtuse. Is a native of the East Indies.

7. *Æschynomene Seseban*, or Egyptian æschynomene: stem herbaceous, smooth; legumes cylindric, equal; leaflets obtuse. This species was cultivated in 1680, in the Oxford botanic garden; and flowers in July and August; but it is a native of Egypt.

8. *Æschynomene pumila*, or dwarf æschynomene: stem herbaceous, smooth; legumes ferrate on one side, rough in the middle; leaflets acuminate. A native of the East Indies.

9. *Æschynomene sensitiva*: stem shrubby, smooth; leaflets obtuse; legumes smooth and even, obtuse; stipules acute deciduous. This species is a native of the West Indies.

10. *Æschynomene heterophylla*: stem shrubby, lower leaves ternate ovate, upper pinnate roundish. Native of Northern Cochinchina.

11. *Æschynomene lagenaria*: stem herbaceous, leaflets obtuse in several pairs, legumes muricate. The sheath of the stamens in this species is cleft towards the keel, and not towards the banner, as usual in papilionaceous flowers. The stem, being spongy and elastic, is used for stopping bottles in a country where there are no corks. Native of Cochinchina, in marshy places.

12. *Æschynomene cannabina*: stem herbaceous, leaflets obtuse acuminate, peduncles solitary, legumes compressed smooth and even. Native of the East Indies. Treated as hemp, it may be used for the same purposes.

Propagation and Culture. The first sort is with difficulty preserved through the winter in this country. The seedling plants should be brought forward on a hot-bed, and then plunged into the bark-bed in the stove, where, if they be tenderly treated, they will live through the winter, and flower the summer following. The second, third, and seventh, may in like manner be preserved thro' the winter in a warm stove, and will flower early in the following summer, and their seeds will ripen in the autumn. The other sorts usually flower in July, and their seeds ripen in October. As their stalks are succulent, they must be kept dry in winter, otherwise they are very subject to rot. They should be plunged into the tan-bed; for, when put into a dry stove, the fibres of their roots soon grow dry, and their leaves hang and fade, which shews their want of moisture; but, when they have water given them, it causes the tender fibres of their roots to perish, and the plants soon after decay. The fourth, fifth, sixth, and eighth, species, are annual, and therefore must be brought forward like the first, early in the year, otherwise they will not perfect their seeds. All the sorts are propagated by seeds, which should be sown on a hot-bed early in the spring; and, when the plants have strength enough to be removed, they should be put each into a separate small pot, filled with light earth, and plunged into a fresh hot-bed, to bring them forward; and, as they advance in their growth, they should be shifted into larger pots, but great care should be taken not to over-pot them, for, if the pots be too large, the plants will not thrive.

ÆSCULAPIUS,

ÆSCULAPIUS, in the heathen mythology, the god of physic, was the son of Apollo and the nymph Coronis. He was educated by the centaur Chiron, who taught him physic; by which means Æsculapius cured the most desperate diseases. But Jupiter, enraged at his restoring to life Hippolitus, who had been torn in pieces by his own horses, killed him with a thunder-bolt. According to Cicero, there were three deities of this name: the first, the son of Apollo, worshipped in Arcadia, who invented the probe, and bandages for wounds; the second, the brother of Mercury, killed by lightning; and the third, the son of Arisippus and Arinoe, who first taught the art of tooth-drawing and purging. At Epidaurus, Æsculapius's statue was of gold and ivory, with a long beard, his head surrounded with rays, holding in one hand a knotty stick, and the other entwined with a serpent; he was seated on a throne of the same materials as his statue, and had a dog lying at his feet. The Romans crowned him with laurel, to represent his descent from Apollo; and the Phalians represented him as beardless. The cock, the raven, and the goat, were sacred to this deity. His chief temples were at Pergamus, Smyrna, Trica, a city in Ionia, and the isle of Coos; in all which votive tablets were hung up, shewing the diseases cured by his assistance. But his most famous shrine was at Epidaurus; where, every five years, games were instituted to him, nine days after the Isthmian games at Corinth.

ÆSCULUS, *f. [æfea, food, Lat.]* In botany, a genus of the heptandria monogynia class, of the natural order of trihilata. The generic characters are—Calyx: perianth one-leaved, ventricose, small, five-toothed. Corolla: petals five, roundish, plaited and waving about the edge, flat, spreading, claws narrow, inserted into the calyx, irregularly coloured. Stamina: filaments subulate, the length of the corolla, declining. Antheræ ascending. Pistillum: germ roundish, ending in a subulate style. Stigma acuminate. Pericarpium: capsule leathery, roundish, three-celled, three-valved. Seeds: two, subglobular.—*Essential Character.* Calyx, one-leaved, five-toothed, ventricose. Corolla, five-petalled, irregularly coloured, inserted into the calyx. Capsule, three-celled.

Species. 1. *Æsculus hippocastanum*, or common horse chestnut: the flowers with seven stamens: leaves digitate with seven entire leaflets: capsules prickly. The common horse chestnut is sufficiently known by the beautiful parabolic form in which the branches are disposed, when the tree stands singly: by its digitate leaves, composed of seven leaflets, serrate about the edge, the middle one largest, the outer ones smallest: and by its handsome, upright, pyramidal thyrses of white flowers, variegated with yellow or red towards the centre. Some of these, towards the top of the thyrses, are imperfect and abortive. The capsule, or nut, as it is commonly called, is divided internally into three cells according to Linnæus; but into two only, as others affirm. This tree was in much greater esteem for avenues and walks formerly than at present. It is come into disrepute, because the leaves decay early in the summer, so that it occasions a litter in gardens and plantations, from July till they are all fallen; but, notwithstanding this inconvenience, the tree has great merit, for it affords a noble shade very early; and, during the time of its flowering, no tree has more beauty, for the extremities of the branches are terminated by fine spikes of flowers, so that every part of the tree seems covered with them, and, being intermixed with the large digitate leaves, they make a noble appearance. There is however another inconvenience to which this beautiful tree is subject, namely, that it does not well resist stormy winds. In the old way of planting these trees in avenues, great part of their beauty was lost; for, when their branches meet, fewer flowers are produced, and most of these are hid from sight; their leaves will also decay much sooner in close plantations than in single trees; the great beauty of them is to stand singly upon lawns, or in parks, where their fruit will be of use to the deer, who are very fond of them. In such situations,

especially when they can be placed so as to terminate a view, there is not a finer object than they afford during their season of flowering, which is in May; and, when the weather is moderate, they will continue in beauty near a month. In the opinion of Mr. Gilpin, the horse chestnut is a heavy disagreeable tree. It forms its foliage generally in a round mass, with little appearance of those breaks which contribute to give an airiness and lightness, at least a richness and variety, to the whole mass of foliage. This tree is however chiefly admired for its flower, which in itself is beautiful: but the whole tree together in flower is a glaring object, totally unharmonious, and unpicturesque. In some situations indeed, and among a profusion of other wood, a single horse chestnut or two, in bloom, may be beautiful. As it forms an admirable shade, it may be of use too in thickening distant scenery; or in screening an object near at hand: for there is no species of foliage, however heavy, nor any species of bloom, however glaring, which may not be brought, by some proper contrast, to produce a good effect. Few trees make a greater progress than this. I have known some raised from nuts, which in twelve or fourteen years were large enough to shade two or three chairs under the spread of their branches, and were covered with flowers. There are many old trees now standing, which, having been planted singly, are grown to a large size, their heads forming a fine natural parabola. I have measured some of them, whose branches have extended more than thirty feet, and their heads have been so close as to afford a perfect shade in the hottest seasons. These were planted in 1679; so that, although they are of quick growth, yet they are not of short duration. As the wood is of little value, this tree should not however be propagated in too great plenty; but a few of them only placed at proper distances in parks, for ornament, and for the deer, who keep much about them in windy weather, watching the falling of the nuts, and greedily devouring them as they fall. In Turkey, the nuts are ground, and mixed with the provender for their horses, especially those which are troubled with coughs or are broken winded. Hanbury affirms, that swine will fatten on them; while others on the contrary assert that they are so bitter, that even hogs will not eat them, either raw, boiled, or baked. Haller relates, that sheep have been fed with the nuts whole, and have done very well with them: and that poultry have been kept with them boiled. He also observes, that, having a saponaceous quality, they may be used to spare soap in washing: and that the bark of the tree has been given in Italy, not without success, in intermittent fevers. This bark has also been used with good success in dying several sorts of yellow colours. The timber, though of inferior quality, does not merit the character that Mr. Miller gives of it, namely, that it is not fit even for burning, nor any other use that he knows of. Mr. Boutcher, though he affirms that the timber, except for fuel, answers no valuable purpose; yet allows that for pipes, to convey water under ground, it will last longer than many harder woods. Dr. Hunter informs us, that it is chiefly used by the turner, and in the north is worth about sixpence a foot. And Mr. Hanbury not only admits it to be useful for most sorts of turners' ware, but that, as the tree grows to a great magnitude, it sells at such a price as to make it well worth the planting for the sake of the timber. He prescribes the felling to be performed in November or December. The horse chestnut was brought from the northern parts of Asia into Europe about the year 1550, and was sent to Vienna about the year 1558. From Vienna it migrated into Italy and France: but it came to us from the Levant immediately. Gerard, in his Herbal, speaks of it only as a foreign tree. In Johnson's edition of the same work, it is said,—"Horse chestnut groweth in Italy, and in sundry places of the east countries: it is now growing with Mr. Tradescant at South Lambeth." Parkinson says: "our Christian world had first the knowledge of it from Constantinople." The same author places the horse chestnut in his orchard, as a fruit-

tree, between the walnut and mulberry. How little it was then known, (in 1629,) may be inferred from his saying not only that it is of a greater and more pleasant aspect, for the fair leaves, but also of as good use for the fruit, which is of a sweet taste, roasted and eaten, as the ordinary sort. He also describes and figures the corolla with four petals. This tree does not seem to have been so common even at the beginning of the present century as it is now. Mr. Houghton (1700) mentions some at Sir William Ashhurst's at Highgate, and especially at the bishop of London's at Fulham. Those now standing at Chelsea-college were then very young. There was also a very fine one in the post-house garden near Old-freet, and another not far from the ice-house under the shadow of the Observatory in Greenwich-park.

2. *Æsculus flava*, or yellow-flowered horse chestnut: leaves digitate, with five leaflets; the laminas of the corolla cordate-roundish; the claws twice the length of the calyx. This species is a native of North-Carolina. It flowers in May and June.

3. *Æsculus pavia*, or scarlet horse chestnut: flowers with eight stamens: leaves digitate with five or six serrate leaflets; capsules smooth, laminas of the corolla obovate, claws the length of the calyx. This species rises to the height of twenty feet, but does not spread its branches to any great extent. They appear in June, and are sometimes succeeded by fruit in England; but the seeds rarely ripen here. It grows naturally in Brazil, Carolina, Florida, Japan, and several parts of the east; and was cultivated here in 1712.

Propagation and Culture. The common horse chestnut is propagated by sowing the nuts; the best time for doing this is early in the spring; but the nuts should be preserved in sand during the winter, otherwise they are apt to grow mouldy and rot. They may indeed be put into the ground in autumn, but then they will be in danger of rotting, if the winter should prove very wet, as also of being disturbed and eaten by vermin. Others however affirm, that, if they are kept till spring, many will miscarry. When the nuts succeed, and have a proper soil, the plants will shoot near a foot the first summer; so that, where they grow pretty close together, it will be proper to transplant them the following autumn, or February and March, planting them in rows at three feet distance, and one foot asunder in the rows: in this nursery they may remain two years, by which time they will be fit to plant where they are designed to be continued; for the younger these trees are planted out, the larger they will grow. But there are many who will object to their being planted out young in parks, because they will require a fence to secure them against cattle, which will also be necessary whatever size they are when planted; and, if large, they must be well staked to prevent their being displaced by strong winds: and, when we consider how much faster a young tree will grow than one which is removed at a greater age, there can be no excuse for planting large trees. The horse chestnut requires little care in the management, is never injured by cold in our climate, and will thrive in moist soils and situations: but in a sandy loam it makes the greatest progress; and, if the soil be inclining to moisture, the leaves will continue in verdure much longer than in very dry ground. When these trees are transplanted, their roots should be preserved as entire as possible, for they do not succeed well when torn or cut; nor should any of the branches be shortened, for there is scarcely any tree which will not bear amputation better than this; so that, when any branches are by accident broken, they should be cut off close to the stem, that the wound may heal over. There is, something very singular in the growth of this tree, which is that the whole shoot is completed in less than three weeks after the buds are opened, in which time I have measured shoots a foot and half long, with their leaves fully expanded: and no sooner are the flowers fallen, than the buds for the succeeding year are formed, which continue swelling till autumn, at which time the folding co-

vers are spread over with a thick tenacious juice, serving to defend the tender buds from the frost and rain in winter; but, upon the first return of warmth in the spring, this melts and runs off, leaving the bud at liberty to extend. This juice is never so far hardened as to injure the tender buds, which are always formed at the extremity of the former year's shoot; a plain direction not to shorten them, for, by so doing, the future shoots are entirely cut off.

There are varieties of this tree in the nurseries, both with gold and silver striped leaves. These are increased by layers, and by budding or ingrafting them upon stocks of the common sort.

The third species may also be propagated by the nuts, which must be procured from the countries where the trees naturally grow. They should be sown in pots early in the spring; and the pots must be plunged into a moderate hot-bed to forward their growth: toward the end of May, the pots should be plunged into the ground in a south-east border, and in dry weather the plants should be duly watered, that they may acquire strength by the autumn, when it will be very proper to screen the plants from early frosts which often pinch the top buds, and occasion their decay in the winter; for, while the plants are young, they are impatient of frosts, but, when they have obtained strength, it seldom hurts them: the spring following, the plants should be carefully separated and planted at the distance of a foot from each other, in a sheltered situation; and the following winter, when it proves cold; it will be proper to cover the plants with some light covering. After the second winter they will require no farther sheltering. Others think it sufficient to sow the nuts on a warm border, in a rich, loose, sweet, mould; to remove them the succeeding spring to a situation and soil of the same quality, where they may remain three years, when they will have acquired strength enough for any situation not too much exposed. The common method practised by nurserymen, who propagate this tree for sale, is to graft or bud it upon stocks of the common horse chestnut; but, as the stock greatly outgrows the bud or graft, the trees make a bad appearance, nor do they last long.

ÆSOP, the Phrygian, lived in the time of Solon, about the 50th Olympiad, under the reign of Cræsus the last king of Lydia. As to genius and abilities, he was greatly indebted to nature; but in other respects not so fortunate, being born a slave and extremely deformed. St. Jerom, speaking of him, says, "he was unfortunate in his birth, condition in life, and death;" hinting thereby at his deformity, servile state, and tragical end. His great genius, however, enabled him to support his misfortunes; and, in order to alleviate the hardships of servitude, he composed those entertaining and instructive Fables which have acquired him so much reputation. He is generally supposed to have been the inventor of that kind of writing; but this is contested by several, particularly Quintilian, who seems to think that Hesiod was the first author of fables. Æsop, however, certainly improved this art to a very great degree; and hence it is that he has been accounted the author of this sort of productions:

Æsopus auctor quam materiam reperit,
Hanc ego pollivi versibus senariis.

Phad. Prol. ad lib. i.

If any thoughts in these iambics shine,
Th' invention's Æsop's, and the verse is mine.

The first master whom Æsop served, was one Carasius Demarchus, an inhabitant of Athens; and there in all probability he acquired his purity in the Greek tongue. After him he had several masters; and at length came under a philosopher named Idmon or Iadmon, who enfranchised him. After he had recovered his liberty, he soon acquired a great reputation amongst the Greeks; so that, according to Meziriac, the report of his wisdom having reached Cræsus, he sent to enquire after him, and engaged him in his service. He travelled through Greece, according

According to the same author; whether for his own pleasure, or upon the affairs of Croesus, is uncertain; and, passing by Athens soon after Pisistratus had usurped the sovereign power, and, finding that the Athenians bore the yoke very impatiently, he told them the fable of the frogs who petitioned Jupiter for a king. The images made use of by Æsop are certainly very happy inventions to instruct mankind; they possess all that is necessary to perfect a precept, having a mixture of the useful with the agreeable. "Æsop the fabulist (says Aulus Gellius) was deservedly esteemed wise, since he did not, after the manner of the philosophers, rigidly and imperiously dictate such things as were proper to be advised and persuaded; but, framing entertaining and agreeable apologues, he thereby charms and captivates the human mind." Æsop was put to death at Delphi. Plutarch tells us, that he came there with a great quantity of gold and silver, being ordered by Croesus to offer a sacrifice to Apollo, and to give a considerable sum to each inhabitant: but, a quarrel arising betwixt him and the Delphians, he sent back the money to Croesus; for he thought those for whom the prince designed it had rendered themselves unworthy of it. The inhabitants of Delphi contrived an accusation of sacrilege against him; and, pretending they had convicted him, threw him headlong from a rock. For this cruelty and injustice, we are told they were visited with famine and pestilence; and, consulting the oracle, they received for answer, that the god designed this as a punishment for their treatment of Æsop: they endeavoured to make an atonement, by raising a pyramid to his honour.

ÆSOP (Clodius), a celebrated actor, who flourished about the 670th year of Rome. He and Roscius were contemporaries, and the best performers who ever appeared upon the Roman stage, the former excelling in tragedy, the latter in comedy. Cicero put himself under their direction to perfect his action. Æsop lived in a most expensive manner, and at one entertainment is said to have had a dish which cost above 800*l*. this dish, we are told, was filled with singing and speaking birds, some of which cost near 50*l*. The delight which Æsop took in this sort of birds proceeded, as Mr. Bayle observes, from the expense. He did not make a dish of them because they could speak, according to the refinement of Pliny upon this circumstance, this motive being only by accident; but because of their extraordinary price. If there had been any birds that could not speak, and yet more scarce and dear than these, he would have procured such for his table. Æsop's son was no less luxurious than his father, for he dissolved pearls for his guests to swallow. Some speak of this as a common practice of his; but others mention his falling into this excess only on a particular day, when he was treating his friends. Horace speaks only of one pearl of great value, which he dissolved in vinegar, and drank. Æsop, notwithstanding his expences, is said to have died worth above 160,000*l*. When he was upon the stage, he entered into his part to such a degree, as sometimes to be seized with a perfect ecstasy. Plutarch mentions it as reported of him, that, whilst he was representing Atreus deliberating how he should revenge himself on Thyestes, he was so transported beyond himself in the heat of action, that with his truncheon he smote one of the servants crossing the stage, and laid him dead on the spot.

ÆSTIMATIO CAPITIS, *f.* a term met with in old law-books for a fine anciently paid for offences committed against persons of quality, according to their several degrees.

ÆSTUARIA, *f.* in geography, denotes an arm of the sea which runs a good way within land: Such is the Bristol Channel, and many of the Friths of Scotland.

ÆSTUARIES, *f.* in ancient baths, were secret passages from the hypocaustum into the chambers.

ÆSTUARY, *f.* among physicians, a vapour-bath, or any other instrument for conveying heat to the body.

ÆSYMNIUM, in antiquity, a monument erected to the memory of the heroes, by Æsymnus the Megarean.

He, consulting the oracle in what manner the Megareans might be most happily governed, was answered, "If they held consultation with the more numerous:" whom he taking for the dead, built the said monument, and a senate-house that took within its compass the monument; imagining that thus the dead would assist at their consultations.

ÆTATE PROBANDA, *f.* was a writ that lay to enquire, whether the king's tenant holding *in capite* by knight's service, was of full age to receive his lands into his own hands. It was directed to the escheator of the county, but is now disused, since wards and liveries were by statute taken away.

ÆETH, or ATH, a strong little town in the Austrian Netherlands and province of Hainault, situated on the river Dender, about twenty miles S. W. of Brussels.

ÆTHALIA, or ILUA, now Elba; an island on the coast of Etruria, in compass an hundred miles, abounding in iron.

ÆTHIOPIA. See ETHIOPIA.

ÆTHIOPIIS, *f.* in botany. See SALVIA.

ÆTHUSA, *f.* [*αἰθουσα*, beggarly.] In botany, a genus of the pentandria digynia class, ranking in the natural order of umbellatæ or umbelliferæ. The generic characters are—Calyx: umbel universal spreading, the rays gradually shortening towards the middle: partial also spreading but small; involucre universal none, partial placed on the outside, only consisting of three very long, linear, pendulous leaflets; proper perianthium scarcely observable. Corolla: universal nearly uniform, with all the floscules fertile: partial has the petals bent in, heart-shaped and unequal. Stamina: filaments simple with roundish antheræ. Pistillum: germ inferior; styles reflex with obtuse stigmas; fruit roundish, streaked, bipartite. Seeds: two, roundish, streaked, except on a third part of the surface, which is plane.—*Essential Character.* Partial involucre halved, three-leaved, pendulous; fruit streaked.

Species. 1. *Æthusa cynapium*, or common fool's parsley: leaves conform. Fool's parsley, called also lesser hemlock, is a very common weed in kitchen gardens, and in a slight degree poisonous. It is easily distinguished when in flower (July and August) from true parsley and chervil, by the three narrow pendent folioles or leaflets of the involucre, placed on the outer part only of the umbel; whereas those of the partial umbels in chervil surround them entirely, growing equally on every side: and, as to parsley, it has only a few short leaflets fine almost as hairs, and distributed indifferently at the base of both umbels. Fool's parsley is a much humbler plant than either of the others. They can only be confounded in a very young state, and even then the leaves may be observed to have a different form, a darker hue, and, on being bruised, to emit in a slight degree a disagreeable venomous smell. The safest way to avoid all doubt is to cultivate the curled parsley. Most cattle eat it: but it is said to be noxious to geese.

2. *Æthusa buniis*, or coriander-leaved fool's parsley: radical leaves pinnate, cauline manifold-setaceous. This species is perennial, and it is a native of the Pyrennees.

3. *Æthusa meum*, or spignel, mew, or bawd-money: all the leaves manifold-setaceous. This is also a perennial plant, rising a foot and a half high, with channelled stalks, terminated by an umbel of flowers, that are white with a little tincture of green, and are succeeded by oblong smooth seeds. The leaves are much branched, and composed of fine capillary leaflets, set close, and of a deep green. The old name of this species is meum, but it stood in the genus *athananta* in Linnæus's Works, till the fourteenth edition of the *Systema Naturæ*. It grows wild in the mountains of Switzerland, Germany, Austria, Carniola, Italy, and Spain. Also in the high pastures of Westmoreland, Cumberland, Lancashire, and Merionethshire. The roots and seeds are aromatic and acrid: they are recommended as carminatives and stomachics; in the stone, stoppage of urine, and all uterine disorders; sometimes they are given to cure tertians. Spignel is an ingredient

in theriaca and mithridate, and appears to be of the same nature with lovage.

4. *Æthusa fatua*, or fine-leaved fool's parsley: all the leaves many-parted-fetaceous, leaflets subverticillate, stem many-leaved, sheaths of the petioles narrow, universal involucre many-leaved. It is not known where this is a native, but it was introduced here in 1781, by M. Thouin; and flowers in August and September.

Propagation and Culture. Fool's parsley is an annual, and may easily be kept down in gardens, by not suffering it to seed, which it does abundantly. The third and fourth sorts are hardy perennial plants, and may be increased, either by parting the roots at Michaelmas, or by sowing the seeds soon after they are ripe: the plants should have a shady situation and moist soil. The seeds ripen in July and August. The second sort may be propagated by seeds like the foregoing. It flowers in July.

AETIANS, in church-history, a branch of Arians who maintained, that the Son and Holy Ghost are in all things dissimilar to the Father. See **AETIUS**.

ÆTIOLOGY, *f.* is that part of Pathology which is employed in exploring the causes of diseases.

ÆTION, a celebrated painter, who has left us an excellent picture of Roxana and Alexander, which he exhibited at the Olympic games: it represents a magnificent chamber, where Roxana is sitting on a bed of a most splendid appearance, which is rendered still more brilliant by her beauty. She looks downwards, in a kind of confusion, being struck with the presence of Alexander standing before her. A number of little Cupids flutter about, some holding up the curtain, as if to shew Roxana to the prince, whilst others are busied in undressing the lady; some pull Alexander by the cloak, who appears like a young bashful bridegroom, and present him to his mistresses: he lays his crown at her feet, being accompanied by Ephestion, who holds a torch in his hand, and leans upon a youth who represents Hymen. Several other little Cupids are represented playing with his arms; some carry his lance, stooping under so heavy a weight; others bear along his buckler, upon which one of them is seated, whom the rest carry in triumph; another lies in ambush in his armour, waiting to frighten the rest as they pass by. This picture gained Ætion so much reputation, that the president of the games gave him his daughter in marriage.

ÆTITES, or **EAGLE-STONE**, *f.* in natural history, a flinty or crusted stone, hollow within, and containing a nucleus, which, on shaking, rattles within. It was formerly in repute for several extraordinary magical as well as medical powers; such as preventing abortion, discovering thieves, and other ridiculous properties. The word is formed from *ætes*, "eagle;" the popular tradition being, that it is found in the eagle's nest, whither it is supposed to be carried while the female sits, to prevent her eggs from being rotten. It is found in several parts: near Trevous in France, one can scarcely dig a few feet, without finding considerable strata or beds of the coarser or ferruginous kind. They are originally soft, and of the colour of yellow oaker. But the finest and most valued of all the eagle-stones, are accidental states of one or other of our common pebbles.

AETIUS, one of the most zealous defenders of Arianism, was born in Syria, and flourished about the year 336. After being servant to a grammarian, of whom he learned grammar and logic, he was ordained deacon, and at length bishop, by Eudoxus patriarch of Constantinople. St. Epiphanius has preserved forty-seven of his propositions against the Trinity. His followers were called **AETIANS**.

AETIUS, a famous physician, born at Amida in Mesopotamia, and the author of a work intitled *Tetrabiblos*, which is a collection from the writings of those physicians who went before him. He lived, according to Dr. Freind, at the end of the fifth or the beginning of the sixth century.

AETIUS, governor of Gallia Narbonensis in the reign

of Valentinian III. forced the Franks who were passing into Gaul to repass the Rhine. He defeated the Goths; and routed Attila king of the Huns, who invaded Gaul with an army of 700,000 men. But the emperor, jealous of the merit of this great man, killed him in 454 with his own hand, under the pretence that he had permitted the invasion of the Huns, after Attila's defeat.

ÆTNA. See **ETNA**.

ÆTOLARCHA, *f.* in Grecian antiquity, the principal magistrate or governor of the Ætolians.

AFAR, *adv.* [from *a* for *at*, and *far*.] At a great distance. To or from a great distance. *From afar*; from a distant place. *Afar off*; remotely distant.—We hear better when we hold our breath than contrary; inasmuch as in listening to attain a sound *afar off*, men hold their breath. *Bacon*.

AFEARD, *part. adj.* [from *to fear*, for *to fright*, with *a* redundant.] Frighted; terrified; afraid. It has the particle *of* before the object of fear. It is now obsolete.—Fear is described by Spencer to ride in armour, at the clashing whereof he looks *afraid of* himself.

AFER, *f.* [Lat.] The south-west wind.

AFFER (Domitius), a famous orator, born at Nisinas, flourished under Tiberius and the three succeeding emperors. Quintilian makes frequent mention of him; and commends his pleadings. But he disgraced his talents, by turning informer against some of the most distinguished personages in Rome. Quintilian, in his youth, cultivated the friendship of Domitius very assiduously. He tells us that his pleadings abounded with pleasant stories, and that there were public collections of his witty sayings, some of which he quotes. Domitius was once in great danger from an inscription he put upon a statue erected by him in honour of Caligula, wherein he declared that this prince was a second time consul at the age of twenty-seven. This he intended as an encomium, but Caligula taking it as a sarcasm upon his youth, and his infringement of the laws, raised a process against him, and pleaded himself in person. Domitius, instead of making a defence, repeated part of the emperor's speech with the highest marks of admiration; after which he fell upon his knees, and, begging pardon, declared, that he dreaded more the eloquence of Caligula than his imperial power. This piece of flattery succeeded so well, that the emperor not only pardoned, but also raised him to the consulship. *Afer* died in the reign of Nero, A. D. 59.

AFFA, a weight used on the Gold Coast of Guinea. It is equal to an ounce, and half of it is called *eggeba*. Most of the blacks on the Gold Coast give these names to those weights.

AFFABILITY, *f.* [affabilité, Fr. *affabilitas*, Lat.] The quality of being affable; easiness of manners; courteousness; civility; condescension. It is commonly used of superiors.—All instances of charity, sweetness of conversation, *affability*, admonition, all significations of tenderness, care, and watchfulness, must be expressed towards children. *Taylor*.

AFFABLE, *adj.* [affable, Fr. *affabilis*, Lat.] Easy of manners, accostable; courteous; complaisant. It is used of superiors. It is applied to the external appearance; benign; mild; favourable.—Augustus appeared, looking round him with a serene and *affable* countenance upon all the writers of his age. *Tatler*.

AFFABLENESS, *f.* Courtesy; affability.

AFFABLY, *adv.* In an affable manner; courteously; civilly.

AFFABROUS, *adj.* [affabre, Fr.] Skillfully made; complete; finished in a workman-like manner.

AFFABULATION, *f.* [affabulatio, Lat.] The moral of a fable.

AFFAIR, *f.* [affaire, Fr.] Business; something to be managed or transacted. It is used for both private and public matters.

To AFFEAR, *v. n.* [from *affier*, Fr.] To confirm; to give sanction to; to establish: an old term of law.

AFFECT,

AFFECT, *f.* Affection; passion; sensation. Quality; circumstance.—It seemeth that, as the feet have a sympathy with the head, so the wrists have a sympathy with the heart; we see the *affects* and passions of the heart and spirits are notably disclosed by the pulse. *Bacon*.—This is only the antiquated word for *affection*.

To **AFFECT**, *v. a.* [*affecter*, Fr. *afficio*, *affectum*, Lat.] To act upon; to produce effects in any other thing. To move the passions.—As a thinking man cannot but be very much *affected* with the idea of his appearing in the presence of that Being, whom none can see and live; he must be much more *affected*, when he considers, that this Being, whom he appears before, will examine the actions of his life, and reward or punish him accordingly. *Addison*.—To aim at; to endeavour after: spoken of persons. To tend to; to endeavour after: spoken of things.—The drops of every fluid *affect* a round figure, by the mutual attraction of their parts; as the globe of the earth and sea *affects* a round figure, by the mutual attraction of its parts by gravity. *Newton*.—To be fond of; to be pleased with; to love; to regard with fondness. To make a show of something; to study the appearance of any thing; with some degree of hypocrisy. To imitate in an unnatural and constrained manner. To convict of some crime; to attain with guilt: a phrase merely juridical.—By the civil law, if a dowry with a wife be promised and not paid, the husband is not obliged to allow her alimony. But, if her parents shall become insolvent by some misfortune, she shall have alimony, unless you can *affect* them with fraud, in promising what they knew they were not able to perform. *Allyffe*.

AFFECTATION, *f.* [*affectatio*, Lat.] Fondness; high degree of liking; commonly with some degree of culpability. An artificial show; an elaborate appearance; a false pretence.—It has been, from age to age, an *affectation* to love the pleasure of solitude, among those who cannot possibly be supposed qualified for passing life in that manner. *Spectator*.

AFFECTED, *part. adj.* Moved; touched with affection; internally disposed or inclined. Studied with overmuch care, or with hypocritical appearance. In a personal sense, full of affectation: as, An *affected* lady.—These antic, lipping, *affected*, phantasies, these new tuners of accents. *Shakespeare*.

AFFECTEDLY, *adv.* In an affected manner; hypocritically; with more appearance than reality. Studiously; with laboured intention.—Some mispersuasions concerning the divine attributes tend to the corrupting men's manners, as if they were designed and *affectedly* chosen for that purpose.

AFFECTEDNESS, *f.* The quality of being affected, or of making false appearances.

AFFECTION, *f.* [*affection*, Fr. *affectio*, Lat.] The state of being affected by any cause or agent. This general sense is little in use. Passion of any kind.—*Affections*, as joy, grief, fear, and anger, with such like, being, as it were, the sundry fashions and forms of appetite, can neither rise at the conceit of a thing indifferent, nor yet choose but rise at the sight of some things. *Hooker*.—Love; kindness; good will to some persons: often with *to* or *to-wards* before the person. Good-will to any object; zeal; passionate regard.—Let not the mind of a student be under the influence of warm *affection* to things of sense, when he comes to the search of truth. *Watts*.—State of the mind, in general. Quality; property. State of the body, as acted upon by any cause.—It seemed to be a venereal gonorrhœa, and others thought it arose from some scorbutical *affection*. *Wifeman*.—Lively representation in painting.—*Affection* is the lively representation of any passion whatsoever, as if the figures stood not upon a cloth or board, but as if they were acting upon a stage. *Wotton*.—It is used by Shakespeare sometimes for *affection*.

AFFECTION, among physicians, signifies the same as disease. Thus the *hysteric affection* is the same with the hysteric disease.

AFFECTIONATE, *adj.* [*affectionné*, Fr. from *affection*.] Full of affection; strongly moved; warm; zealous. Strongly inclined to; disposed to; with the particle *to*. Fond; benevolent; tender.—When we reflect on all this *affectionate* care of Providence for our happiness, with what wonder must we observe the little effect it has on men! *Rogers*.

AFFECTIONATELY, *adv.* In an affectionate manner; fondly; tenderly; benevolently.

AFFECTIONATENESS, *f.* The quality or state of being affectionate; fondness; tenderness; good-will; benevolence.

AFFECTIONED, *adj.* Affected; conceited. This sense is now obsolete.—An *affectioned* ass that cons state without book, and utters it by great swaths. *Shakespeare*.—Inclined; mentally disposed.—Be kindly *affectioned* one to another. *Rom. xii. 10*.

AFFECTUOUSLY, *adv.* In an affecting manner.

AFFECTIVE, *adj.* That which affects; that which strongly touches. It is generally used for painful.—Pain is so uneasy a sentiment, that very little of it is enough to corrupt every enjoyment; and the effect God intends this variety of ungrateful and *affective* sentiments should have on us, is to reclaim our affections from this valley of tears. *Rogers*.

AFFECTUOSITY, *f.* Passionateness.

AFFECTUOUS, *adj.* Full of passion; as, An *affectuous* speech. A word little used.

To **AFFERE**, *v. a.* [*affier*, Fr.] A law-term, signifying to confirm.

AFFERORS, *f.* [from *affeurer*, Fr. to tax.] In law, are those in the court-leet or court-baron that settle and moderate the fines and amercements imposed on such persons as have committed faults for which no express penalty is prescribed by statute. The persons nominated to this office affirm upon their oaths what penalty they think in conscience ought to be inflicted upon the offenders.

AFFETUOSO, or **CON AFFETTO**, *adj.* in the Italian music, intimates that the part to which it is added ought to be played in a tender moving way, and consequently rather slow than fast.

AFFIANCE, *f.* [*affiance*, from *affier*, Fr.] A marriage-contract. Trust in general; confidence; secure reliance. Trust in the divine promises and protection. To this sense it is now almost confined.—There can be no surer way to success, than by disclaiming all confidence in ourselves, and referring the events of things to God with an implicit *affiance*. *Atterbury*.

AFFIANCE, in law, is the plighting of troth between a man and a woman upon their agreement of marriage; and signifies as much as *fidem dare*, to pledge one's faith or fidelity. *Litt. sec. 39*.

To **AFFIANCE**, *v. a.* To betroth; to bind any one by promise to marriage. To give confidence:

Stranger! whoe'er thou art, securely rest
Affianc'd in my faith, a friendly guest.

Pope.

AFFIANCER, *f.* He that makes a contract of marriage between two parties.

AFFIDATION, or **AFFIDATURE**, *f.* [from *affido*, Lat.] Mutual contract; mutual oath of fidelity.

AFFIDAVIT, *f.* in law, is an oath in writing; sworn before some person who hath authority to take it. The plaintiff or defendant may make affidavit in a cause depending, but it will not be admitted in evidence at the trial, but is only admitted upon motion. Affidavits ought to set forth the matter of fact only, which the party intends to prove by his affidavit; and not to declare the merits of the cause, of which the court is to judge. An affidavit regularly ought to be before the judges of the court wherein the cause is depending; but, by the statute 29 Car. II. c. 5. the judges of the courts of King's Bench, Common Pleas, and Exchequer, may grant commissions to persons in the country to take affidavits concerning any matter depending in the respective courts, in like manner

as may be done by masters extraordinary of the court of Chancery. When an affidavit hath been read in court, it ought to be filed, that the other party may see it and take a copy of it.

AFFIED, *part. adj.* [from the verb *affy*, derived from *affido*, Lat. Bracton using the phrase *affidare mulieres*.] Joined by contract; affianced.

AFFILIATION, *f.* [from *ad* and *filius*, Lat.] In writers of the middle age, the same with adoption; the act of taking a son. Among the ancient Gauls it was performed with military ceremonies.

AFFINAGE, *f.* [*affinage*, Fr.] The act of refining metals by the cupel.

AFFINED, *adj.* [from *affinis*, Lat.]—Joined by affinity to another; related to another.

AFFINITY, *f.* [*affinité*, Fr. from *affinis*, Lat.] Among civilians, implies a relation contracted by marriage; in contradistinction to consanguinity, or relation by blood. Affinity does not found any real kinship; it is no more than a kind of fiction, introduced on account of the close relation between husband and wife. It is even said to cease when the cause of it ceases: hence a woman, who is not capable of being a witness for her husband's brother during his life-time, is allowed as a witness when a widow, by reason the affinity is dissolved. Yet, with regard to the contracting marriage, affinity is not dissolved by death, though it be in every thing else. In Lev. xviii. ver. 7. et seq. we find that there were several degrees of affinity, wherein marriage was prohibited by the law of Moses. But these cases are not to be proposed as examples: because in some they were authorised by necessity; in others by custom; and the law as yet was not in being. If some other examples have existed, either before or since the law, the scripture expressly disapproves of them, as Reuben's incest with Bala his father's concubine, and the action of Ammon with his sister Tamar; and that of Herod-Antipas, who married Herodias his sister-in-law, his brother Philip's wife, while her husband was yet living.

AFFINITY is also used to denote conformity or agreement. Thus we say, the affinity of languages, the affinity of words, the affinity of sounds, &c.

AFFINITY, or ELECTIVE ATTRACTION, are terms used by modern chemists to express that peculiar propensity which different species of matter have to unite and combine with certain other bodies exclusively, or in preference to any other connexion.

The power, in bodies on which their various transpositions and combinations depend, and which is called their affinity, is a term like the Newtonian attraction, which is designed to express not the cause but the effect. When an acid spontaneously quits a metal to unite with an alkali, it is said that it hath a greater affinity to the alkali than to the metal; this is only to say in other words, that it will unite with the alkali in preference to the metal.

The doctrine of the affinities of bodies is of very extensive use in the chemical pharmacy; for, as several processes are founded on it, so if an error happens, and thereby the medicine proves unfit for its intended use, it may be rendered applicable to other purposes, by such transpositions of their component parts as are pointed out by the knowledge of their affinities. Combinations and separations that are chemical, depend on elective attraction. See **CHEMISTRY**.

AFFION, *f.* an Arabian name of opium; also of an electary in which opium is a part of the composition.

To AFFIRM, *v. n.* [*affirmo*, Lat.] To declare; to tell confidently: opposed to the word *deny*.

To AFFIRM, *v. a.* To declare positively; as, *To affirm a fact.* To ratify or approve a former law, or judgment: opposed to *reverse* or *repeal*.—The house of peers hath a power of judicature in some cases, properly to examine, and then to *affirm*; or, if there be cause, to reverse the judgments which have been given in the court of king's bench. *Bacon*.—In this sense we say, *To affirm the truth.*

AFFIRMABLE, *adj.* That which may be affirmed.—

Those attributes and conceptions that were applicable and *affirmable* of him when present, are now *affirmable* and applicable to him, though past. *Hale*.

AFFIRMANCE, *f.* Confirmation: opposed to *repeal*.—This statute did but restore an ancient statute, which was itself also made but in *affirmance* of the common law. *Bacon*.

AFFIRMANT, *f.* The person that affirms; a declarer.

AFFIRMATION, *f.* [*affirmatio*, Lat.] The act of affirming or declaring: opposed to *negation* or *denial*. The position affirmed. Confirmation: opposed to *repeal*.

AFFIRMATION, in law, is an indulgence allowed to the people called Quakers, who, in cases where an oath is required from others, may make a solemn affirmation of the truth: and, if they make a false affirmation, they are subject to the penalties of perjury. But their affirmation is not allowed in any criminal cause, nor shall they by virtue hereof be allowed to serve on any juries, or to bear any office or place of profit in the government. 7 & 8 Wm. c. 34. 8 Geo. c. 6. 22 Geo. II. c. 46.

AFFIRMATIVE, *adj.* That which affirms, opposed to *negative*; in which sense we use the *affirmative* absolutely, that is, the *affirmative position*. That which can or may be affirmed: a sense used chiefly in science.—As in algebra, where *affirmative* quantities vanish or cease, there negative ones begin; so in mechanics, where attraction ceases, there a repulsive virtue ought to succeed. *Newton*.—Applied to persons, he who has the habit of affirming with vehemence; positive; dogmatical.

AFFIRMATIVELY, *adv.* In an affirmative manner; on the positive side; not negatively.

AFFIRMER, *f.* The person that affirms.

To AFFIX, *v. a.* [*affigo*, *affixum*, Lat.] To unite to the end, or *à posteriori*; to subjoin.—If men constantly *affixed* applause and disgrace where they ought, the principle of shame would have a very good influence on public conduct; though on secret villanies it lays no restraint. *Rogers*.—To connect consequentially. Simply to fasten or fix. Obsolete.

AFFIX, *f.* [*affixum*, Lat.] In grammar, a participle added at the close of a word, either to diversify its form or alter its signification. We meet with *affixes* in the Saxon, the German, and other northern languages; but more especially in the Hebrew, and other oriental tongues. The Hebrew *affixes* are single syllables, frequently single letters, subjoined to nouns and verbs; and contribute not a little to the brevity of that language. The oriental languages are much the same as to the *radicals*, and differ chiefly from each other as to *affixes* and *prefixes*.

AFFIXION, *f.* The act of affixing. The state of being affixed.

AFFLATION, *f.* [*afflo*, *afflatum*, Lat.] The act of breathing upon any thing.

AFFLATUS, *f.* [from *ad*, to, and *flare*, Lat. to blow.] It literally denotes a blast of wind, breath or vapour, striking with force against another body. Naturalists sometimes speak of the *afflatus* of serpents. Tully uses the word figuratively, for a divine inspiration; in which sense, he ascribes all great and eminent accomplishments to a divine *afflatus*. The Pythian priestesses being placed on a tripod or perforated stool, over a holy cave, received the divine *afflatus*, as a late author expresses it, in her belly; and, being thus inspired, fell into agitations, like a phrenetic; during which she pronounced, in hollow groans and broken sentences, the will of the deity. This *afflatus* is supposed, by some, to have been a subterraneous fume, or exhalation, wherewith the priestesses was literally inspired. Accordingly, it had the effects of a real physical disease; the paroxysm of which was so vehement, that Plutarch observes it sometimes proved mortal. Van Dale supposes the pretended enthusiasm of the Pythia to have arisen from the fumes of aromatics.

To AFFLICT, *v. a.* [*afflicto*, *afflictum*, Lat.] To put to pain; to grieve; to torment. The passive, *to be afflicted*, has often *at* before the casual noun; *by* is likewise proper.—The

—The mother was so *afflicted* at the loss of a fine boy, who was her only son, that she died of grief of it. *Addison*.

AFFLICTEDNESS, *f.* The state of affliction, or of being afflicted; sorrowfulness; grief.

AFFLICTER, *f.* The person that afflicts.

AFFLICTION, *f.* [*afflictio*, Lat.] The cause of pain or sorrow; calamity. The state of sorrowfulness; misery: opposed to *joy* and *prosperity*.—Some virtues are only seen in *affliction*, and some in *prosperity*. *Addison*.

Though affliction is not itself a disease, it produces many, for whatever excites envy, anger, or hatred, produces diseases from tense fibres; as whatever excites fear, grief, joy, or delight, begets diseases from relaxation.

AFFLICTIVE, *adj.* That which causes affliction; painful; tormenting:

Restless Proserpine—

—On the spacious land and liquid main

Spreads slow disease, and darts *afflictive* pain. *Prior*.

AFFLUENCE, *f.* [*affluence*, Fr. *affluentia*, Lat.] The act of flowing to any place; concurrence. It is almost always used figuratively.—I shall not relate the *affluence* of young nobles from hence into Spain, after the voice of our prince being there had been noised. *Wotton*.—Exuberance of riches; stream of wealth; plenty:

Let joy or ease, let *affluence* or content,
And the gay conscience of a life well spent,
Calm ev'ry thought, inspirit ev'ry grace.

Pope.

AFFLUENCY, *f.* The same with **AFFLUENCE**.

AFFLUENT, *adj.* [*affluent*, Fr. *affluens*, Lat.] Flowing to any part. Abundant; exuberant; wealthy.

AFFLUENTNESS, *f.* The quality of being affluent.

AFFLUX, *f.* [*affluxus*, Lat.] The act of flowing to some place; affluence. That which flows to another place.—The cause hereof cannot be a supply by procreations; ergo, it must be by new *affluxes* to London out of the country. *Graunt*.

AFFLUXION, *f.* [*affluxio*, Lat.] The act of flowing to a particular place. That which flows from one place to another.

AFFORAGE, *f.* in the French customs, was a duty paid to the lord of a district, for permission to sell wine or other liquors within his seignory. Afforage was also used for the rate or price of provisions laid and fixed by the provost or sheriffs of Paris.

TO AFFORD, *v. a.* [*affourer*, *affourager*, Fr.] To yield or produce; as, The soil *affords* grain; The trees *afford* fruits. This seems to be the primitive signification. To grant, to confer any thing; generally in a good sense, and sometimes in a bad, but less properly. To be able to sell. It is used always with reference to some certain price; as, I can *afford* this for less than the other. To be able to bear expences; as, Traders can *afford* more finery in peace than war.

TO AFFOREST, *v. a.* [*afforestare*, Lat.] To turn ground into a forest.—It appeareth, by Charta de Foresta, that he *afforested* many woods and wastes, to the grievance of the subject, which by that law were disafforested. *Davies*.

AFFORESTING, *f.* [*afforestatio*, Lat.] The turning ground into a forest. The Conqueror, and his successors, continued afforesting the lands of the subject for many reigns; till the grievance became so notorious, that the people of all degrees and denominations were brought to sue for relief; which was at length obtained, and commissions were granted to survey and perambulate the forest, and separate all the new-afforested lands, and reconvert them to the uses of their proprietors, under the name and quality of *purlieu* or *pouralle land*.

TO AFFRANCHISE, *v. a.* [*affrancher*, Fr.] To make free.

TO AFFRAY, *v. a.* [*effrayer*, or *effriger*, Fr. which *Ménage* derives from *fragor*; perhaps it comes from *frigus*.] To fright; to terrify; to strike with fear. This word is not now in use.

AFFRAY, or **AFFRAYMENT**, *f.* A tumultuous assault of one or more persons upon others. A battle: in this sense it is written *fray*. Tumult; confusion.

In law, an affray is the fighting of two or more persons in some public place, to the terror of his majesty's subjects: for, if the fighting be in private, it is no affray, but an assault. 4 *Blackll.* 145.

Affrays may be suppressed by any private person present, who is justifiable in endeavouring to part the combatants, whatever consequence may ensue. But more especially the constable, or other like officer, is bound to keep the peace; and for that purpose may break open doors to suppress an affray, or apprehend the affrayers; and may carry them either before a justice, or imprison them by his own authority for a convenient time, till the heat be over.

It is said, that no quarrelsome or threatening words whatever shall amount to an affray; and that no one can justify laying his hands on those who shall barely quarrel with angry words, without coming to blows; yet it seemeth that the constable may, at the request of the party threatened, carry the person who threatens to beat him before a justice, in order to find sureties. 1 *Haw.* 135.

Also it is certain, that it is a very high offence to challenge another, either by word or letter, to fight a duel, or to be the messenger of such a challenge; or even barely to endeavour to provoke another to send a challenge or to fight, as by dispersing letters to that purpose, full of reflections, and insinuating a desire to fight. *Id.*

All affrays in general are punishable by fine and imprisonment. 1 *Haw.* 138.

AFFRICTION, *f.* [*affriccio*, Lat.] The act of rubbing one thing upon another.—I have divers times observed, in wearing silver-hilted swords, that, if they rubbed upon my clothes, if they were of a light-coloured cloth, the *affriccion* would quickly blacken them; and, congruously hereunto, I have found pens blackened almost all over, when I had awhile carried them about me in a silver case. *Boyle*.

TO AFFRIGHT, *v. a.* To affect with fear; to terrify. It generally implies a sudden impression of fear:

Thy name *affrights* me, in whose sound is death.

Shakespeare.

It is used in the passive, sometimes with *at* before the thing feared.—Thou shalt not be *affrighted* at them: for the Lord thy God is among you. *Deut.* vii. 21.—Sometimes with the particle *with* before the thing feared:

As one *affright*

With hellish fiends, or furies mad uproar,
He then arose.

Spencer.

AFFRIGHT, *f.* Terror; fear. This word is chiefly poetical:

Wide was his parish, not contracted close
In streets, but here and there a straggling house;
Yet still he was at hand, without request,
To serve the sick, to succour the distressed;
Tempting, on foot, alone, without *affright*,
The dangers of a dark tempestuous night.

Dryden.

The cause of fear; a terrible object; dreadful appearance:

The war at hand appears with more *affright*,
And rises ev'ry moment to the sight.

Dryden.

AFFRIGHTFUL, *adj.* Full of affright or terror; terrible; dreadful.

AFFRIGHTMENT, *f.* The impression of fear; terror. The state of fearfulness.—Passionate words or blows from the tutor, fill the child's mind with terror and *affrightment*; which immediately takes it wholly up, and leaves no room for other impression. *Locke*.

TO AFFRONT, *v. a.* [*affronter*, Fr. that is, *ad frontem stare*; *ad frontem contumeliam allidere*, to insult a man to his face.] To meet face to face; to encounter. This seems the genuine and original sense of the word, which was formerly indifferent to good or ill. To meet, in an hostile manner, front to front. To offer an open insult; to offend.

fend avowedly. With respect to this sense, it is observed by Cervantes, that, if a man strikes another on the back, and then runs away, the person so struck is injured, but not affronted; an affront always implying a justification of the act.

AFFRONT, f. Open opposition; encounter: a sense not frequent, though regularly deducible from the derivation. Insult offered to the face; contemptuous or rude treatment; contumely.—There is nothing which we receive with so much reluctance as advice: we look upon the man who gives it us, as offering an *affront* to our understanding, and treating us like children or idiots. *Addison*.—Outrage; act of contempt, in a more general sense. Disgrace; shame. This sense is rather peculiar to the Scottish dialect.

AFFRONTER, f. The person that affronts.

AFFRONTING, part. adj. That which has the quality of affronting; contumelious.—Among words which signify the same principal ideas, some are clean and decent, others unclean; some are kind, others are *affronting* and reproachful, because of the secondary idea which custom has affixed to them. *Watts*.

To AFFUSE, v. a. [*affundo, effusum, Lat.*] To pour one thing upon another.—I poured acid liquors, to try if they contained any volatile salt or spirit, which would probably have discovered itself, by making an ebullition with the *affused* liquor. *Boyle*.

AFFUSION, f. [*affusio, Lat.*] The act of pouring one thing upon another.

Dr. Grew gives several experiments of the luctation arising from the affusion of divers menstrooms on all sorts of bodies. Divines and church-historians speak of baptism by affusion; which amounts to much the same with what we now call *sprinkling*.

To AFFY, v. a. [*affier, Fr. affidare mulierem, Bracton.*] To betroth in order to marriage:

Wedded be thou to the hags of hell,
For daring to *affy* a mighty lord
Unto the daughter of a worthless king. *Shakespeare*.

To AFFY, v. n. To put confidence in; to put trust in; to confide. Not in use.

AFGHANS, the general name of a people in Persia, who, under the late Kouli Khan, subverted the Persian monarchy.

AFIELD, adv. [from *a* and *field*.] To the field:

Afield I went, amid the morning dew,
To milk my kine, for so should housewives do. *Gay*.

AFLAT, adv. [from *a* and *flat*.] Level with the ground.—When you would have many new roots of fruit-trees, take a low tree, and bow it, and lay all his branches *aflat* upon the ground, and cast earth upon them; and every twig will take root. *Bacon*.

AFLOAT, adv. [from *a* and *float*.] Floating; born up in the water; not sinking: in a figurative sense, within view; in motion:

There is a tide in the affairs of men,
Which, taken at the flood, leads on to fortune;
Omitted, all the voyage of their life
Is bound in shallows and in miseries.
On such a full sea are we now *afloat*;
And we must take the current when it serves,
Or lose our ventures. *Shakespeare*.

AFOOT, adv. [from *a* and *foot*.] On foot; not on horseback. In action; as, *A design is afoot*. In motion.

AFORE, prep. [from *a* and *fore*.] Not behind; as, He held the shield *afore*: not in use. Before; nearer in place to any thing: as, He stood *afore* him. Sooner in time.—If your diligence be not speedy, I shall be there *afore* you. *Shakespeare*.

AFORE, adv. In time foregone or past. First in the way. In front; in the fore-part:

Approaching nigh, he reared high *afore*
His body monstrous, horrible, and vast.

Spencer.

AFOREGOING, part. adj. [from *afore* and *going*.] Going before.

AFOREHAND, adv. [from *afore* and *hand*.] By a previous provision. Provided; prepared; previously fitted.—For it will be said, that in the former times whereof we have spoken, Spain was not so mighty as now it is; and England, on the other side, was more *aforehand* in all matters of power. *Bacon*.

AFOREMENTIONED, adj. [from *afore* and *mentioned*.] Mentioned before.—Among the nine other parts, five are not in a condition to give alms or relief to those *aforementioned*; being very near reduced themselves to the same miserable condition. *Addison*.

AFORENAMED, adj. [from *afore* and *named*.] Named before.—Imitate something of circular form, in which, as in all other *aforenamed* proportions, you shall help yourself by the diameter. *Peacham*.

AFORESAID, adj. [from *afore* and *said*.] Said before.—It need not go for repetition, if we resume again that which we said in the *aforesaid* experiment. *Bacon*.

AFORETIME, adv. [from *afore* and *time*.] In time past.—O thou that art waxen old in wickedness, now thy sins which thou hast committed *aforetime* are come to light. *Susanna*.

AFFRAID, part. adj. [from the verb *affray*: it should therefore properly be written with *ff*.] Struck with fear; terrified; fearful. It has the particle *of* before the object of fear:

There, loathing life, and yet *of* death *afraid*,
In anguish of her spirit, thus she pray'd.

Dryden.

AFRESH, adv. [from *a* and *fresh*.] Anew; again, after intermission.—When once we have attained ideas, they may be excited *afresh* by the use of words. *Watts*.

AFRANIUS, a Latin poet, who wrote comedies in imitation of Menander, commended by Tully and Quintilian. He lived in the 170th Olympiad.

AFRICA, [according to Bochart, from a Punic word, signifying Ears of Corn;] one of the four great divisions, by the moderns called quarters, of the world, and one of the three called by the Greeks *Ἡμεραι*, or continents. By them it was also called Libya.

Africa lies south of Europe, and west of Asia. It is bounded on the north by the Mediterranean, which separates it from the former: on the north-east by the Red Sea, which divides it from Asia, and to which it is attached by a neck of land called the Isthmus of Suez, about sixty miles over, separating the Mediterranean from the Red Sea. On the west, south, and east, it is bounded by the main ocean: so that it is properly a vast peninsula, bearing some faint resemblance of a pyramid, the base of which is the northern part, running along the shores of the Mediterranean; and the top of the pyramid, the base of which is the southern part, running along the shores of the Mediterranean; and the top of the pyramid is the most southerly point, called the Cape of Good Hope. Its greatest length from north to south is 4300 miles; and its greatest breadth from east to west is 3500 miles; reaching from lat. 37° N. to 35° S. and from lon. 170° W. to 50° E.

Though a great part of this continent hath been in all ages unknown both to Europeans and Asiatics, its situation is more favourable than either Europe or Asia for maintaining an intercourse with other nations. It stands, as it were, in the centre of the three other quarters of the globe; and has thereby a much nearer communication with Europe, Asia, and America, than any one of these has with another. For, 1. It is opposite to Europe in the Mediterranean, for almost 1000 miles in a line from east to west; the distance seldom 100 miles, never 100 leagues, and sometimes not above twenty leagues: 2. It is opposite to Asia for all the length of the Red Sea, the distance

sometimes not exceeding five leagues, seldom fifty. 3. Its coast for the length of about 2000 miles lies opposite to America at the distance of from 500 to 700 leagues, including the islands: whereas America, unless where it may be a *terra incognita*, is no where nearer Europe than 1000 leagues; and Asia, than 2500. It is, however, the misfortune of Africa, that, though it has 10,000 miles of sea-coast, with noble, large, deep, rivers, it should be inhabited by barbarous or savage nations. At the mouths of many of its rivers are the most excellent harbours, deep, safe, calm, and sheltered from the wind, and capable of being made perfectly secure by fortifications; but quite destitute of shipping, trade, and merchants, even where there is plenty of merchandise. In short, Africa, though a full quarter of the globe, stored with an inexhaustible treasure, and capable, under proper improvements, of producing so many things delightful, as well convenient, within itself, seems to be almost entirely neglected, not only by the natives, who are quite unsolicitous of reaping the benefits which nature has provided for them, but also by the more civilized Europeans who are settled in it, particularly the Portuguese.

As the equator divides this continent almost in the middle, the far greatest part of it is within the tropics; and of consequence the heat in some places is almost insupportable by Europeans, it being there greatly increased by vast deserts of burning sand.

It cannot be doubted, however, that, were the country well cultivated, it would be extremely fertile; and would produce, in great abundance, not only the necessaries, but also the luxuries, of life. It has been asserted, that the sugars of Barbadoes and Jamaica, as also the ginger, rice, cotton, pepper, pimento, cocoa, indigo, &c. of these islands, would thrive in Africa to as much perfection as where they are now produced. Nor can it be doubted, that the East-Indian spices, the tea of China and Japan, the coffee of Mocha, &c. would all thrive in some parts of the African coast; as this continent has the advantage of feeling no cold, the climate being either very warm or very temperate.

From what has been said, the reader cannot expect to find here a variety of climates. In many parts of Africa snow never falls in the plains, and it seldom lies but on the tops of the high mountains. The natives, in these scorching regions, would as soon expect that marble should melt and flow in liquid streams, as that water, by freezing, should lose its fluidity, be arrested by the cold, and, ceasing to flow, become like the solid rock.

That the geography of Africa (observes Major Rennell) has made a slower progress towards improvement than that of every other part of the world, during the last and the present century, is to be attributed more to natural causes than to an absolute want of attention on the part of geography. Formed by the Creator with a contour and surface totally unlike the other continents, its interior parts elude all nautic research; whilst the wars and commerce in which Europeans have taken part, have been confined to very circumscribed parts of its borders. To the lovers of adventure and novelty, Africa displays a most ample field; but the qualification of local manners, and in some degree of habits, must in this case be super-added to that of language; and this unquestionably renders the undertaking more arduous than that of an ordinary tour.

"Africa stands alone in a geographical view. Penetrated by no inland seas, like the Mediterranean, Baltic, or Hudson's Bay; nor overspread with extensive lakes, like those of North America; nor having, in common with the other continents, rivers running from the centre to the extremities; but, on the contrary, its regions separated from each other by the least practicable of all boundaries, and deserts of such formidable extent, as to threaten those who traverse them with the most horrible of all deaths, that arising from thirst! Placed in such circumstances, can we be surprised either at our ignorance of its

interior part, or of the tardy progress of civilization in it? Possibly the difficulty of conveying merchandise to the coasts, under the above circumstances, may have given rise to the traffic in men, a commodity that can transport itself! But, laying this out of the question, as an abstract speculation, there can be little doubt but that the progress of civilization amongst the Africans has been as slow as can be conceived in any situation: and it has also happened, that the destined instruments of their civilization have remained in a proportionable degree of ignorance concerning the nature of the country.

"Nothing can evince the low state of the African geography, more than M. d'Anville's having had recourse to the works of Ptolemy and Edrisi, to compose the interior part of his map of Africa (1749). It is well known that those authors wrote in the second and, in the twelfth centuries of our æra. Most of the positions in the inland part of the great body of Africa are derived from Edrisi; and it is wonderful how nearly some of the positions agree with those furnished by the latest observations. Such was the transcendent judgment of D'Anville, in combining the scanty notices that are furnished by the Nubian geographer!

"But the public are not to expect, even under an improved system of African geography, that the interior part of that continent will exhibit an aspect similar to the others; rich in variety; each region assuming a distinct character. On the contrary, it will be meagre and vacant in the extreme. The dreary expanses of desert which often surround the habitable spots, forbid the appearance of the usual proportion of towns; and the paucity of rivers, added to their being either absorbed or evaporated, instead of being conducted in flowing lines to the ocean, will give a singular cast to its hydrography; the direction of their courses being, moreover, equivocal, through the want of that information which a communication with the sea usually affords at a glance.

"The society for promoting the discovery of the interior parts of Africa has been fortunate in collecting much geographical information in so early a stage of the African researches; and there is little doubt but that, in a few years, all the great features of this continent (within the reach of their enquiries) may be known and described. But, to accomplish this, it will be necessary that intelligent Europeans should trace some of the principal routes; as well to apportion the distances, as to establish some kind of criterion for the parole information derived from the natives. As yet, in the wide extent of near thirty degrees on a meridian, between Benin and Tripoli, not one celestial observation has been taken to determine the latitude."

Whatever may be the case with the internal parts of Africa, it is certain that its coasts are well watered with many very considerable rivers. The Nile and the Niger may be reckoned among the largest in any part of the world, America excepted. The first discharges itself into the Mediterranean, after a prodigious course from its source in Abyssinia. See NILE.—The Niger is said to fall into the Atlantic or Western Ocean at Senegal, after a course of 2800 miles. But this is extremely difficult, if not impossible, to ascertain; for, according to Mr. Lucas's communications to the African Association, both the rise and termination of the Niger are unknown, but the course is from east to west. So great is its rapidity, that no vessel can ascend its stream: and such is the want of skill, or such the absence of commercial inducements among the nations who inhabit its borders, that even with the current neither vessels nor boats are seen to navigate. In one place, indeed, the traveller finds accommodations for the passage of himself and of his goods; but even there, though the ferrymen, by the indulgence of the sultan of Cahna, are exempted from all taxes, the boat which conveys the merchandise is nothing more than an ill-constructed raft, for the planks are fastened to the timbers with ropes, and the interstices are closed, both within and without, by a plaster of tough clay, of which a large provision is always carried

ried on the raft, for the purpose of excluding the stream wherever its entrance is observed. The depth of the river at the place of passage, which is more than an hundred miles to the south of the city of Cashna, the capital of the empire of that name, is estimated at twenty-three or twenty-four feet English. Its width is such, that, even at the island of Gongoo, where the ferrymen reside, the sound of the loudest voice from the northern shore is scarcely heard; and, at Tombuctou, where the name of *Gnewa*, or black, is given to the stream, the width is described as being that of the Thames at Westminster. In the rainy season it swells above its banks, and not only floods the adjacent lands, but often sweeps before it the cattle and cottages of the short-sighted or too confident inhabitants. That the people who live in the neighbourhood of the Niger should refuse to profit by its navigation, may justly surprise the traveller; but much greater is his astonishment, when he finds that even the food which the bounty of the stream affords, is uselessly offered to their acceptance; for such is the want of skill, or such the settled dislike of the people to this sort of provision, that the fish, with which the river abounds, are left in undisturbed possession of its waters.

Both these rivers annually overflow their banks, fertilizing by that means the countries through which they pass. The Gambia and Senegal rivers are only branches of the Niger.

The most considerable mountains in Africa are the Atlas, a ridge extending from the Western Ocean (to which it gives the name of Atlantic Ocean) as far as Egypt. It had its name from the king of Mauritania, a great lover of astronomy, who used to observe the stars from its summit; on which account the poets represent him as bearing the heavens on his shoulders. The mountains of the Moon, extending themselves between Abyssinia and Monomotapa, are still higher than those of Atlas. Those of Sierra Leona, or the mountains of the Lions, which divide Nigritia from Guinea, and extend as far as Ethiopia. These were styled by the ancients the mountains of God, on account of their being subject to thunder and lightning. The Peak of Teneriffe, which the Dutch make their first meridian, rises about two miles high in the form of a sugar-loaf, and is situated on an island of the same name near the coast.

The most noted capes or promontories in this country are, Cape Verd, so called, because the land is always covered with green trees and mossy ground, and it is the most westerly point of the continent of Africa. The Cape of Good Hope, so denominated by the Portuguese, when they first went round it in 1498, and discovered the passage to Asia. It is the southern extremity of Africa, in the country of the Hottentots, and is the general rendezvous of ships of every nation who trade to India, being about half way from Europe.—There is but one strait in Africa, which is called Babel-Mandel, and joins the Red Sea with the Indian Ocean.

To what we have already said concerning the produce of Africa, we may add, that no part of the world abounds with gold and silver in a greater degree. Here are also a prodigious number of elephants; and it is surprising, that neither the ancient nor modern Europeans, notwithstanding their extravagant and insatiable thirst after gold and silver, should have endeavoured to establish themselves in a country much nearer to them than either America or the East Indies; and where the objects of their desire are found in equal, if not greater, plenty.

Next to gold and silver, copper is the most valuable metal; and on this continent it is found in great plenty, in so much that the mountains of Atlas above-mentioned are said to be all composed of copper ore.

Only a small part of this continent was known to the ancients, viz. the kingdom of Egypt, and the northern coast, comprehending little more than what is now known by the name of Barbary. It was divided into *Africa Propria*, and *Africa Interior*. *Africa Propria* comprehended

only the Carthaginian territories. *Africa Interior* comprehended all other nations to the southward of those territories, or those at a greater distance from Rome. The only kingdoms, however, with which the Romans had any connection, were the Numidians, the Mauritians, and the Gætuli. All these, as well as Egypt, were swallowed up by that enormous power, and reduced to the condition of Roman provinces. But the Romans never seem to have penetrated beyond the tropic of Cancer. There appears, indeed, to have been some intercourse between them and the Ethiopians: but the latter always preserved their liberty; and we find their queen Candace mentioned in the times of the Apostles, when the Roman power was at its highest pitch.

Between the tropic of cancer and the equinoctial line, a multitude of savage nations were supposed to have their residence, known by the names of Melanogætuli, Nigritæ, Blemmyes, Dolopes, Astacuri, Lotophagi, Ichthyophagi, Elephantophagi, &c. (which are taken notice of, as well as the others already mentioned, under their proper names); but that Africa was a peninsula, seems to have been totally unknown both to the Europeans and Asiatics for many ages. It is probable, indeed, that some of the Phenicians, and their offspring the Carthaginians, were not so ignorant; as they carried navigation to a much greater height than either the Greeks or Romans: but their discoveries were all concealed with the greatest care, lest other nations should reap the benefit of them; and, accordingly we can now find no authentic accounts concerning them. The navigation round Africa, in particular, is recorded by the Greek and Roman writers rather as a strange amusing tale than as a real transaction; and, as neither the progress of the Phenician and Carthaginian discoveries, nor the extent of their navigation, were communicated to the rest of mankind, all memorials of their extraordinary skill in naval affairs seem in a great measure to have perished, when the maritime power of the former was annihilated by Alexander's conquest of Tyre, and the empire of the latter was overturned by the Romans.

That the peninsula of Africa, however, was in reality failed round by the Phenicians, we have on indisputable authority; for some of that nation undertook the voyage, at the command of Necho king of Egypt, about 604 years before the Christian æra. They sailed from a port in the Red Sea, and after three years returned by the Mediterranean: and the very objections that were made to the veracity of their accounts at that time, are unanswerable proofs to us that this voyage was really accomplished. They pretended, that, having sailed for some time, the sun became more and more vertical, after which he appeared in the north, and seemed to recede from them: that, as they returned, the sun gradually seemed to move southwards; and, after becoming vertical once more, appeared then in the south side of them as before they set out. This, which we know must certainly have been the case, was deemed incredible at that time, and universal ignorance concerning the extent of this continent prevailed till the fifteenth century. The first attempts towards attaining a knowledge of Africa was made by the Portuguese, in 1412. Notwithstanding their vicinity, they had never ventured beyond Cape Non, situated in about lat. 27° N. which had received its name from a supposed impossibility of passing it. This year they proceeded one hundred and sixty miles farther, to Cape Bojador; which stretching a considerable way into the Atlantic Ocean, with rocky cliffs, appeared so dreadful to the navigators, that they returned without any attempt to pass it. In an attempt to double this formidable cape, they discovered the Madeira Islands, in 1419; but Cape Bojador continued to be the boundary of their continental discoveries till 1433, when they penetrated within the tropics, and in a few years discovered the river Senegal, Cape de Verd, and the islands which lie off that promontory. In 1449, the western islands, called the Azores, were discovered: and, in 1471, they first penetrated beyond the line; and were surprised

surprised to find, that the torrid zone, contrary to the opinion of the ancients, who imagined it to be burnt up with heat, was not only habitable, but fertile and populous. In 1484, they proceeded 1500 miles beyond the line; so that they began to entertain hopes of finding that way a passage to the East Indies: and, two years afterwards, the Cape of Good Hope was discovered by Bartholomew de Diaz; but it was not till the year 1497, that the Portuguese, under Vazquez de Gama, actually doubled this cape, and discovered the true shape of the continent. Thus the coasts of Africa were made perfectly known; and probably the knowledge concerning its interior parts would have been much greater than it is, had not the general attention been called off from this continent by the discovery of America, in 1492.

The Romans for a long time maintained their power in Africa: but, in the year 426, Bonifacius, supreme governor of all the Roman dominions in this quarter, being compelled to revolt by the treachery of another general called Aetius, and finding himself unable to contend with the whole strength of the Roman empire, called in Genferic king of the Vandals to his aid; who thereupon abandoned the provinces he had seized in Europe, and passed over into Africa. Bonifacius, however, being soon after reconciled to his empress, Placidia, endeavoured in vain to persuade the Vandals to retire. Hereupon a war ensued, in which the barbarians proved victorious, and quickly over-ran all the Roman provinces in Africa. In the year 435, a peace was concluded; when Numidia and some other countries were ceded to the Vandals, who soon after seized all the rest. These barbarians did not long enjoy their ill-gotten possessions: for, about the year 533, Belisarius drove them out, annexing the provinces to the eastern empire; and, in 647, the Saracens having conquered Mesopotamia, Egypt (which anciently was not included in the meaning of the word Africa), Phenicia, Arabia, and Palestine, broke like a torrent into Africa, which they quickly subdued. Their vast empire being, anno 936, divided into seven kingdoms, the African states retained their independency long after the others were subdued by the Turks: but, in the beginning of the sixteenth century, being afraid of falling under the yoke of Spain, they invited the Turks to their assistance, who first protected, and then enslaved, them. They still continue in a kind of dependence on the Ottoman empire. They are not, however, properly speaking, the *subjects* of the Grand Signior, but call him their *protector*, paying him an annual tribute. On the coasts, the natives are almost all addicted to piracy; and, with such success have they carried on their employment, that the greatest powers in Europe are become their tributaries, in order to procure liberty to trade on the Mediterranean.

Concerning even those states which are nearest to Europe, very little is known: but the interior nations are scarcely known by name; nor do almost any two of the most learned moderns agree in their division of Africa into kingdoms; and the reason is, that scarcely any traveller hath ever penetrated into these inhospitable regions. According to the best accounts, concerning those regions of Africa lying beyond Egypt and Barbary, they are divided in the following manner:—On the western coast, to the south of Barbary, lie the kingdoms of Bildulgerid, Zaara, Negroland, Loango, Congo, Angola, Benguela, and Terra de Natal. On the eastern coast, beyond Egypt, are those of Nubia, Adel, Ajan, Zanguebar (between these two a huge desert is interposed), Monomotapa, and So-fola. In the interior parts the kingdoms of Lower Ethiopia, Abex, Monemuge, and Matanan, are mentioned. The southernmost part, called Caffraria, is well known for the habitation of the Hottentots.

In many material circumstances, the inhabitants of this extensive continent agree with each other. If we except the people of Abyssinia, who are tawny, and who profess a mixture of Christianity, Judaism, and Paganism, they are all of a black complexion. In their religion, except

on the sea-coasts, which have been visited and settled by strangers, they are Pagans; and the form of government is every where monarchical. Few princes, however, possess a very extensive jurisdiction; for, as the natives of this part of Africa are grossly ignorant in all the arts of utility or refinement, they are little acquainted with one another; and generally united in small societies, each governed by its own prince. In Abyssinia, indeed, as well as in Congo, Loango, and Angola, we are told of powerful monarchs; but, on examination, it is found that the authority of these princes stands on a precarious footing, each tribe or separate body of their subjects being under the influence of a petty chieftain of their own, styled *Negus*, to whose commands, however contrary to those of the Negafcha Negafcht, or king of kings, they are always ready to submit.

The fertility of a country so prodigiously extensive, might be supposed more various than we find it is: in fact, there is no medium in this part of Africa with regard to the advantages of soil; it is either perfectly barren, or extremely fertile. This arises from the intense heat of the sun; which, where it meets with sufficient moisture, produces the utmost luxuriance; and, in those countries where there are few rivers, reduces the surface of the earth to a barren sand. Of this sort are the countries of Anian and Zaara; which, for want of water, and consequently of all other necessities, are reduced to perfect deserts, as the name of the latter denotes. In those countries, on the other hand, where there is plenty of water, and particularly where the rivers overflow the land part of the year, as in Abyssinia, the productions of nature, both of the animal and vegetable kinds, are found in the highest perfection and greatest abundance. The countries of Mandingo, Ethiopia, Congo, Angola, Batua, Truticui, Monomotapa, Cafati, and Mehenemugi, are extremely rich in gold and silver. The baser metals, likewise, are found in these and many other parts of Africa. But the persons of the natives make the most considerable article in the traffic of this miserable quarter of the globe.

On the Guinea or western coast, the English trade to James Fort; and other settlements near and up the river Gambia; where they exchange their woollen and linen manufactures, their hardware, and spirituous liquors, for the persons of the natives. By the treaty of peace in 1783, the river of Senegal, with its dependencies, were given up to France. Gold and ivory, next to the slave-trade, form the principal branches of African commerce. These are carried on from the same coast, where the Dutch and French, as well as the English, have long had their settlements for this purpose.

The Portuguese are in possession of the east and west coast of Africa, from the tropic of Capricorn to the Equator; which immense tract they became masters of by their successive attempts and happy discovery and navigation of the Cape of Good Hope. From the coast of Zanguebar, on the eastern side, they trade not only for the articles above-mentioned, but likewise for several others; as sen-na, aloes, civet, ambergris, and frankincense. The Dutch had settlements towards the southern part of the continent, in the country called Caffraria, or the land of the Hottentots, particularly Cape Town, which is well fortified; but, while this article was in the press, (Nov. 1795,) news is said to have arrived that they were totally dispossessed by the English, who hold these settlements in trust for the stadtholder.

The Portuguese, being sovereigns of the greatest part of the coast, have a number of black princes their tributaries. There are some independent princes who have extensive dominions; particularly the kings of Dahome and Widah, the most noted of any for the infamous slave-trade. Upwards of 200 years have the European nations traded with Africa in human flesh; and encouraged in the Negro countries wars, rapine, desolation, and murder, that the West-India islands might be supplied with that commodity. The annual exportation of poor creatures from

from Africa for slaves hath exceeded 100,000; numbers of whom are driven down like sheep, perhaps near 1000 miles from the sea-coast, who are generally inhabitants of villages that have been surrounded in the night by armed force, and carried off to be sold to our traders. Nor do our planters, who purchase them, use any pains to instruct them in religion, to make them amends for the oppression thus exercised on them. It is said they are unnaturally averse to every thing that tends to it; yet the Portuguese, French, and Spaniards, in their settlements, succeed in their attempts to instruct them, as much to the advantage of the commerce as of religion. It is for the sake of Christianity, and the advantages accompanying it, that English slaves embrace every occasion of deserting to the settlements of these nations. See SLAVE-TRADE.

The inhabitants of this continent, with respect to religion, may be divided into three sorts, viz. Pagans, Mahometans, and Christians. The first are the most numerous, possessing the greatest part of the country, from the tropic of Cancer to the Cape of Good Hope, and they are generally black. The Mahometans, who are of a tawny complexion, possess Egypt, and almost all the northern shores of Africa, or what is called the Barbary coast. The people of Abyssinia, or the Upper Ethiopia, are for the most part denominated Christians, but retain many Pagan and Jewish rites. There are also some Jews, on the north of Africa, who manage all the little trade that part of the country enjoys.

There are scarcely any two nations, or indeed any two of the learned, that agree in the modern divisions of Africa, as has been before observed; and therefore we must acknowledge our ignorance of the true bounds, and even the names, of several of the inland nations, which may still be reckoned among the unknown and undiscovered parts of the world.

AFRICAN ASSOCIATION, is a society that was lately established by subscription for the purpose of making discoveries in the interior parts of Africa. See the preceding article.

AFRICAN BLADDER-NUT, *f.* in botany. See ROYENA.

AFRICAN COMPANY, a society of merchants, established by king Charles II. for trading to Africa; which trade is now laid open to all his majesty's subjects, paying 10 per cent. for maintaining the forts.

AFRICAN FLEA-BANE, *f.* in botany. See TARCHONANTHUS.

AFRICAN MARYGOLD, *f.* in botany. See TAGETES.

AFRICAN RAGWORT, *f.* in botany. See OTHONNA.

AFRICANUS (Julius), an excellent historian of the third century, the author of a chronicle which was greatly esteemed, and in which he reckons 5500 years from the creation of the world to Julius Cæsar. This work, of which we have now no more than what is to be found in Eusebius, ended at the 221st year of the vulgar æra. Africanus also wrote a letter to Origen on the History of Sufanna, which he reckoned supposititious; and we have still a letter of his to Aristides, in which he reconciles the seeming contradictions in the two genealogies of Christ, recorded by St. Matthew and St. Luke.

AFRONT, *adv.* [from *a* and *front*.] In front; in direct opposition to the face.—These four came all *afront*, and mainly thrust at me. *Shakespeare*.

AFSLAGERS, *f.* persons appointed by the burgomasters of Amsterdam to preside over the public sales made in that city. They must always have a clerk of the secretary's office with them, to take an account of the sale. They correspond to our brokers, or auctioneers.

AFT, *f.* in sea-language, the same with ABAFT.

AFTER, *prep.* [after, Sax.] Following in place. It is commonly applied to words of motion; as, He came *after*, and stood *behind* him. It is opposed to *before*:

What says Lord Warwick, shall we *after* them?—

—*After* them! nay, *before* them, if we can. *Shakespeare*.

In pursuit of.—*After* whom is the king of Israel come out? *After* whom dost thou pursue? *After* a dead dog, *after* a flea? 1 Sam. xxiv. 14.—*Behind*. This is not a common use.—Sometimes I placed the third prism *after* a second, and sometimes also a fourth *after* a third, by all which the image might be often refracted sideways. *Newton*.—*Posterior* in time.—We shall examine the ways of conveyance of the sovereignty of Adam to princes that were to reign *after* him. *Locke*.—According to.—He that thinketh Spain our over-match, is no good mint-man, but takes greatness of kingdoms according to bulk and currency, and not *after* their intrinsic value. *Bacon*.—In imitation of.—There are, among the old Roman statues, several of Venus, in different postures and habits; as there are many particular figures of her made *after* the same design. *Addison*.

AFTER, *adv.* In succeeding time. It is used of time mentioned as succeeding some other. So we cannot say, I shall be happy *after*, but *hereafter*; but we say, I was at first made miserable by the loss, but was *after* happier. Following another.—Let go thy hold, when a great wheel runs down a hill, lest it break thy neck with following it; but the great one that goes upward, let him draw thee *after*. *Shakespeare*.—*After* is compounded with many words, but almost always in its genuine and primitive signification; some, which occurred, will follow, by which others may be explained.

AFTER ACCEPTATION, *f.* [from *after* and *acceptation*.] A sense afterwards, not at first admitted:

'Tis true, some doctors in a scantier space,
I mean, in each apart, contract the place?
Some, who to greater length extend the line,
The church's *after* acceptance join.

Dryden.

AFTERAGES, *f.* [from *after* and *ages*.] Successive times; posterity. Of this word I have found no singular; but see not why it might not be said, This will be done in some *afterage*. *Johnson*.

AFTER ALL, *prep.* When all has been taken into the view; when there remains nothing more to be added; at last; in fine; in conclusion; upon the whole; at the most.—But, *after all*, if they have any merit, it is to be attributed to some good old authors, whose works I study. *Pope*.

AFTERBIRTH, *f.* [from *after* and *birth*.] The membrane in which the birth was involved, which is brought away *after*; the secundine. See MIDWIFERY.

AFTERCLAP, *f.* [from *after* and *clap*.] Unexpected events happening after an affair is supposed to be at an end. It is commonly taken in an ill sense.

AFTERCOST, *f.* [from *after* and *cost*.] The latter charges; the expences incurred after the original plan is executed.—You must take care to carry off the land-floods and streams, before you attempt draining; lest your *after-cost* and labour prove unsuccessful. *Mortimer*.

AFTERCROP, *f.* [from *after* and *crop*.] The second crop or harvest of the same year.—*Aftercrops* I think neither good for the land, nor yet the hay good for the cattle. *Mortimer*.

AFTER-DINNER, *f.* [from *after* and *dinner*.] The hour passing just after dinner, which is generally allowed to indulgence and amusement.

AFTER-ENDEAVOUR, *f.* [from *after* and *endeavour*.] Endeavours made after the first effort or endeavour.—There is no reason why the found of a pipe should leave traces in their brains, which, not first, but by their *after-endeavours*, should produce the like sounds. *Locke*.

AFTER-ENQUIRY, *f.* [from *after* and *enquiry*.] Enquiry made after the fact committed, or after life.—You must either be directed by some that take upon them to know, or take upon yourself that, which, I am sure, you do not know, or lump the *after-enquiry* on your pencil. *Shakespeare*.

To AFTEREYE, *v. a.* [from *after* and *eye*.] To keep one in view; to follow in view. This is not in use.

AFTERGAME, *f.* [from *after* and *game*.] The scheme which may be laid, or the expedients which are practised;
after

after the original design has miscarried; methods taken after the first turn of affairs:

Our first design, my friend, has prov'd abortive;
Still there remains an *aftergame* to play. *Addison.*

AFTER-HOURS, *f.* [from *after* and *hours.*] The hours that succeed:

So smile the heav'n's upon this holy act,
That *after-hours* with sorrow chide us not. *Shakespeare.*

AFTER-LIVER, *f.* [from *after* and *live.*] He that lives in succeeding times.

AFTER-LOVE, *f.* [from *after* and *love.*] The second or later love:

If but the first, how heinous e'er it be,
To win thy *after-love*, I pardon thee. *Shakespeare.*

AFTERMATH, *f.* [from *after* and *math*, from *mow.*] The latter math; the second crop of grass, mown in the autumn.

AFTERNOON, *f.* [from *after* and *noon.*] The time from the meridian to the evening:

A beauty-waning and distressed widow,
E'en in the *afternoon* of her best days,
Made prize and purchase of his wanton eye. *Shakespeare.*

AFTERPAINS, *f.* [from *after* and *pain.*] The pains after birth, by which women are delivered of the secundine.

AFTERPART, *f.* [from *after* and *part.*] The latter part.—The flexibility of the former part of a man's age, not yet grown up to be headstrong, makes it more governable and safe; and, in the *afterpart*, reason and foresight begin a little to take place, and mind a man of his safety and improvement. *Locke.*

AFTERPROOF, *f.* [from *after* and *proof.*] Evidence posterior to the thing in question. Qualities known by subsequent experience.

AFTER-SWARMS, *f.* [from *after* and *swarm.*] In the management of bees, are those which leave the hive some time after the first has swarmed. See BEE.

AFTERTASTE, *f.* [from *after* and *taste.*] A taste remaining upon the tongue after the draught, which was not perceived in the act of drinking.

AFTERTHOUGHT, *f.* [from *after* and *thought.*] Reflections after the act; expedients formed too late. It is not properly to be used for *secondthought*.

AFTER-TIMES, *f.* [from *after* and *time.*] Succeeding times:

You promis'd once, a progeny divine
Of Romans, rising from the Trojan line,
In *after-times* should hold the world in awe,
And to the land and ocean give the law. *Dryden.*

AFTERTOSSING, *f.* [from *after* and *tofs.*] The motion of the sea after a storm.—Confusions and tumults are only the impotent remains of an unnatural rebellion, and are no more than the *aftertossings* of a sea when the storm is laid. *Addison.*

AFTERWARD, *adv.* [from *after* and *ward*, Sax.] In succeeding time; sometimes written *afterwards*, but less properly.

AFTERWIT, *f.* [from *after* and *wit*] The contrivance of expedients after the occasion of using them is past.—There is no recalling what's gone and past; so that *afterwit* comes too late, when the mischief is done. *L'Es-trange.*

AFTER-WRATH, *f.* [from *after* and *wrath.*] Anger when the provocation seems past.

AFWESTAD, a large copper-work belonging to the crown of Sweden, which lies on the Dala, in the province of Dalecarlia, in Sweden. It appears like a town, and has its own church. Here they make copper-plates; and have a mint for small silver coin, and was a royal post-office. Lat. 58. 10. N. lon. 14. 10. W.

AFWIOWARA, a village of Lapland, among the

mountains, under Norway. It has a bailiwick and a court of law. Lat. 69. 20. N. lon. 26. 12. E.

AGA, *f.* in the Turkish language, a great lord or commander. Hence the aga of the Janissaries is the commander in chief of that corps; as the general of horse is denominated *spahiclar aga*. The aga of the Janissaries is an officer of great importance. He is the only person who is allowed to appear before the Grand Seignior without his arms across his breast in the posture of a slave. Eunuchs at Constantinople are in possession of most of the principal posts of the seraglio: the title aga is given to them all, whether in employment or out. This title is also given to all such men without employ, and especially to wealthy landholders.

We find also agas in other countries. The chief officers under the khan of Tartary are called by this name. And, among the Algerines, we read of agas chosen from among the *boluk bashis* (the first rank of military officers), and sent to govern in the chief towns and garrisons of that state. The aga of Algiers is the president of the divan or senate. For some years, the aga was the supreme officer, and governed the state in the place of bashaw, whose power dwindled to a shadow. But the soldiery rising against the *boluk bashis*, or agas, massacred most of them, and transferred the sovereign power to the calif, with the title of *dey* or king.

AGADES, a kingdom and city of Negroland in Africa. It lies nearly under the tropic of Cancer, between Gubur and Cano. The town stands on a river that falls into the Niger; it is walled, and the king's palace is in the midst of it. The king has a retinue, who serve as a guard. The inhabitants consist of merchants and artificers. Those that inhabit the fields are shepherds or herdsmen, whose cottages are made of boughs, and are carried about from place to place on the back of oxen, to fix on the spot where they intend to feed their cattle. The houses in the city are stately, and built after the Barbary fashion. This kingdom is well watered; and there is great plenty of grass, cattle, fenna, and manna. The prevailing religion is the Mahometan, but very loosely professed. Lat. 26. 10. N. lon. 9. 10. E.

AGAIN, *adv.* [*agen*, Sax.] A second time; once more; marking the repetition of the same thing.—The poor remnant of human seed, which remained in their mountains, peopled their country *again* slowly, by little and little. *Bacon*.—On the other hand; marking some opposition or contrariety.—His wit increased upon the occasion; and so much the more, if the occasion were sharpened with danger. *Again*, whether it were the shortness of his foresight, or the strength of his will, certain it is, that the perpetual trouble of his fortunes could not have been without defects in his nature. *Bacon*.—On another part; marking a transition to some new consideration:

Behold yon mountain's hoary height,
Made higher with new mounts of snow;

Again, behold the winter's weight
Oppress the lab'ring woods below.

Dryden.

In return, noting re-action, or reciprocal action; as, His fortune worked upon his nature, and his nature *again* upon his fortune. Back; in retribution. In return for any thing; in recompence.—That he hath given will he pay *again*. *Prov.* xix. 27.—In order of rank or succession; marking distribution. Besides; in any other time or place.—They have the Walloons, who are tall soldiers; yet that is but a spot of ground. But, on the other side, there is not in the world *again* such a spring and seminary of brave military people, as in England, Scotland, and Ireland. *Bacon*.—Twice as much; marking the same quantity once repeated:

There are whom heav'n has blest with store of wit,
Yet want as much *again* to manage it;
For wit and judgment ever are at strife,
Tho' meant each other's aid, like man and wife. *Pope.*

Again.

Again and again; with frequent repetition; often.—This is not to be obtained by one or two hasty readings: it must be repeated *again and again*, with a close attention to the tenor of the discourse. *Locke*.—In opposition; by way of resistance.—Who art thou that answerest *again*? *Rom. ix. 20*.—Back; as, returning from some message.—Bring us word *again* which way we shall go. *Deut. i. 22*.

AGAINST, *prep.* [*ægeon, ongeond*, Sax.] In opposition to any person.—And he will be a wild man; his hand will be *against* every man, and every man's hand *against* him. *Gen. xvi. 12*.—Contrary; opposite, in general.—Men often say a thing is *against* their conscience, when really it is not. *Swift*.—In contradiction to any opinion.—After all that can be said *against* a thing, this will still be true, that many things possibly are, which we know not of. *Tillotson*.—With contrary motion or tendency: used of material action.—The kite being a bird of prey, and therefore hot, delighteth in the fresh air; and many times flieth *against* the wind, as trouts and salmon swim *against* the stream. *Bacon*.—Contrary to rule or law. Opposite to in place. To the hurt of another. In provision for; in expectation of. This last mode of speaking probably had its original from the idea of making provision *against*, or in opposition to, a time of misfortune, but by degrees acquired a neutral sense. It sometimes has the case elliptically suppressed, as, *Against* he comes, that is, *Against the time* when he comes.

AGALAXY, *f.* [from α and $\gamma\alpha\lambda\alpha$, Gr.] A defect of milk in child-bed. Hence the epithet $\alpha\gamma\alpha\lambda\alpha\kappa\iota\alpha$, given by Hippocrates to a lying-in woman that hath no milk.

AGALLOCHA, *f.* in botany. See EXCOECARIA.

AGALMATA, *f.* in antiquity, a term originally used to signify any kind of ornaments in a temple; but afterwards for the statues only, as being most conspicuous.

AGAMEMNON, the son of Atreus by Eope, was captain-general of the Trojan expedition. It was foretold to him by Cassandra, that his wife Clytemnestra would be his death: yet he returned to her; and accordingly was slain by Aegisthus, who had gained upon his wife in his absence, and by her means got the government into his own hands.

AGAMENTICUS, a mountain of North America, in the province of Main, in lat. 43. 16. It is a noted landmark for sailors, and about eight miles from the sea.

AGAN, a Ladrona island, where Magellan, in search of the Molucca islands, was assassinated.

AGANIPPE, in antiquity, a fountain of Bœotia at mount Helicon, on the borders between Phocis and Bœotia, sacred to the Muses, and running into the river Permessus. Ovid seems to make *Aganippe* and *Hippocrene* the same. Solinus more truly distinguishes them, and ascribes the blending them to poetical licence.

AGANIPPIDES, *f.* in ancient poetry, a designation given to the Muses, from a fountain of mount Helicon, called **AGANIPPE**.

AGAPANTHUS, *f.* [$\alpha\gamma\alpha\pi\alpha\nu\theta\omicron\varsigma$, Gr. a delightful flower.] In botany, a genus of the hexandria monogynia class, in the natural order of lilia or liliaceæ. The generic characters are—Calyx: spathe common gaping at the side. Corolla: one-petalled, funnel-shaped, regular; tube cornered, as if composed of six claws; border six-parted, parts oblong, spreading. Stamina: filaments six, inserted into the throat, shorter than the corolla, declinate; antheræ kidney-shaped, incumbent. Pistillum: germ superior, oblong, three-cornered; style filiform, length of the filaments, declinate; stigma simple. Pericarpium: capsule oblong, three-fided, three-celled, three-valved; valves navicular, with contrary dissepiment. Seeds: numerous, oblong, compressed, enlarged with a membrane.—*Essential Character*. Corolla inferior, funnel-shaped, hexapetaloid, regular.

The root of the agapanthus umbellatus, or African blue lily, is composed of many thick fleshy fibres, diverging from the same head, striking deep into the ground, and putting out many smaller fibres, which are white and

fleshy: from the same head arises a cluster of leaves surrounding each other at the base, so as to form a kind of herbaceous stalk about three inches high, from which the leaves spread only two ways, appearing flat the other two. The leaves of this plant are thick, succulent, about a foot long, and near an inch broad, compressed, and of a dark green. Between these comes out the flower-stalk, from two to three feet in height, round, as large as a man's little finger, naked to the top, where it supports a large head or umbel of blue flowers, inclosed in a sheath, which splits into two parts, and is bent back. Each flower stands on a pedicel about an inch long. The petals are blunt, and waved on their edges. The umbel being large, the flowers numerous, and of a bright blue colour, make a fine appearance. They come out at the end of August, or the beginning of September, and frequently continue in beauty till spring. It is a native of the Cape of Good Hope, from whence it was brought to the gardens in Holland. In 1692, it was cultivated in the royal garden at Hampton-Court.

Propagation and Culture. This plant is propagated by offsets, which come out from the side of the old plants, and may be taken off the latter end of June, at which time these plants are in their greatest state of rest; when the plants should be turned out of the pots, and the earth carefully cleared away from the roots, that the fibres of the offsets may be better distinguished, which should be separated from those of the old roots, being careful not to break their heads. But, where they adhere so closely to the old plant as not to be so separated, they must be cut off with a knife, taking great care not to wound or break the roots of either the offsets or the parent plant. When these are parted, they should be planted each into a separate pot, filled with light kitchen-garden earth, and placed in a shady situation, where they may enjoy the morning sun, giving them a little water twice a week, if the weather proves dry; but they must not have too much wet, especially at this season, when they are almost inactive; for, as the roots are fleshy and succulent, they are apt to rot with great moisture. In about five weeks time the offsets will have put out new roots, when the pots may be removed to a more sunny situation, and then they may have a little more water, which will strengthen their flowering; but it must not be given too liberally, for the reasons before stated. In September they will put out their flower-stalks, and toward the end of that month the flowers will begin to open, when, if the weather should not be good, they should be removed under shelter, to prevent the flowers from being injured by frost or too much wet; but they should have as much free air as possible, otherwise the flowers will be pale-coloured and weak. Toward the end of October they should be removed into the greenhouse, and placed where they may enjoy as much free air as possible, and not be over-hung by other plants; and, during the winter, they may have a little water once a week or oftener in mild weather, but in the frost they should be kept dry. This plant only requires protection from frost and moisture; it should not therefore have any artificial warmth in winter, and must be placed in the open air in summer.

AGAPE, *adv.* [from α and $\gamma\alpha\pi\epsilon$.] Staring with eagerness; as, a bird gapes for meat:

In himself was all his state;
More solemn than the tedious pomp that waits
On princes, when their rich retinue long
Of horses led, and grooms besmeared with gold,
Dazzles the crowd, and sets them all *agape*. *Milton*.

AGAPE, *f.* in ecclesiastical history, the love-feast, or feast of charity, of the primitive Christians; when a liberal contribution was made by the rich to feed the poor. The word is Greek, $\alpha\gamma\alpha\pi\epsilon$, and signifies *love*. These love-feasts, during the three first centuries, were held in the church without scandal or offence; but, in after-times, the heathens began to tax them with impurity. This at length

length gave occasion to their reformation; but, notwithstanding this precaution, the abuses committed occasioned their abolition at the council of Carthage, in the year 397.

AGAPETÆ, in ecclesiastical history, a name given to certain virgins and widows, who, in the ancient church, associated themselves with, and attended on, ecclesiastics, out of a motive of piety and charity.—In those days, women were instituted DEACONESSES; and, in the fervour of the primitive piety, there was nothing scandalous in such societies; but they afterwards degenerated into libertinism, and were at length suppressed.

AGARD (Arthur), a learned English antiquarian, born at Toston in Derbyshire in the year 1540. His fondness for English antiquities induced him to make many large collections; and his office as deputy chamberlain of the exchequer, which he held forty-five years, gave him great opportunities of acquiring skill in that study. Similarity of taste brought him acquainted with Sir Robert Cotton, and other learned men, who associated themselves under the name of *The Society of Antiquarians*, of which society Mr. Agard was a conspicuous member. He made the doomday-book his peculiar study; and composed a work purposely to explain it, under the title of *Traſtatus de uſu et obſcurioribus verbis libri de Domeſday*: he also compiled a book for the service of his successors, which he deposited with the keepers of the king's receipt, as a proper index for succeeding officers. All the rest of his collections, containing at least twenty volumes, he bequeathed to Sir Robert Cotton; and died in 1615.

AGARIC, *f.* [*agaricum*, Lat.] A drug of use in physic, and the dying trade. It is divided into male and female; the male is used only in dying, the female in medicine: the male grows on oaks, the female on larches.—There are two excrescences which grow upon trees, both of them in the nature of mushrooms; the one the Romans call *boletus*, which groweth upon the roots of oaks, and was one of the dainties of their table; the other is medicinal, that is called *agaric*, which groweth upon the tops of oaks; though it be affirmed by some, that it groweth also at the roots. *Bacon*.

AGARICUS, *f.* [*Agaria*, a city of Sarmatia.] In botany, a genus of the cryptogamia fungi. The generic characters are—Pileus or cap with gills underneath. Gills: differing in substance from the rest of the plant, composed of two laminas. Seeds: in the gills.

Species. In the thirteenth edition of Linnæus's *Systema Vegetabilium*, we have no more than twenty-seven species of agaricus. In the fourteenth by Murray there are only thirty-five. Micheli on the contrary has given 634. In the third edition of Ray's *Synopsis* are fifty-seven species, fourteen of which are added by Dillenius. Gleditsch reduces the agarici to thirty-two species, but informs us that there are 120 more, involved in much obscurity. Haller describes 134; and Scopoli 114, of which eleven only have Linnæus's names. Mr. Hudson enumerates forty-six; and Mr. Lightfoot accurately describes twenty, in his *Flora Scotica*. Allione enumerates eighty-two. But in the third part of Dr. Withering's *Botanical Arrangement*, the number of British species ascertained and described amounts to 213. Out of all these, one only has been selected for cultivation in our gardens; namely:—

Agaricus campestris, the common mushroom, or champignon, which is thus described: gills crowded, irregular, pink changing to liver-colour; cap convex, white to brown; stem white, cylindrical; eurtain white. This species is esteemed the best and most savoury of the genus, and is in much request for the table in England. It is eaten fresh either stewed or broiled; and preserved either as a pickle or in powder. The sauce vulgarly called catch-up is made from its juice with salt and spices. The wild mushrooms, from fresh undunged pastures, are more delicate than those which are raised on artificial beds; the flesh of the latter being less tender: those who are much accustomed to them, can immediately tell the difference by their smell. Mr. Miller is of a different opinion, proba-

bly because the cultivated ones are more slightly, and may be collected in a proper state for eating more easily: they are firmer and better for pickling.

The agaricus georgii of Linnæus much resembles this, but is far inferior to it in flavour, though not poisonous, as generally supposed. It is very common: the cap turns yellow, but the gills are always white.

The agaricus procerus, or tall mushroom, which is common in woods and dry hilly pastures, is sometimes exposed to sale in Covent-garden market. It may be easily distinguished from the genuine sort by the sponginess of its flesh; and from all others by its tallness, its bulbous base, its large volva or ruffle, and the flakiness or scaly texture of its spongy cap: the gills are numerous, brittle, and whitish.

Agaricus cæfareus, or imperial agaric, is the most splendid of all the species. It is common in Italy, and is brought to the markets there for sale. The ancient Romans esteemed it one of the greatest luxuries of the table. Having been made the vehicle for poison to Claudius Cæsar, by his wife Agrippina, it has been celebrated by Juvenal and Martial. It was first found wild in this country in Red-Rock plantation, Edgbaston, by Dr. Withering's daughter, on the sixth of July, 1791.

Agaricus orcadæ of Bolton and Withering is very different from all these. It is a small pale brown, or rather buff-coloured, mushroom, very common in dry pastures, particularly in the fairy rings. It is also found in woods and hedges; but in such situations the flavour is inferior. Those from dry pastures have a very pleasant smell, and a most luscious flavour, either stewed alone, or in ragouts, hashes, &c. I have eaten them in great quantities, above forty years, without the least injury, nor did I ever perceive any thing of that toughness like leather, which is so much complained of, except in very dry weather, or when they are in too advanced a state: they should be gathered young, early in a morning, and there is some nicety in dressing them. This sort makes excellent catchup, and is admirable in the form of powder. It is in season during September and October, but may be dried so as to be in use for the table all the winter. Dr. Withering is satisfied that the circles in pasture fields, called fairy rings, are caused by the growth of this agaric. Where the ring is brown or almost bare, upon digging up the soil to the depth of two inches, the spawn of the fungus will be found of a greyish white colour; but where the grass has again grown green and rank there is no spawn. These observations have been confirmed by my own experience long since for many years together. I have frequently remarked the same ring to increase in diameter, till a part of it has been cut off by a fence of the inclosure. In many parts of Europe several other sorts are eaten, which we fancy to be poisonous. The nature of this work does not require that we should enter more minutely into the consideration of the agarics. The bare enumeration and description of the species contained in the class cryptogamia, would make a large volume. See FUNGI.

Propagation and Culture of Mushrooms. In order to cultivate mushrooms, if you have no beds in your own or in neighbouring gardens, which produce them, you must look abroad in rich pastures, during the months of August and September, that being the season when they are naturally produced: open the ground about the roots of mushrooms, where you will find the earth very often full of small white knobs, which are the offsets, or young mushrooms; these should be carefully gathered, preserving them in lumps with the earth about them: but, as this spawn cannot be found in the pasture except at the season when mushrooms are naturally produced, you may probably find some in old dung-hills, especially where there has been much litter amongst it, and the wet has not penetrated to rot it; as likewise in old hot beds; shooting out in long strings: or it may be procured by mixing some, long dung from the stable, which has not been thrown on a heap

a heap to ferment, with strong earth, and put under cover to prevent wet getting to it; the more the air is excluded from it, the sooner the spawn will appear; but this must not be laid so close together as to heat, for that will destroy the spawn; in about two months after, the spawn will appear, especially if the heap is closely covered with old thatch, or such litter as has lain long abroad, so as not to ferment; then the beds may be prepared to receive the spawn: these should be made of dung, in which there is good store of litter, but this should not be thrown on a heap to ferment; that dung which has lain spread abroad for a month or longer is best. These beds should be made on dry ground, and the dung laid upon the surface; the width of them at bottom should be about two feet and a half or three feet, the length in proportion to the quantity of mushrooms desired; then lay the dung about a foot thick, covering it about four inches with strong earth. Upon this lay more dung, about ten inches thick; then another layer of earth, still drawing in the sides of the bed, so as to form it like the ridge of a house, which may be done by three layers of dung and as many of earth. When the bed is finished, it should be covered with litter or old thatch, to keep out wet, as also to prevent its drying; in this situation it may remain eight or ten days, by which time the bed will be in a proper temperature of warmth to receive the spawn; for there should only be a moderate warmth in it, great heat destroying the spawn, as will also wet; therefore, when the spawn is found, it should always be kept dry until it is used, for, the drier it is, the better it will take in the bed. The bed being in a proper temperature for the spawn, the covering of litter should be taken off, and the sides of the bed smoothed; then a covering of light rich earth about an inch thick should be laid all over the bed, but this should not be wet; upon this the spawn should be thrust, laying the lumps four or five inches asunder; then gently cover this with the same light earth above half an inch thick, and put the covering of litter over the bed, laying it so thick as to keep out wet, and prevent the bed from drying: when these beds are made in the spring or autumn, as the weather is in those seasons temperate, the spawn will then take much sooner, and the mushrooms will appear perhaps in a month after making; but those beds which are made in summer, when the season is hot, or in winter, when the weather is cold, are much longer before they produce. The great skill in managing these beds is, that of keeping them in a proper degree of moisture, never suffering them to receive too much wet; during the summer season the beds may be uncovered, to receive gentle showers of rain at proper times; and, in long dry seasons the beds should be now and then gently watered, but by no means suffer much wet to come to them; during the winter season they must be kept as dry as possible, and so closely covered as to keep out cold. In frosty or very cold weather, if some warm litter shaken out of a dung-heap is laid on, it will promote the growth of the mushrooms; but this must not be laid next the bed, but a covering of dry litter between the bed and this warm litter; and, as often as the litter is found to decay, it should be renewed with fresh; and, as the cold increases, the covering should be laid so much thicker. If these things are observed, there may be plenty of mushrooms produced all the year; and those produced in beds are much better for the table than any of those which are gathered in the fields. A bed thus managed, if the spawn takes kindly, will continue good for several months, and produce great quantities of mushrooms; from these beds, when they are destroyed, you should take the spawn for a fresh supply, which may be laid up in a dry place until the proper season of using it, which should not be sooner than five or six weeks, that the spawn may have time to dry before it is put into the bed, otherwise it will not succeed well. Sometimes it happens, that beds thus made do not produce any mushrooms till they have lain five or six months, so that beds should not be destroyed, though they do not at first answer expectation; for, I have frequently

known these to have produced great quantities of mushrooms afterward, and to have continued a long time in perfection.

This practice of propagating mushrooms by the spawn, or the white fibrous radicles, which produce tubercles in the manner of potatoes, is the most common. But they may also be increased by the seed. When this method is used, the gills are cut out and put into the beds; or else they are infused in water, and the beds are sprinkled with the infusion. In the same manner any other species of fungus may be cultivated; and experiments have been made on the *boletus* and *phallus* with success.

AGAST, *adj.* [This word, which is usually, by later authors, written *aghaft*, is, not improbably, the true word derived from *agaze*, which has been written *aghaft*, from a mistaken etymology.] Struck with terror; amazed; frightened to astonishment.

AGATE, or ACHAT, *f.* [among the Greeks and Latins, *Αχατης*, and *Achates*, from a river in Sicily, on the banks of which it was first found.] A very extensive genus of the semipellucid gems.

These stones are variegated with veins and clouds, but have no zones like those of the onyx. They are composed of chrysal debased by a large quantity of earth, and not formed, either by repeated incrustations round a central nucleus, or made up of plates laid evenly on one another; but are merely the effect of one simple concretion, and variegated only by the disposition given, by the fluid they were formed in, to their differently-coloured veins or matters.

Agates are arranged according to the different colours of their ground. Of those with a *white* ground there are three species. 1. The *dendrachates moeca stone*, or *aborescent agate*. This seems to be the same with what some authors call the *achates* with rosemary in the middle, and others *achates* with little branches of black leaves. 2. The *dull milky-looking agate*. This, though greatly inferior to the former, is yet a very beautiful stone. It is common on the shores of rivers in the East Indies, and also in Germany and some other parts of Europe. Our lapidaries cut it into counters for card-playing, and other toys of small value. 3. The *lead-coloured agate*, called the *phassachates* by the ancients.

Of the agates with a *reddish* ground there are four species. 1. An impure one of a flesh-coloured white, which is, but of little beauty in comparison with other agates. The admixture of flesh-colour is but very slight; and it is often found without any clouds, veins, or other variegations; but, sometimes it is prettily veined or variegated with spots of irregular figures, having fimbriated edges. It is found in Germany, Italy, and some other parts of Europe; and is wrought into toys of small value, and often into the German gun-flints. It has been sometimes found with evident specimens of the perfect mosses bedded deep in it. 2. That of a pure blood colour, called *hamachates*, or the *bloody agate*, by the ancients. 3. The clouded and spotted agate, of a pale flesh colour, called by the ancients the *carnelian agate*, or *sardachates*. 4. The red lead coloured one, variegated with yellow, called the *coral agate*, or *coralla-achates*, by the ancients.

Of the agates with a *yellowish* ground there are only two known species; the one of the colour of yellow wax, called *cerachates* by the ancients; the other a very elegant stone, of a yellow ground, variegated with white, black, and green, called the *leonina*, and *leontiferes* by the ancients.

Lastly, Of the agates with a *greenish* ground, there is only one known species, called by the ancients *jaspachates*.

Of all these species there are a great many varieties; some of them having upon them natural representations of men and different kinds of animals, &c. These representations are not confined to the agates whose ground is of any particular colour, but are occasionally found on all the different species. Velschius had in his custody a flesh-coloured agate, on one side of which appeared a half-moon in great perfection, represented by a milky semicircle;

cle; on the other side, the phases of *vesper*, or the evening-star: whence he denominated it an *aphrodisian agate*. An agate is mentioned by Kircher, on which was the representation of a heroine armed; and one in the church of St. Mark, in Venice, has the representation of a king's head adorned with a diadem. On another, in the museum of the prince of Gonzaga, was represented the body of a man with all his clothes in a running posture. A still more curious one is mentioned by de Boot, wherein appears a circle struck in brown, as exactly as if done with a pair of compasses, and in the middle of the circle the exact figure of a bishop with a mitre on: but, inverting the stone a little, another figure appears; and, if it is turned yet further, two others appear, the one of a man and the other of a woman. But the most celebrated agate of this kind is that of Pyrrhus, wherein were represented the nine Muses, each with their proper attributes, and Apollo in the middle playing on the harp. In the emperor's cabinet is an oriental agate of a surprising bigness, being fashioned into a cup, whose diameter is an ell abating two inches. In the cavity is found delineated in black specks, B. XRISTOR. s. XXX. Other agates have also been found, representing the numbers 4191, 191; whence they were called *arithmetical agates*, as those representing men or women have obtained the name of *anthropomorphous*.

Great medicinal virtues were formerly attributed to the agate; such as resisting poisons, especially those of the viper, scorpion, and spider; but they are now very justly rejected from medicinal practice.

Agates may be stained artificially with solution of silver in spirit of nitre, and afterwards exposing the part to the sun; and though these artificial colours disappear on laying the stone for a night in aquafortis, yet a knowledge of the practicability of thus staining agates, must render those curious figures above-mentioned strongly suspected of being the work not of nature, but of art. Some account for these phenomena from natural causes. Thus, Kircher, who had seen a stone of this kind in which were depicted the four letters usually inscribed on crucifixes, I. N. R. I. apprehends that some real crucifix had been buried under ground, among stones and other rubbish, where the inscription, happening to be parted from the cross, and to be received among a soft mould or clay susceptible of the impression of the letters, came afterwards to be petrified. In the same manner he supposes the agate of Pyrrhus to have been formed. Others resolve much of the wonder into fancy, and suppose those stones formed in the same manner with the *caméaux* or Florentine stones.

The agate is used for making cups, rings, seals, handles for knives and forks, hilts for swords and hangers, beads to pray with, smelling-boxes, patch-boxes, &c. being cut or sawed with no great difficulty.

Considerable quantities of these stones are still found near the river Achetes in Sicily. There are found in some of these the surprising representations above-mentioned, or others similar to them. By a dexterous management of these natural stains, medals have been produced, which seem master-pieces of nature: for this stone bears the graver well; and, as pieces of all magnitudes are found of it, they make all sorts of work of it. The high altar of the cathedral of Messina is all over encrusted with it. The lapidaries pretend that the Indian agates are finer than the Sicilian; but Father Labat informs us, that in the same quarries, and even in the same block, there are found pieces much finer than others, and these fine pieces are sold for Indian agates in order to enhance their price.

AGATE, among antiquaries, denotes a stone of this kind engraved by art. In this sense, agates make a species of antique gems; in the workmanship whereof we find eminent proofs of the great skill and dexterity of the sculptors. Several agates of exquisite beauty are preserved in the cabinets of the curious; but the facts or histories represented on these antique agates, however well executed, are now become so obscure, and their explications so difficult, that several diverting mistakes and disputes have

arisen among those who undertook to give their true meaning.

The great agate of the apotheosis of Augustus, in the treasury of the holy chapel, when sent from Constantinople to St. Lewis, passed for a triumph of Joseph. An agate, now in the French king's cabinet, had been kept 700 years with great devotion in the Benedictine abbey of St. Evre at Toul, where it passed for St. John the Evangelist carried away by an eagle, and crowned by an angel; but, the Heathenism of it having been lately detected, the religious would no longer give it a place among their relics, but presented it in 1634 to the king. The antiquaries found it to be the apotheosis of Germanicus. In like manner the triumph of Joseph was found to be a representation of Germanicus and Agrippina, under the figures of Ceres and Triptolemus. Another was preserved, from time immemorial, in one of the most ancient churches of France, where it had passed for a representation of Paradise and the fall of man; there being on it two figures representing Adam and Eve, with a tree, a serpent, and a Hebrew inscription round it, taken from the third chapter of Genesis, "The woman saw that the tree was good, &c." The French academists, instead of our first parents, found Jupiter and Minerva represented by the two figures; the inscription was of a modern date, written in a Rabbinical character, very incorrect, and poorly engraven. The prevailing opinion was, that this agate represented simply the worship of Jupiter and Minerva at Athens.

AGATE, is also a name of an instrument used by gold-wire drawers; so called from the agate in the middle of it, which forms its principal part.

AGATHIAS, or, as he calls himself in his epigrams, AGATHIUS, distinguished by the title of Scholasticus, a Greek historian in the 6th century under Justinian. He was born at Myrina, a colony of the ancient Æolians, in Asia the Less, at the mouth of the river Phythicus. He was an advocate at Smyrna. Though he had a taste for poetry, he was yet more famous for his history, which begins with the 26th year of Justinian's reign, where Procopius ends. It was printed in Greek and Latin, with Bonaventure Vulcanius's, at Leyden, 1594, in 4to; and in Paris at the king's printing-office, 1660, in folio.

AGATHO, a tragic and comic poet, disciple to Prodicus and Socrates, applauded in Plato's Dialogues for his virtue and beauty. His first tragedy obtained the prize; and he was crowned in the presence of upwards of 30,000 men, the fourth year of the 90th Olympiad. There is nothing now extant of his, except a few quotations in Aristotle, Athenæus, and others.

AGATHOCLES, the famous tyrant of Sicily, was son of a potter at Reggio. He was a thief, a common soldier, a centurion, a general, and a pirate, all in a regular succession. He defeated the Carthaginians several times in Sicily; and was once defeated himself. He first made himself tyrant of Syracuse, and then of all Sicily; after which he vanquished the Carthaginians again both in Sicily and Africa. But at length having ill-success, and being in arrears with his soldiers, they mutinied, and forced him to fly his camp, and cut the throats of his children, whom he left behind. Recovering himself again, he relieved Corsica, besieged by Cassander; burnt the Macedonian fleet; returned to Sicily; murdered the wives and children of those who had murdered him; afterwards, meeting with the soldiers themselves, he put them all to the sword; and, ravaging the sea-coast of Italy, took the city of Hipponium. He was at length poisoned by his grandson Archagathus, in the seventy-second year of his age, 290 years before Christ, having reigned twenty-eight years.

AGATHOPHYLLUM, *f.* [αγαθος, good, and φυλλον, a leaf.] In botany, a genus of the dodecandria monogynia class. The generic characters are—Calyx: perianthium very small, truncate, entire, permanent. Corolla: petals six, ovate, somewhat villose within, inserted into the calyx. Stamina: filaments twelve, broadish, very short, alternately

alternately placed at the base of the petals and alternately on the calyx; antheræ roundish. Pistillum: germ superior, very small; style very short; stigma pubescent. Pericarpium: drupe somewhat globose, crowned with the calyx. Seed: nut somewhat globose, terminated by a truncate point, half-six-celled; kernel convex, beneath six-lobed, with coriaceous partitions separating the lobes. —*Essential Character.* Calyx superior, very short, toothless: corolla six-petalled, somewhat villose; stamina alternately inserted into the calyx and petals; drupe juiceless, with a half-six-celled nut, and one seed.

The *raïon-yfara* (for it is so called in the Island of Madagascar, the place of its growth) is a large bushy tree, with a pyramidal head like the clove-tree, and a reddish odorous bark; the wood is hard, heavy; white, with some reddish fibres, and has no smell. There is a single fruit at the end of each branch, the size of a large cherry, shaped like a pear, with a roundish body: it consists of a nut divided into six parts, in the same manner as the walnut is into four, covered with a hard coriaceous shell, and that with a thin green shell or bark very closely adhering to it; both these are aromatic; but the nut has an acrid biting taste, which is almost caustic. This tree bears at five or six years' growth, and it flowers in January and February. The fruit is ten months in ripening. The natives of Madagascar gather it before it is ripe, as a spice, for the purpose of seasoning their meat. It has a fine aromatic smell when fresh; and the caustic taste may be abated by keeping it some months; after which it may be thrown into boiling water for four or five minutes, and then dried in the sun. The leaves may be prepared as a spice, in the same manner.

AGATHYRNA, or AGATHYRNUM, AGATHYRSA, or AGATHYRSUM, an ancient town of Sicily, now St. Marco; as old as the war of Troy, being built by Agathyrnus, son of Æolus, on an eminence. The gentillitious name is *Agathyrneus*: or, according to the Roman idiom, *Agathyrnefsis*.

AGAVE, *f.* [*αγανος*, Gr. admirable.] In botany, a genus of the hexandria monogynia class, ranking in the natural order of coronariæ. The generic characters are — Corolla: one-petalled, funnel-shaped; border six-parted, equal, parts lanceolate, erect. Stamina: filaments filiform, erect, longer than the corolla; antheræ linear, shorter than the filaments, versatile. Pistillum: germ oblong, growing thinner towards both ends, inferior; style filiform, the length of the stamens, three-cornered; stigma headed, three-cornered. Pericarpium: capsule oblong, three-cornered, three-celled, three-valved. Seeds: numerous. —*Essential Character.* Corolla erect, superior; filaments longer than the corolla, erect.

Linnaeus has separated this genus from the aloe, because the stamens and style are extended much longer than the corolla, and the corolla rests upon the germ. There is also another difference in the growth of the plants; which is, that all the agaves have their central leaves closely folding over each other, and embracing the flower-stem, which is formed in the centre; so that these never flower until all the leaves are expanded; and, when the flower is past, the plants die. Whereas the flower-stem of the aloe is produced on one side of the centre, annually from the same plant, and the leaves are more expanded than in this genus.

Species. 1. *Agave Americana*, or common American agave: stemless; leaves tooth-thorny. The great American aloe, as it is commonly called, has been long preserved in the English gardens, where, for many years past, there have been several of the plants in flower. When they are vigorous, the stems generally rise upwards of twenty feet high, and branch out on every side, so as to form a kind of pyramid, composed of greenish yellow flowers, which stand erect, and come out in thick clusters at every joint. The seeds do not come to maturity in England. When these plants flower, they make a fine appearance, and continue a long time in beauty, if they

are protected from the cold in autumn; for there will be a succession of new flowers produced, near three months in favourable seasons. It has been generally believed, that this plant does not flower till it is an hundred years old; but this a great mistake, for the time of its flowering depends on its growth; so that in hot countries, where it grows fast and expands many leaves every season, it will flower in a few years; but, in colder climates, where the growth is slow, it will be much longer before it shoots up a stem. Cortusus is said to have been the first European who possessed the great American aloe, and that was in the year 1561. Gerard, in his Herbal of 1597, speaks of it merely from report. In the edition of 1633, by Johnson, it is mentioned, but not said to be in England. Parkinson (Theatr. p. 150, printed in 1649) relates, that it was first brought into Spain, and from thence spread into all quarters. He gives an account of its flowering at Avignon and Rome, but is silent as to its being in the English gardens. It flowered at Paris in 1663 and 1664. Mr. Verisprit, of Lambeth, had one twelve or fifteen feet high, and in flower, (about 1698 or perhaps sooner,) which was then a great rarity here. Two other plants flowered about 1714 at Hampton Court, and one at the duke of Buckingham's, (now the queen's palace,) by St. James's Park. Another flowered at Leipzig in 1700.

Mr. Cowell asserts, that the plant which flowered in his garden, at Hoxton, in 1729, was the first which had been seen in England; those which are mentioned above not being the true great American aloe. Another flowered in 1737, at Eaton Hall, in Cheshire, the seat of Sir Robert Grosvenor, Bart. and there is a plate of it, dedicated to Sir Robert, by his gardener John Fossey. By the inscription on the print, it appears, that it opened the crown for flowering on June 5; the stem-bud appeared the 15th, and grew five inches a-day for some weeks; the flower-branches were perfected in twelve weeks; and then it was at a stand for a month, whilst the flower-buds were forming. The number of flowers was about 1050. Two agaves flowered at Hampton Court in 1743; they were about fifty years old, and their heights were twenty-seven and twenty-four feet. The flower-stem appeared on the third of June, was in perfection the middle of August, and continued blooming to the middle of October. A plant which flowered near Carlsbad in 1754, was twenty-six feet high, and produced twenty-eight branches, which bore above 3000 flowers. Another flowered at Leyden in 1760, and a third in the royal garden at Friedricksborg, in Denmark, which was twenty-two feet high, it had nineteen branches, and more than 4000 flowers. The highest, of which we have seen any account, was one that flowered in the king of Prussia's garden: this was forty feet in height. Two plants blossomed at Smith's Nursery, in Dalton, near Hackney, in September 1790; but they are now scarcely considered as rarities.

Very few of the variety with yellow-edged leaves have yet blossomed. We have an account of one at Sir James Lake's, in Edmonton, which was eighty years old, and the height of the flowering-stem was twenty-one feet. The top bud of the stem appeared on the sixth of June, 1785; it was in full bloom on the twelfth of September; and out of bloom on the nineteenth. One blew in Holland six years earlier, and another at Hampton Court the year before it: there is a print also of these. In the botanic garden at Cambridge, there is a very large variegated agave, which came out of the Sherardian collection, at Eltham, and belonged to Dr. Walker, the founder of the garden. It must therefore be more than sixty years old, and has not yet produced flowers. There are now hedges of the common agave in Spain, Portugal, Sicily, and Calabria: it flourishes also about Naples, between Villafranca and Monaco, and in other parts of Italy.

The leaves of agave are very useful as a succedaneum for soap. For this purpose, after being cut, they are passed between the rollers of a mill with their points foremost; and, the juice being conducted into wide shallow receivers,

A G A V E .

The Great American Aloe.

receivers, through a coarse cloth or strainer, it is exposed to a hot sun, until, the aqueous part being exhaled, it is reduced to a thick consistence. It may then be made up into balls, with the help of lye ashes, and it will lather with salt water as well as fresh. This soap may also be prepared by pounding the leaves in a wooden mortar, and then expressing the juice, which may be brought to a consistence by the sun or by boiling. One gallon of juice thus prepared will yield about one pound of a soft extract. The juice, in both these ways, must be carefully strained, and the extract must never be combined with tallow or other unctuous materials. The leaves are also used for scowering pewter and other kitchen utensils, and floors. The inward spongy substance of the decayed stalk is used for tinder. The fibres of the leaves, separated by bruising and steeping in water, and afterwards beating them, make a strong thread for common uses.

2. *Agave vivipara*, or viviparous or childing agave: stemless; leaves toothed. This species of aloe never grows to a large size; the leaves are seldom more than a foot and a half long, and about two inches and a half broad at the base; it never produces any suckers from the root, and therefore cannot be increased till it flowers.

3. *Agave Virginica*, or Virginian agave: stemless, herbaceous; leaves tooth-thorny. This is so like the first sort, as not to be distinguished from it but by good judges. This sort, however, seldom puts out so many offsets as the common aloe.

4. *Agave lurida*: subcaulescent; leaves tooth-thorny. This also greatly resembles the first.

5. *Agave tuberosa*, or tuberous-rooted agave: caulescent; leaves tooth-thorny. This has never flowered in England. Indeed this and the preceding are doubtful species, their fructification being unknown.

6. *Agave foetida*, or fetid agave: caulescent; leaves quite entire. A plant of this species flowered in the Chelsea garden in the year 1755. The stem began to shoot the beginning of October, and by the end of that month was upwards of ten feet high; by the end of November it was near twenty, and the lower lateral branches were upwards of four feet long, the others decreasing gradually, so as to form a regular pyramid. In December the branches were closely set with flowers; and, in the spring, when the flowers dropped off, they were succeeded by young plants; the flowers putting out roots as they fell into the pots that stood near, thereby became good plants. The old plant presently after died. It was cultivated in 1690, in the royal garden at Hampton Court.

Propagation and Culture. The first and third sorts are hardy. Plants of the former have lived in the open air for some years, in mild seasons; but in severe winters they are always killed, if not sheltered. They are propagated by offsets, which the first sends out in plenty. The third sort generally puts out suckers enough for propagation, though, though not in so great plenty as the first. They should be planted in pots or tubs filled with light sandy earth, and housed in winter with oranges, myrtles, &c. and, during that season, should have but little wet. In the summer they must be placed abroad in the open air, where they may remain till toward the end of October. The Vera-Cruz agave, being a little more tender than these, should be housed before them, and may remain in the green-house a little longer in the spring. The second, fourth, and sixth, never produce offsets or suckers from the root; they cannot, therefore, be increased this way, except when they flower; at which time there will be abundance of them. They may however be increased, by taking off some of the larger roots, when the plants are shifted. The second, fifth, and sixth, with the karatato and rigid agaves, are much more tender than the others, and cannot be preserved through the winter in England, unless they are placed in a warm stove; nor will they thrive if set abroad in summer: therefore they should constantly remain in the stove; observing to let them enjoy a great share of free air in warm weather. They also

require a light sandy earth, and should have little wet in winter; but in summer they may be gently watered twice a week. If they have too much water, it rots their roots, and then their leaves will decay, and insects will infest them. They should be shifted every summer into fresh earth, but must not be put into large pots; for, unless their roots are confined, the plants will not thrive.

To AGAZE, *v. a.* [from *a* and *gaze*, to set a gazing; as, *amaze*, *amuse*, and others.] To strike with amazement; to stupify with sudden terror. The verb is now out of use:

So as they travell'd, so they 'gan espy
An armed knight toward them gallop fast,
That seem'd from some feared foe to fly,
Or other grisly thing that him agast.

Spencer.

AGAZED, *part. adj.* Struck with amazement; terrified to stupidity:

Hundreds he sent to hell, and none durst stand him;

Here, there, and every where, enrag'd he flew:

The French exclaim'd, "The devil was in arms!"

All the whole army stood agazed on him. *Shakespeare.*

AGDE, a city of France, in Lower Languedoc, in the territory of Agadez, with a bishop's see. The diocese is small, but is one of the richest countries in the kingdom. It produces fine wool, wine, oil, corn, and silk. It is seated on the river Eraut, a mile and a quarter from its mouth, where it falls into the gulph of Lyons, and where there is a fort built to guard its entrance. It is well peopled; the houses are built of black stone, and there is an entrance into the city by four gates. The greatest part of the inhabitants are merchants or seamen. The public buildings are but mean; the cathedral is small, and not very handsome; and the bishop's palace is an old building, but convenient. The city is extended along the river, where it forms a little port, wherein small craft may enter: Lat. 43. 19. lon. 3. 20. E.

AGE, *f.* [age, Fr. anciently *eage*, or *aage*; it is deduced by Menage from *atatum*, of *atas*; by Junius, from *aa*, which, in the Teutonic dialects, signified long duration.] Any period of time attributed to something as the whole, or part, of its duration.

Thus, among the ancient poets, this word was used for the space of thirty years; in which sense, *age* amounts to much the same with *generation*. Thus, Nestor is said to have lived *three ages* when he was ninety years old. By the ancient Greek historians, the time elapsed since the beginning of the world is divided into three periods, which they called *ages*. The first reaches from the creation to the deluge, which they called the *obscure* or *uncertain* age, because the history of mankind is altogether uncertain during that period. The second they call the *fabulous* or *heroic* age, because it is the period in which the fabulous exploits of their gods and heroes are said to have been performed. It began with the Ogygian deluge, and continued to the first Olympiad; where the third or *historical* age commenced.

The interval since the first formation of man has been divided by the poets into four *ages*, distinguished by the epithets of *golden*, *silver*, *brazen*, and *iron*. During the *golden* age, Saturn reigned in heaven, and justice and innocence in this lower world. The earth then yielded her productions without culture; men held all things in common, and lived in perfect friendship. This period is supposed to have lasted till the expulsion of Saturn from his kingdom. The *silver* age commenced when men began to deviate from the paths of virtue; and, in consequence of this deviation, their lives became less happy. The *brazen* age commenced on a farther deviation; and the *iron* age took place in consequence of one still greater. A late author, however, reflecting on the barbarism of the first ages, will have the order which the poets assign to the four ages inverted; the first being a time of rudeness and ignorance, more properly denominated an *iron* than a *golden*.

golden age. When cities and states were founded, the *silver age* commenced; and, since arts and sciences, navigation and commerce, have been cultivated, the *golden age* has taken place.

In some ancient northern monuments, the *rocky* or *stony age* corresponds to the *brazen age* of the Greeks. It is called *rocky*, on account of Noah's ark, which rested on mount Ararat; whence men were said to be descended or sprung from mountains: or from Deucalion and Pyrrha restoring the race of mankind, by throwing stones over their heads. The northern poets also style the fourth age of the world the *ashen age*, from a Gothic king Madenis, or Mannus, who on account of his great strength was said to be made of ash, or because in his time people began to make use of weapons made of that wood.

Among the Jews, the duration of the world is also divided into three ages. 1. The *seculum inane*, or *void age*, was the space of time from the creation to Moses. 2. The *present age*, denotes all the space of time from Moses to the coming of Messiah. 3. The *age to come*, denotes the time from the coming of the Messiah to the end of the world.

Various other divisions of the duration of the world into ages have been made by historians. The Sibylline Oracles, written, according to some, by Jews acquainted with the prophecies of the Old Testament, divide the duration of the world into *ten ages*; and, according to Josephus, each age contained six hundred years. It appears, by Virgil's fourth eclogue, and other testimonies, that the age of Augustus was reputed the end of those ten ages, consequently as the period of the world's duration.

By some, the space of time commencing from Constantine, and ending with the taking of Constantinople by the Turks, in the fifteenth century, is called the *middle age*. But others choose rather to date the middle age from the division of the empire made by Theodosius at the close of the fourth century, and extend it to the time of the emperor Maximilian I. in the beginning of the sixteenth century, when the empire was first divided into circles. The *middle* is by some denoted the *barbarous age*, and the latter part of it the *lowest age*. Some divide it into the *non-academical* and *academical ages*. The first includes the space of time from the sixth to the ninth centuries, during which schools or academies were lost in Europe. The second from the ninth century, when schools were restored, and universities established, chiefly by the care of Charlemagne.

The several ages of the world may be reduced to three grand epochs, viz. the *age of the law of nature*, called by the Jews the *void age*, from Adam to Moses; the *age of the Jewish law*, from Moses to Christ; and the *age of grace*, from Christ to the present year.

AGE is also frequently used in the same sense with *century*, to denominate a duration of 100 years.

AGE likewise signifies a certain period of the duration of human life; by some divided into four stages, viz. infancy, youth, manhood, and old age; the first extending to the 14th year, the second to the 23th, the third to the 50th, and the fourth to the end of life: by others divided into infancy, childhood, youth, manhood, and old age.

AGE, in law, is particularly used for those special times which enable persons of both sexes to do certain acts, which before, through want of years and judgment, they are prohibited to do. As for example, a man at twelve years of age ought to take the oath of allegiance to the king; at fourteen, which is his age of discretion, he may consent to marriage, and chuse his guardian; and at twenty-one he may alienate his lands. A woman at nine years of age is dowable, at twelve she may consent to marriage, at fourteen she is of years of discretion and may chuse a guardian, and at twenty-one she may alienate her lands. The age of twenty-one is the full age of man or woman; which enables them to contract and manage for themselves, in respect of their estates: until which time they

cannot act with security to those that deal with them, for their acts are in most cases either void or voidable.

AGE of a HORSE. See HORSE.

AGE of TREES. These after a certain age waste. An oak, at an hundred years old, it is said, ceases to grow. The usual rule for judging of the age of wood, is by the number of circles which appear in the substance of a trunk or stock cut perpendicularly, each circle being supposed the growth of a year; though some reject this method as precarious, alleging, that a simple circle is sometimes the produce of several years; besides that, after a certain age, no new circles are formed.

AGED, *adj.* Old; stricken in years; generally applied to animate beings:

Kindness itself too weak a charm will prove,
To raise the feeble fires of *aged* love.

Prior.

Old; applied to inanimate things. This use is rare, and commonly with some tendency to the *protopopæia*.—The people did not more worship the images of gold and ivory, than they did the groves; and the same Quintilian faith of the *aged oaks*. *Stillingfleet.*

AGEDLY, *adv.* After the manner of an aged person.

AGELNOTH, EGELNOTH, or ÆTHELNOTH, in Latin *Achelnotus*, archbishop of Canterbury, in the reign of Canute the Great, succeeded Livingus in that see in the year 1020. This prelate, furnished the *Good*, was son of earl Agilmer, and, at the time of his election, dean of Canterbury. After his promotion he went to Rome, and received his pall from pope Benedict VIII. In his way thither, as he passed through Pavia, he purchased, for an hundred talents of silver and one of gold, St. Augustin's arm, which was kept there as a relic; and sent it over to England as a present to Leofric earl of Coventry. Upon his return, he is said to have raised the see of Canterbury to its former lustre. He sat seventeen years in the see of Canterbury, and departed this life the 29th of October, 1038.

AGEMA, in Macedonian antiquity, was a body of soldiery, not unlike the Roman legion.

AGEMOGLANS, AGIAMOGLANS, or AZAMOGLANDS, in the Turkish polity, are children purchased from the Tartars, or raised every third year by way of tribute from the Christians tolerated in the Turkish empire. These, after being circumcised and instructed in the religion and language of their tyrannical masters, are taught the exercises of war, till they are of a proper age for carrying arms; and from this corps the janissaries are recruited. With regard to those who are thought unfit for the army, they are employed in the lowest offices of the seraglio.

A similar custom seems to have prevailed at Seringapatam, under Hyder Ali, and Tippoo Saib, who singled out from their English prisoners the best favoured young men, whom they caused to be circumcised, and incorporated in their army, or appointed to menial offices.

AGEN, *adv.* [*agen*, Sax.] Again; in return. This word is now only written in this manner, though it be in reality the true orthography, for the sake of rhyme:

Thus Venus: Thus her son reply'd *agen*;
None of your sisters have we heard or seen. *Dryden.*

AGEN, a city of France, on the river Garonne, the capital of Agenois in Guienne, and the see of a bishop. Though the situation of this place is very convenient for trade and commerce, the inhabitants are so very indolent that there is very little; of which the neighbouring cities take the advantage. It is seated in a pleasant country; but is itself a very mean and disagreeable place, the houses being ill-built, and the streets narrow, crooked, and dirty. Lat. 44. 12. N. lon. 0. 30. E.

AGENCY, *f.* [from *agent*.] The quality of acting; the state of being in action; action. The office of an agent or factor for another; business performed by an agent.

AGENDA,

AGENDA, *f.* among philosophers and divines, signifies the duties which a man lies under an obligation to perform; thus we meet with the agenda of a Christian, or the duties he ought to perform; in opposition to the *credenda*, or things he is to believe.

AGENDA, among merchants, a term sometimes used for a memorandum-book, in which is set down all the business to be transacted during the day, either at home or abroad.

AGENDA, among ecclesiastical writers, denotes the service or office of the church. We meet with *agenda matutina & vespertina*, "morning and evening prayers;" *agenda diet*, "the office of the day," whether feast or fast day; *agenda mortuorum*, called also simply *agenda*, "the service of the dead."

AGENDA, is also applied to certain church-books, compiled by public authority, prescribing the order and manner to be observed by the ministers and people in the principal ceremonies and devotions of the church. In which sense *agenda* amounts to the same with what is otherwise called *ritual*, *liturgy*, *acalouthia*, *missal*, *formulary*, *directory*, &c.

AGENHINE, in our old writers, signifies a guest that has lodged at an inn for three nights, after which time he was accounted one of the family; and, if he offended the king's peace, his host was answerable for him. It is also written *HOGENHINE* and *HOGENHYNE*.

AGENORIA, in mythology, the goddess of courage and industry, as *Vacuna* was of indolence.

AGENT, *adj.* [*agens*, Lat.] That which acts; opposed to *patient*, or that which is acted upon.

AGENT, *f.* An actor: he that acts; he that possesses the faculty of action. A substitute; a deputy; a factor; a person employed to transact the business of another. That which has the power of operating, or producing effects upon another thing:

Heav'n made us *agents* free to good or ill,
And forc'd it not, though he foresaw the will.
Freedom was first bestow'd on human race,
And prescience only held the second place. *Dryden.*

AGENTES IN REBUS, one of the ranks of officers in the court of the Constantinopolitan emperors, whose business was that of a courier and messenger, and also of a general inspector or comptroller of the provinces. In case of plots or disturbances, he was to give early notice thereof to the emperor.

The *agentes in rebus* are by some made synonymous with our postmasters, but their functions were of greater extent. They correspond to what the Greeks call *πρωτοποροι*, and the Latins *veredarii*. There were various degrees of them; as, *tribuni*, *primicerii*, *senatores*, *ducenarii*, *biarchi*, *circitores*, *equestes*, *tyrones*, &c.

AGE PRAYER, *f.* in law, is, where an action is brought against a person under age, for lands which he hath by descent, and he by petition or motion shews the matter to the court, and prays that the action may stay till his full age. See *PAROL DEMURRER*.

AGER, *f.* in Roman antiquity, a certain portion of land allowed to each citizen. See *AGRARIAN LAW*.

AGER PICENUS, or **PICENUM**, a territory of Italy to the south-east of Umbria, reaching from the Apennine to the Adriatic. The people are called *Picentes*, distinct from the *Picentini* on the Tuscan Sea, though called by Greek writers *Πικεντινους*. This name is said to be from the bird *Picus*, under whose conduct they removed from the Sabines, of whom they were a colony.

AGERATUM, *f.* [*αγρῶν*, from *α* and *γρᾶς*, never old, evergreen.] In botany, a genus of the syngenesia polygamia æqualis class, in the natural order of compositæ discoideæ. The generic characters are—Calyx: common oblong, with many lanceolate sub-equal scales. Corolla: compound uniform; corollers hermaphrodite, tubulous, numerous, equal, scarcely longer than the calyx; proper monopetalous, funnel-shaped; border quadrifid spreading.

Stamina: filaments capillary, very short; antheræ cylindric, tubular. Pistillum: germ oblong; style filiform, the length of stamens; stigmas two, very slender, erect. Pericarpium: none; calyx unchanged. Seed: solitary, oblong, angular, crowned with a chaffy, five-leaved, upright, awned, calycle. Receptaculum: naked, convex, very small.—*Essential Character*. Receptaculum naked, down five-awned, calyx oblong sub-equal, corollers quadrifid.

Species. 1. *Ageratum conyzoides*, or hairy *ageratum*: leaves ovate, stem hairy. The leaves are an inch and a half long, and three quarters of an inch broad, resembling those of nettles. It flowers in July and August, and is a native of Africa, the islands of America, and the isle of Tanna in the South Seas. Cultivated in 1714, by the Dukes of Beaufort.

2. *Ageratum ciliare*: leaves ovate, crenate, obtuse; stem smooth. This species is said to be found wild at La Vera Cruz, by Dr. William Houstoun; and does not seem to differ in any thing from the first sort.

Propagation and Culture. The seeds must be sown on a hot-bed in the spring; when the plants are strong enough to remove, they should be transplanted into another moderate hot-bed, observing to water and shade them until they have taken root, after which time they must have a good share of air in warm weather. In June they should be inured to the open air; and toward the middle of the month they may be transplanted into the full ground, where they will begin to flower in July, and continue flowering till the frosts in autumn destroy them. The seeds ripen in September and October; and when any of them scatter upon the ground, if the same earth happens to be put on a hot-bed the following spring, the plants will come up in great plenty; as they frequently do also in the open air, but these will be too late to produce good seeds, unless the summer prove warm.

AGERATUM, *f.* in botany. See *ACHILLEA*, *ATHANASIA*, *CONYZA*, *ERINUS*, *EUPATORIUM*, and *SENECIO*.

AGESILAUS, king of the Lacedæmonians, the son of Archidamus, was raised to the throne notwithstanding the superior claim of Leotychides. As soon as he came to the crown, he advised the Lacedæmonians to be beforehand with the king of Persia, who was making great preparations for war, and to attack him in his own dominions. He was himself chosen for this expedition; and gained so many advantages over the enemy, that, if the league which the Athenians and Thebans formed against the Lacedæmonians had not obliged him to return home, he would have carried his victorious arms into the very heart of the Persian empire. He gave up, however, all these triumphs readily, to come to the succour of his country, which he happily relieved by his victory over the allies in Bœotia. He obtained another near Corinth; but, to his great mortification, the Thebans afterward gained several over the Lacedæmonians. These misfortunes at first raised somewhat of a clamour against him. He had been sick during the first advantages which the enemy gained; but, as soon as he was able to act in person, by his valour and prudence he prevented the Thebans from reaping the advantages of their victories; inasmuch, that it was generally believed, had he been in health at the beginning, the Lacedæmonians would have sustained no losses, and that all would have been lost had it not been for his assistance. It cannot be denied that he loved war more than the interest of his country required; for, if he could have lived in peace, he had saved the Lacedæmonians several losses, and they would not have been engaged in many enterprises which in the end contributed much to weaken their power. He died in the third year of the 104th Olympiad, being the 84th year of his age, and 41st year of his reign. Agesilaus would never suffer any picture or sculpture to be made of him, and prohibited it also by his will: this he is supposed to have done from a consciousness of his own deformity; for he was of a short stature, and lame of one

foot, so that strangers used to despise him at the first sight. His fame went before him into Egypt, and there they had formed the highest idea of Agesilaus. When he landed in that country, the people ran in crowds to see him: but, great was their surprise when they saw an ill-dressed, slovenly, mean-looking, little fellow, lying upon the grass: they could not forbear laughing, and applied to him the fable of the mountain in labour. He was, however, the first to jest upon his own person; and such was the gaiety of his temper, and the strength with which he bore the roughest exercises, that these qualities made amends for his corporal defects. Agesilaus was extremely fond of his children, and would often amuse himself by joining in their diversions: one day, when he was surprised riding upon a stick with them, he said to the person who had seen him in this posture, "Forbear talking of it till you are a father."

AGE VITA, *f.* The name of an antidote, rather supposed to be called *jugis vita*, long or continual life. It is a medicated wine, made with galangal root, long and white pepper, fage, ginger, cinnamon, saffron, and cloves, boiled in wine.

AGGA, or **AGGONA**, a British settlement on the gold coast of Guinea. It is situated under the meridian of London, in six degrees of N. lat.

AGGELATION, *f.* [Lat. *glu.*] Concretion of ice.—It is round in hail, and figured in its guttulous descent from the air, growing greater or smaller according to the accretion or pluvius *aggelation* about the fundamental atoms thereof. *Brown.*

AGGENERATION, *f.* [from *ad* and *generatio*, Lat.] The state of growing or uniting to another body.—To make a perfect nutrition, there is required a transmutation of nutriment; now, where this conversion or *aggeneration* is made, there is also required in the aliment a familiarity of matter. *Brown.*

AGGER, *f.* in the ancient military art, a work of fortification, used both for the defence and the attack of towns, camps, &c. In which sense it is the same with what was otherwise called *vallum*, and in later times *aggestum*; and among the moderns *lines*, sometimes *cavaliers*, *terrasses*, &c. The agger was usually a bank, or elevation of earth or other matter, bound and supported with timber; having sometimes turrets on the top, wherein the workmen, engineers, and soldiery, were placed. It was also accompanied with a ditch, which served as its chief defence. The usual materials of which it was made were earth, boughs, fascines, stakes, and even trunks of trees, ropes, &c. variously crossed, and interwoven somewhat in the figure of stars; whence they were called *stellati axes*. Where these were wanting, stones, bricks, and tiles, supplied the office: on some occasions, arms, utensils, pack-saddles, were thrown in to fill it up. We even read of aggers formed of the carcases of the slain; sometimes of dead bones mixed with lime; and even with the heads of slaughtered citizens. For want of due binding, or solid materials, aggers have sometimes tumbled down, with infinite mischief to the men. The besiegers used to carry on a work of this kind nearer and nearer towards the place, till at length they reached the very wall.

The height of the agger was frequently equal to that of the wall of the place. Cæsar tells us of one he made, which was thirty feet high and 330 feet broad.

There were vast aggers made in towns and places on the sea-side, fortified with towers, castles, &c. The wall of Severus, in the north of England, may be considered as a grand agger, to which belong several smaller ones. See **SEVERUS'S WALL**.

AGGER, in ancient writers, denotes the middle part of a military road, raised into a ridge, with a gentle slope on either side, to make a drain for the water, and keep the way dry.—The term is also used for the whole road or military way.—Our *causeways* are the *aggeres calceati* of the Romans.

To AGGERATE, *v. a.* [from *agger*, Lat.] To heap up.

AGGEROSE, *adj.* [from *agger*, Lat.] Full of heaps. **AGGERHUYS**, a city of Norway, capital of the province of the same name. It is subject to Denmark, and situated in E. lon. 28. 35. and N. lat. 59. 30.

AGGERS-HERRED, a district of Christianland and a diocese of Norway. It consists of three juridical places; namely, Ascher, West Barn, and Ager.

To AGGLOMERATE, *v. a.* [*agglomer*, Lat.] To gather up in a ball, as thread. To gather together.

To AGGLOMERATE, *v. n.*

Besides the hard *agglomerating* salts, The spoil of ages, would impervious choke Their secret channels.

Thompson.

AGGLUTINANTS, *f.* in pharmacy, is a general name for all medicines of a glutinous or viscid nature; which, by adhering to the solids, contribute greatly to repair their loss.

To AGGLUTINATE, *v. n.* [from *ad* and *gluten*, glue, Lat.] To unite one part to another; to join together, so as not to fall asunder. It is a word almost appropriated to medicine.—The body has got room enough to grow into its full dimensions, which is performed by the daily ingestion of food that is digested into blood; which being diffused through the body, is *agglutinated* to those parts that were immediately *agglutinated* to the foundation parts of the womb. *Harvey.*

AGGLUTINATION, *f.* Union; cohesion; the act of agglutinating; the state of being agglutinated.

AGGLUTINATIVE, *adj.* That which has the power of procuring agglutination.

To AGGRANDIZE, *v. a.* [*aggrandiser*, Fr.] To make great; to enlarge; to exalt; to improve in power, honour, or rank. It is applied to persons generally, sometimes to things.—If the king should use it no better than the pope did, only to *aggrandize* covetous churchmen, it cannot be called a jewel in his crown. *Ayliffe.*—These furnish us with glorious springs and mediums, to raise and *aggrandize* our conceptions, to warm our souls, to awaken the better passions, and to elevate them even to a divine pitch, for devotional purposes. *Watts.*

AGGRANDIZEMENT, *f.* [*aggrandissement*, Fr.] The state of being aggrandized; the act of aggrandizing.

AGGRANDIZER, *f.* The person that aggrandizes or makes great another.

To AGGRATE, *v. a.* [*aggratare*, Ital.] To please; to treat with civilities: a word not now in use.

To AGGRAVATE, *v. a.* [*aggravare*, Lat.] To make heavy, used only in a metaphorical sense; as, to *aggravate* an accusation, or a punishment. To make any thing worse, by the addition of some particular circumstance, not essential.—This offence, in itself so heinous, was yet in him *aggravated* by the motive thereof, which was not malice or discontent, but an aspiring mind to the crown. *Bacon.*

AGGRAVATION, *f.* The act of aggravating, or making heavy. The act of enlarging to enormity. The extrinsecal circumstances or accidents, which increase the guilt of a crime, or the misery of a calamity.—He, to the sins which he commits, has the *aggravation* superadded of committing them against knowledge, against conscience, against sight of the contrary law. *Hammond.*

AGGREGATE, *adj.* [*aggregatus*, Lat.] Framed by the collection of any particular parts into one mass, body, or system.—The solid reason of one man with unprejudicate apprehensions, begets as firm a belief as the authority or *aggregate* testimony of many hundreds. *Brown.*

AGGREGATE, *f.* The complex, or collective result of the conjunction or acervation of many particulars.—The reason of the far greatest part of mankind, is but an *aggregate* of mistaken phantasms, and, in things not sensible, a constant delusion. *Glanville.*

To **AGGREGATE**, *v. a.* [*aggrego*, Lat.] To collect together; to accumulate; to heap many particulars into one mass.

AGGREGATE in botany, is a term used to express those flowers, which are composed of parts or florets, so united, by means either of the receptacle or calyx, that no one of them can be taken away without destroying the form of the whole. They are opposed to simple flowers, which have no such common part, and are usually divided into seven kinds, viz. the *aggregate*, properly so called, whose receptacle is dilated, and whose florets are supported by footstalks; such are the blue daisy, thrift, or sea-pink, &c. the *compound*; the *umbellati*; the *cymose*; the *amentaceous*; the *glumose*; and the *spadicous*.

AGGREGATION, *f.* Collection, or state of being collected. The collection, or act of collecting, many particulars into one whole. The whole composed by the coagervation of many particulars; an aggregate.

To **AGGRESS**, *v. n.* [*aggredior*, *aggressum*, Lat.] To commit the first act of violence; to begin the quarrel.

—The glorious pair advance
With mingled anger and collected might,

To turn the war, and tell *aggressing* France,
How Britain's sons and Britain's friends can fight. *Prior*.

AGGRESSION, *f.* [*aggressio*, Lat.] The first act of injury; commencement of a quarrel by some act of iniquity.

AGGRESSOR, *f.* The person that first commences hostility; the assaulter or invader, opposed to the *defendant*.

AGGRIEVANCE, *f.* Injury; hardship inflicted; wrong endured.

To **AGGRIEVE**, *v. a.* [from *gravis*, Lat.] To give sorrow, to cause grief; to vex. It is not improbable, that to *grieve* was originally neuter, and *aggrieve* the active. To impose some hardships upon; to harass; to hurt in one's right. This is a kind of juridical sense; and whenever it is used now, it seems to bear some allusion to forms of law.—The landed man finds himself *aggrieved* by the falling of his rents, and the frightening of his fortune; whilst the monied man keeps up his gain, and the merchant thrives and grows rich by trade. *Locke*.

To **AGGROUPE**, *v. a.* [*aggruppare*, Ital.] To bring together into one figure; to crowd together: a term of painting.—Bodies of divers natures, which are *aggrouped* (or combined) together, are agreeable and pleasant to the sight. *Dryden*.

AGHAST, *adj.* [either the participle of *agaze*, and then to be written *agazed*, or *aghaft*, or from *a* and *gaft*, Sax. a ghost; which the present orthography favours; perhaps they were originally different words.] Struck with horror, as at the sight of a spectre; stupified with terror. It is generally applied to the external appearance:

Aghast he wak'd, and, starting from his bed,
Cold sweat in clammy drops his limbs o'erspread. *Dryden*.

AGHER, a town of Ireland, which sends two members to parliament. It is situated in the southern part of Ulster, not far from Clogher.

AGHEUSTIA, [*a*, non, and *γενομαι*, *gusto*.] DEFECT OR LOSS OF TASTE, called also *apogusia*, *apogustis*. Dr. Cullen ranks this as a genus of disease, in the class locales and order dysæsthesiæ. The causes are fever, or palsy, whence he forms two species; the first he calls, **ORGANIC**, arising from some affection in the membrane of the tongue, by which relishing things or those which have some taste are prevented from coming in contact with the nerves: the second, **ATONIC**, arising without any affection of the tongue. Sauvages says the cause of this disease is either in the brain, in the tongue itself, or in the passage of the lingual nerves;—he forms two species—First, **FEBRILIS**, where a suppression of taste accompanies ardent and malignant fevers, on account of the extreme dryness of the tongue, when it wants moisture, grows black and rough like wood; or from the delirium, or comatous state into

which patients sometimes fall.—Second, **PARALYTICA**, when it accompanies a paralysis of the tongue, or some comatous disorder.

AGHRIM, a town of Ireland, in the county of Wicklow, and province of Leinster, situated about thirteen miles south-west of Wicklow.

AGHRIM, in Galway; a small village, distant about thirty-two miles from Dublin, and rendered memorable by a decisive battle fought there, and at Kilcommodonhill, the 12th of July, 1691, between general Ginckle and Monsieur St. Ruth, the commanders under king William III. and James II. when St. Ruth, the general of the Irish army, with 7000 of his men, were slain; but of the English only 600. The victory was the more considerable, as the English army consisted of no more than 18,000 men; whereas the Irish were computed at 20,000 foot, and 5000 horse and dragoons. They lost likewise nine pieces of brass cannon; all their ammunition, tents, and baggage; most of their small arms, which they threw away to expedite their flight; with eleven standards and thirty-two pair of colours.

AGIADES, in the Turkish armies, a kind of pioneers employed in fortifying camps, smoothing of roads, and the like offices.

AGILE, *adj.* [*agile*, Fr. *agilis*, Lat.] Nimble; ready; having the quality of being speedily put in motion; active:

To guide its actions with informing care,
In peace to judge, to conquer in the war,
Render it *agile*, witty, valiant, sage,
As fits the various course of human age. *Prior*.

AGILENESS, *f.* The quality of being agile; nimbleness; readiness for motion; quickness; activity; agility.

AGILITY, *f.* [*agilitas*, Lat. from *agilis*, agile.] Nimbleness; readiness to move; quickness; activity.

The improving of agility was one of the chief objects of the institution of games and exercises. The athlete made particular profession of the science of cultivating and improving agility. Agility of body is often supposed peculiar to some people; yet it seems less owing to any thing peculiar, in their frame and structure, than to practice.

AGINCOURT, a village of the French Netherlands, situated in lat. 50. 35. N. lon. 2. 10. E. famous on account of the victory obtained by Henry V. of England over the French, in 1415.

The army of Henry, after landing in France, was by various accidents reduced to 10,000 men, of whom not a few were sick, or slowly recovering from sickness;—they had to traverse a long tract of country, inhabited by exasperated enemies, from whom they were to procure provisions, lodgings, guides, intelligence, and every thing they wanted;—that country was defended by many strong towns, intersected by deep rivers, and guarded by an army of 100,000, or (according to some contemporary writers) 140,000, men.

Henry, undaunted by all these dangers and difficulties, departed from Harfleur, marching his army in three lines, with bodies of cavalry on the wings. He proceeded by very easy journeys, that he might not fatigue his troops, or discourage them by the appearance of a flight; observing the strictest discipline, and paying generously for every thing he received; which induced the country people to bring provisions to his camp, in spite of all the commands they had received to the contrary. To keep his men in spirits, and from repining, the king fared as ill as the meanest soldier, always appearing with a cheerful countenance, and addressing them in the most friendly and encouraging language. They arrived at the village of Agincourt, in the county of St. Pol, on the evening of October 24; and there beheld the whole French army, at a small distance, directly in their route. The king took an attentive view of it from an eminence; and being fully convinced that it was impossible to proceed any further on his

his way to Calais without a battle, and equally impossible to return to Harfleur with so great an army in his rear, he resolved to hazard an action next morning, as the only means of preserving himself and his little army from destruction.

The English army lodged that night in the villages of Agincourt, Maisonneuve, and some others; where they met with better accommodation than they had been accustomed to for some time past, and spent part of their time in mutual exhortations to fight bravely in the approaching battle. The king, overhearing some of his nobles expressing a wish that the many brave men who were idle in England were present to assist them, is said to have cried out—"No! I would not have one man more:—if we are defeated, we are too many—if it shall please God to give us the victory, as I trust he will, the smaller our number the greater our glory." The moon happening to shine very bright, Henry, with some of his best officers, carefully examined the ground, and pitched upon a field of battle admirably calculated to preserve a little army from being surrounded by a great one. It was a gentle declivity from the village of Agincourt, of sufficient extent for his small army, defended on each side by hedges, trees, and brush-wood. Having placed guards, and kindled fires on all sides, the king and his army betook themselves to rest; except such as were of a more serious turn of mind, who, considering that as the last night of their lives, spent it in devotion.

The French, exulting in their numbers, confident of victory, and abounding in provisions, spent the night in noisy festivity, and in forming fanciful schemes about the disposal of their prisoners and their booty. It was in general resolved to put all the English to the sword, except the king and the chief nobility, who were to be taken prisoners for the sake of their ransom.

On the morning of Friday, the memorable 25th of October, A. D. 1415, the day of Crispin and Crispianus; the English and French armies were ranged in order of battle, each in three lines, with bodies of cavalry on each wing. The constable d'Albert, who commanded the French army, fell into the snare that was laid for him, by drawing up his army in the narrow plain between the two woods. This deprived him, in a great measure, of the advantage he should have derived from the prodigious superiority of his numbers; obliged him to make his lines unnecessarily deep, about thirty men in file, to crowd his troops, particularly his cavalry, so close together, that they could hardly move or use their arms; and, in a word, was the chief cause of all the disasters that followed. The French, it is said, had a considerable number of cannon of different sizes in the field; but we do not hear that they did any execution, probably for want of room. The first line of the French army, which consisted of 8000 men-at-arms on foot mixed with 4000 archers, with 500 men-at-arms mounted on each wing, was commanded by the constable d'Albert, the dukes of Orleans and Bourbon, and many other nobles; the dukes of Alençon, Brabant, and Bar, &c. conducted the second line; and the earls of Marle, Darmatine, Fauconberg, &c. were at the head of the third line. The king of England employed various arts to supply his defect of numbers. He placed 200 of his best archers in ambush, in a low meadow, on the flank of the first line of the French. His own first line consisted wholly of archers, four in file; each of whom, besides his bow and arrows, had a battle-axe, a sword, and a stake pointed with iron at both ends, which he fixed before him in the ground, the point inclining outwards, to protect him from cavalry; which was a new invention, and had a happy effect. That he might not be encumbered, he dismissed all his prisoners, on their word of honour to surrender themselves at Calais, if he obtained the victory; and lodged all his baggage in the village of Agincourt, in his rear, under a slender guard. The command of the first line was, at his earnest request, committed to Edward duke of York, assisted by the lords Beaumont, Willoughby,

and Fanhope; the second was conducted by the king, with his youngest brother Humphrey duke of Gloucester, the earls of Oxford, Marshal, and Suffolk; and the third was led by the duke of Exeter, the king's uncle. The lines being formed, the king, in shining armour, with a crown of gold adorned with precious stones on his helmet, mounted on a fine white horse, rode along them, and addressed each corps with a cheerful countenance and animating speeches. To inflame their resentment against their enemies, he told them, that the French had determined to cut off three fingers of the right hand of every prisoner; and to rouse their love of honour, he declared, that every soldier in that army who behaved well, should from henceforth be deemed a gentleman, and intitled to bear coat-armour.

When the two armies were drawn up in this manner, they stood a considerable time gazing at one another in solemn silence. But the king, dreading that the French would discover the danger of their situation and decline a battle, commanded the charge to be sounded, about ten o'clock in the forenoon. At that instant, the first line of the English kneeled down, and kissed the ground; and, then starting up, discharged a flight of arrows, which did great execution among the crowded ranks of the French. Immediately after, on a signal being given, the archers in ambush arose, discharged their arrows on the flank of the French line, and threw it into some disorder. The battle now became general, and raged with uncommon fury. The English archers, having expended all their arrows, threw away their bows, and, rushing forward, made dreadful havoc with their swords and battle-axes. The first line of the enemy was, by these means, defeated; its leaders being either killed or taken prisoners. The second line, commanded by the duke d'Alençon (who had made a vow either to kill or take the king of England, or to perish in the attempt), now advanced to the charge, and was encountered by the second line of the English, conducted by the king. This conflict was more close and furious than the former. The duke of Gloucester, wounded and unhorsed, was protected by his royal brother till he was carried off the field. The duke d'Alençon forced his way to the king, and assaulted him with great fury; but that prince brought him to the ground, and dispatched him with his own hand. Discouraged by this disaster, the second line made no more resistance; and the third fled without striking a blow; yielding a complete and glorious victory to the English, after a violent struggle of three hours duration.

The king did not permit his men to pursue the fugitives to a great distance, but encouraged them to take as many prisoners as they could on or near the field; in which they were so successful, that, in a little time, his captives were more numerous than his soldiers. A great proportion of these prisoners were men of rank and fortune; for many of the French noblesse being on foot, and loaded with heavy armour, could not make their escape. Among these were the dukes of Orleans and Bourbon, the marshal Boucicaut, the counts d'Eu, Vendome, Richemont, and Harcourt, and 7000 barons, knights, and gentlemen. The French left dead on the field of battle, the constable d'Albert, the three dukes of Alençon, Brabant, and Bar, the archbishop of Sens, one marshal, thirteen earls, ninety-two barons, 1500 knights, and a far greater number of gentlemen, besides several thousands of common soldiers. Even the French historians acknowledge, that the loss of the English was inconsiderable: those of our own contemporary writers, who make it the greatest, affirm, that it did not exceed 100, and that the duke of York and the earl of Suffolk were the only great men who fell on that side in this memorable action.

AGIO, *f.* [an Italian word, signifying ease or convenience.] A mercantile term, used chiefly in Holland and Venice, for the difference between the value of bank-notes and the current money.

AGIOSYMANDRUM, *f.* a wooden instrument used by

by the Greek and other churches under the dominion of the Turks, to call together assemblies of the people. The agiofymandrum was introduced in the place of bells, which the Turks prohibited their Christian subjects the use of, lest they should make them subservient to sedition.

AGIS, king of Lacedæmon, and colleague of Leonidas in the government of Sparta, was a young prince of great hopes. He shewed himself just and obliging to all men; and, in the gentleness of his disposition, and the sublimity of his virtues, not only exceeded Leonidas, who reigned with him, but all the kings of Sparta from king Agefilaus. He was a very handsome person, and of a graceful behaviour; yet, to check the vanity he might take therein, he would always dress in a very plain manner. He had been bred very tenderly by his mother Agefistrata, and his grandmother Archidamia, who were the wealthiest of all the Lacedæmonians; yet, before the age of twenty-four, he so far overcame himself, as to renounce effeminate pleasures. In his diet, bathings, and in all his exercises, he chose to imitate the old Lyncurgic frugality and temperance; and was often heard to say, "He would not desire the kingdom, if he did not hope, by means of that authority, to restore their ancient laws and discipline." This maxim governed his whole life: and, with this view, he associated with men of interest and capacity, who were equally willing to bring about the great design he had formed of thoroughly reforming the state, now sunk into luxury and debauch. For this purpose attempts were made; and so far succeeded, that Leonidas thought it advisable to abdicate the throne. But Agefilaus, from interested views, acted so precipitately, that, while Agis was leading a body of Spartan troops to the assistance of the Achæans, a conspiracy was formed for restoring Leonidas, whose ambition, pride, and luxury, had greatly contributed to effeminate the minds of the people. Leonidas, being now re-settled on the throne, tried every method possible to get Agis into his power; and which he at last effected by the treachery of Amphares and Demochares. Being dragged away to the common prison, the ephori constituted by Leonidas sat ready to judge him. As soon as he came in, they asked him, "How he durst attempt to alter the government?" at which he smiled without affording an answer; which provoked one of the ephori to tell him, "That he ought rather to weep; for they would make him sensible of his presumption." Another asked him, "Whether he was not constrained to do what he did by Agefilaus and Lyfander?" To which Agis, with a composed countenance, answered, "I was constrained by no man; the design was mine; and my intent was to have restored the laws of Lyncurgus, and to have governed by them." "But do you not now (said one of his judges) repent of your rashness?" "No, (replied the king;) I can never repent of so just and honourable an intention." The ephori then ordered him to be taken away, and strangled. The officers of justice refused to obey; and even the mercenary soldiers declined so unworthy an action. Whereupon Demochares, reviling them for cowards, forced the king into the room where the execution was to be performed. Agis, about to die, perceiving one of the ferjeants bitterly bemoaning his misfortune: "Weep not, friend, for me, (said he) who die innocently; but grieve for those who are guilty of this horrid act. My condition is much better than theirs." Then, stretching out his neck, he submitted to death with a constancy worthy both of the royal dignity and his own great character. Immediately after Agis was dead, Amphares went out of the prison gate, where he found Agefistrata; who kneeling at his feet, he gently raised her up, pretending still the same friendship as formerly. He assured her, she need not fear any farther violence should be offered against her son; and that, if she pleased, she might go in and see him. She begged her mother might also have the favour of being admitted: to which he replied, "Nobody should hinder her." When they were entered, he commanded the gate should be again locked, and the grandmother to be the

first introduced. She was now grown very old, and had lived all her days in great reputation of wisdom and virtue. As soon as Amphares thought she was dispatched, he told Agefistrata she might go in, if she pleased. She entered: where, beholding her son's body stretched on the ground, and her mother hanging by the neck, she stood at first astonished at so horrid a spectacle: but, after a while recollecting her spirits, the first thing she did was to assist the soldiers in taking down the body; then covering it decently, she laid it by her son's; where, embracing and kissing his cheeks, "O my son, (said she,) it is thy too great mercy and goodness which hath brought thee and us to this untimely end." Amphares, who stood watching behind the door, rushed in hastily; and, with a furious tone and countenance, said to her: "Since you approve so well of your son's actions, it is fit you should partake in his reward." She, rising up to meet her destiny, only uttered these few words: "I pray the gods that all this may redound to the good of Sparta." After which she submitted to death with a composure and firmness that drew tears from the executioner.

To AGIST, *v. a.* [from *giste*, Fr. a bed or resting-place, or from *gister*, i. e. *stabulari*.] To take in and feed the cattle of strangers in the king's forest, and to gather the money. The officers that do this are called *agistors*, in English *guest* or *gift takers*. Their function is termed *agistment*; as, *Agistment* upon the sea-banks. This word *agist* is also used for the taking in of other men's cattle into any man's ground, at a certain rate per week.

AGISTMENT, *f.* in law, is where other men's cattle are taken into any ground, at a certain rate for their feeding. *4 Inst.* 293.

The tithe of agistment of cattle is due of common right, because the grass which is eaten is *de jure* titheable, and must have paid tithe if cut when full grown. And it is to be paid by the occupier of the ground, and not by the owner of the cattle; for, if the occupier in such case were not liable, it would be greatly inconvenient to sue every owner of the beasts, and it might be hard to be known, and infinite. Where there is no special custom concerning the manner of paying this tithe, it is usual to pay the tenth part of the money received; but this is only for convenience, for the tenth part of the produce, and not a sum of money, is due *de jure*. *2 Inst.* 651. *1 Roll's Abr.* 656. *Watf. c. 50.*

AGISTOR, or AGISTATOR, *f.* an officer belonging to forests, who has the care of cattle taken in to be grazed, and levies the moneys due on that account. They are created by letters patent; each royal forest having four agistors.

AGISYMBIA, anciently a district of Libya Interior, situated to the south-east of the Æthiopes Anthropophagi; the parallel passing through which, at 16° to the south of the Equator, was the utmost extent of the knowledge of the ancients to the south.

AGITABLE, *adj.* [*agitabilis*, Lat.] That which may be agitated, or put in motion; perhaps that which may be disputed.

To AGITATE, *v. a.* [*agitō*, Lat.] To put in motion; to shake; to move nimbly; as, The surface of the waters is *agitated* by the wind; The vessel was broken by *agitating* the liquor. To be the cause of motion; to actuate; to move. To affect with perturbation; as, The mind of man is *agitated* by various passions. To stir; to bandy from one to another; to discuss; to controvert; as, To *agitate* a question. To contrive; to revolve; to form by laborious thought.—Formalities of extraordinary zeal and piety are never more studied and elaborate, than when politicians most *agitate* desperate designs. *King Charles.*

AGITATION, *f.* [*agitatio*, Lat.] The act of moving or shaking any thing. The state of being moved or agitated; as, The waters, after a storm, are some time in a violent *agitation*. Discussion; controversial examination. Violent motion of the mind; perturbation; disturbance of the thoughts. Deliberation; contrivance; the state of

being consulted upon.—The project now in *agitation* for repealing of the test act, and yet leaving the name of an establishment to the present national church, is inconsistent. *Swift*.

AGITATION, in physics, an intestine commotion of the parts of a natural body. It is one of the chief instruments of mixture: by the agitation of the parts of the blood and chyle, in their continual circulation, sanguification is in a good measure effected. Agitation is also used in medicine for a species of exercise popularly called *swinging*.

AGITATOR, *f.* He that agitates any thing; he who manages affairs.

AGITATOR, in antiquity, a term used for a charioteer, especially those who drove in the circus at the curule games.

AGITATORS, in the English history, were certain officers set up by the army in 1647, to take care of its interests. Cromwell joined the agitators, only with a view to serve his own ends; which being once accomplished, he found means to get them abolished.

AGLAIA, the name of the youngest of the three Graces, espoused to Vulcan.

AGLET, *f.* [some derive it from *αἴγλη*, splendour; but it is apparently to be deduced from *aiguillette*, Fr. a tag to a point, and that from *aigu*, sharp.] A tag of a point curved into some representation of an animal, generally of a man.—He thereupon gave for the garter a chain worth 200*l.* and his gown addressed with *aglets*, esteemed worth 25*l.* *Hayward*.—In botany, the pendants at the ends of the chieftes of flowers, as in tulips.

AGLIONBY (John), an English divine, chaplain to king James I. a man of universal learning, who had a very considerable hand in the translation of the New Testament appointed by king James I. in 1604.

AGMAT, in the province, and on the river of the same name, in Morocco, is a pleasant town on the declivity of one of the mountains of Atlas. Lat. 30. 56. N. lon. 7. 15. W.

AGMEN, *f.* in antiquity, properly denotes a Roman army in march: in which sense, it stands contradistinguished from *acies*, which denoted the army in battle array; though, on some occasions, we find the two words used indifferently for each other. The Roman armies, in their marches, were divided into *primum agmen*, answering to our van-guard; *medium agmen*, our main-body; and *postremum agmen*, the rear-guard.

AGMINAL, *adj.* [from *agmen*, Lat.] Belonging to a troop.

AGNAIL, *adj.* [from *ange*, grieved, and *nagle*, Sax. a nail.] A disease of the nails; a whitlow; an inflammation round the nails.

AGNAN, a small town in France, in the department of Loire and Cher, in the form of an amphitheatre, at the foot of which runs the Cher, at the distance of sixty miles from Bourges.

AGNANTHUS, *f.* in botany. See *CORNUTIA*.

AGNATI, *f.* in law, are the kindred by the father's side, as *cognati* are kindred by the mother. 2 *Blackst.* 235.

AGNEL, *f.* an ancient French gold coin, first struck under the reign of St. Louis, worth about twelve sols six deniers. The agnel is also called sometimes *mouton d'or*, and *agnel d'or*, from the figures struck on one side.

AGNELET, *f.* an ancient French silver coin, worth about twenty sols, first struck under Philip le Bel.

AGNITION, *f.* [from *agnitio*, Lat.] Acknowledgement.

[To **AGNIZE**, *v. a.* [from *agnosco*, Lat.] To acknowledge; to own; to avow. This word is now obsolete.

AGNO, a river of Naples, which falls into the Mediterranean, about seven miles north of Puzzuoli.

AGNOETÆ, *f.* [from *αγνοειν*, to be ignorant of.] In church-history, a sect of ancient heretics, who maintained that Christ, considered as to his human nature, was ignorant of certain things, and particularly of the time of the day of judgment.

AGNOMEN, *f.* in Roman antiquity, a kind of fourth or honorary name, given to a person on account of some extraordinary action, virtue, or other accomplishment. Thus the agnomen *Africanus* was bestowed upon Publius Cornelius Scipio, on account of his great achievements in Africa. The agnomen was the third in order of the three Roman names: thus, in Marcus Tullius Cicero, Marcus is the prænomen, Tullius the nomen, and Cicero the *agnomen*.

AGNOMINATION, *f.* [*agnominatio*, Lat.] Allusion of one word to another, by resemblance of sound.—The British continueth yet in Wales, and some villages of Cornwall, intermingled with provincial Latin, being very significative, copious, and pleasantly running upon *agnominations*, although harsh in aspirations. *Camden*.

AGNUS, or **LAMB**, *f.* in zoology, the young of the ovine or sheep. See *OVIS*.

AGNUS CASTUS, *f.* in botany, the trivial name of a species of the vitex. See *VITEX*.

The Greeks call it *αγνός*, chaste. It was famous among the ancients as a specific for the preservation of chastity. The Athenian ladies who made profession of chastity, lay upon the leaves of *agnus castus* during the feasts of Ceres. Being reputed a cooler, and particularly of the genital parts, it was anciently used in physic to allay those inordinate motions arising from femal turgescences: but it is out of the present practice.

AGNUS DEI, in the church of Rome, a cake of wax stamped with the figure of a lamb supporting the banner of the cross. These being consecrated by the pope with great solemnity, and distributed among the people, are supposed to have great virtues; as, to preserve those who carry them worthily, and with faith, from all manner of accidents; to expel evil spirits, &c. The name literally signifies *Lamb of God*; this being supposed an image or representation of the Lamb of God who took away the sins of the world. The Romish priests and religious derive considerable pecuniary advantage from selling these *Agnus Dei's* to some, and presenting them to others. The pope provides a regular supply, by consecrating them once in seven years. The *Agnus Dei* is forbidden to be brought into England under pain of incurring a *premunire*. 13 Eliz. cap. 2.

AGNUS DEI is also a popular name for that part of the mass wherein the priest, striking his breast three times, rehearses, with a loud voice, a prayer beginning with the words *Agnus Dei*.

AGNUS SCYTHICUS. See *SCYTHIAN LAMB*.

AGO, *adv.* [*agan*, Sax. past or gone; whence writers formerly used, and in some provinces the people still use, *agone* for *ago*.] Past; as, *long ago*; that is, long time has past since. Reckoning time towards the present, we use *since*; as, It is a year *since* it happened. Reckoning from the present, we use *ago*; as, It happened a year *ago*. This is not, perhaps, always observed.

AGOG, *adv.* [a word of uncertain etymology: the French have the term *à gogo*, in low language; as, *ils vivent à gogo*, they live to their wish. From this phrase our word may be, perhaps, derived.] In a state of desire; in a state of warm imagination; heated with the notion of some enjoyment; longing; strongly excited. It is used with the verbs *to be*, or *to set*; as, He is *agog*, or You may set him *agog*. It has the particles *on*, or *for*, before the object of desire:

On which the saints are all *agog*,
And all this for a bear and dog.

Butler.

Gypsies generally straggle into these parts, and set the heads of our servant-maids so *agog* for husbands, that we do not expect to have any business done as it should be, whilst they are in the country. *Addison*.

AGOING, *part. adj.* [from *a* and *going*.] In action; into action.—Their first movement, and impressed motions, demanded the impulse of an Almighty hand to set them first *agoing*. *Tatler*.

AGOGE,

AGOGÉ, *adj.* among ancient musicians, a species of modulation, wherein the notes proceed by contiguous degrees.

AGON, *f.* among the ancients, implied any dispute or contest, whether it had regard to bodily exercises or the accomplishments of the mind; and therefore poets, musicians, painters, &c. had their agones, as well as the athletes. Games of this kind were celebrated at most of the heathen festivals, with great solemnity, either annually, or at certain periods of years.

AGON also signified one of the ministers employed in the Heathen sacrifices, and whose business it was to strike the victim. The name is supposed to have been derived from hence, that standing ready to give the stroke he asked, *Agon?* or *Agone?* "Shall I strike?"

AGONALES, *f.* an epithet given to the **SALII**.

AGONALIA, *f.* in Roman antiquity, festivals celebrated in honour of Janus, or the god Agonius, whom the Romans invoked before undertaking any affair of importance.

AGONALIS CIRCUS, now La Piazza Navona, a long, large, beautiful, street, in the heart of Rome, adorned with fountains, and the obelisk of Caracalla, still retaining the form of that circus. The reason of the name Agonalis is either unknown or doubtful. Ovid seems to derive it from the agones, or solemn games, there celebrated; supposed to have been the *Ludi Apollinares*, or *Athiaci*, instituted by Augustus: whence the circus was called *Apollinaris*; also *Alexandrinus*, from the emperor Alexander Severus, who either enclosed or repaired the circus.

AGONE, *adv.* [*agan*, Sax.] Ago; past.

AGONISM, *f.* [*αγωνισμος*, Gr.] Contention for a prize.

AGONISMA, *f.* in antiquity, denotes the prize given to the victor in any combat or dispute.

AGONIST, *f.* [*αγωνιστης*, Gr.] A contender for prizes.

AGONISTARCHA, *f.* [from *αγων*, combat, and *αρχος*, chief.] In antiquity, seems to have been much the same with **AGONOTHETA**; though some suggest a difference, making it the office of the former to preside at and direct the private exercises of the athletes.

AGONISTES, *f.* [*αγωνιστης*, Gr.] A prize-fighter; one that contends at any public solemnity for a prize. Milton has so styled his tragedy, because Sampson was called out to divert the Philistines with feats of strength.

AGONISTICAL, *adj.* Relating to prize-fighting.

AGONISTICI, *f.* in church-history, a name given by Donatus to such of his disciples as he sent to fairs, markets, and other public places, to propagate his doctrine; for which reason they were also called *Circuitores*, *Circelliones*, *Catropitæ*, *Coropitæ*, and at Rome *Montenses*.

AGONIUM, *f.* in Roman antiquity, was used for the day on which the *rex sacrorum* sacrificed a victim, as well as for the place, where the games were celebrated, otherwise called *agon*.

To **AGONIZE**, *v. n.* [from *agonizo*, low Lat. *αγωνίζω*, Gr. *agoniser*, Fr.] To feel agonies; to be in excessive pain:

Dost thou behold my poor distracted heart,
Thus rent with agonizing love and rage,
And ask me what it means?

Rowe.

AGONOTHETA, or **AGONOTHETICI**, *f.* [*αγων* and *τις*, Gr.] In Grecian antiquity, was the president or superintendant of the sacred games; who not only defrayed the expences attending them; but inspected the manners and discipline of the athletes, and adjudged the prizes to the victors.

AGONY, *f.* [*αγων*, Gr. *agon*, low Lat. *agonie*, Fr.] The pangs of death; properly the last contest between life and death. Any violent or excessive pain of body or mind. It is particularly used in devotions for our Redeemer's conflict in the garden.

Much of the terror of death consists in the pangs and convulsions wherewith the agony seems attended; though we have reason to believe that the pain in such cases is ordinarily not extremely acute; a course of pain and sickness having usually stupified and indisposed the nerves for any quick sensations. However, various means have been thought of for mitigating the agony of death. Lord Bacon considers this as a part of the province of a physician; and that not only when such a mitigation may tend to a recovery, but also when, there being no hopes of a recovery, it can only tend to make the passage out of life more calm and easy. Complacency in death, which Augustus so much desired, is certainly no small part of happiness. Accordingly the author last cited ranks *euthanasia*, or the art of dying easily, among the desiderata of science; and does not even seem to disapprove of the course Epicurus took for that end,

—*Hinc stygiæ ebrius hausit aquas.*

Opium has been applied for this purpose, with the applause of some, but the condemnation of more.

AGONYCLITÆ, or **AGONYCLITES**, *f.* in church-history, a sect of Christians, in the seventh century, who prayed always standing, as thinking it unlawful to kneel.

AGOOD, *adv.* [from *a* and *good*.] In earnest; not fictitiously. Not in use.

AGORÆUS, *adj.* in heathen antiquity, an appellation given to such deities as had statues in the market-places; particularly Mercury, whose statue was to be seen in almost every public place.

AGORANOMUS, *f.* a magistrate of Athens, who had the regulation of weights and measures, the prices of provisions, &c. To these a certain toll or tribute was paid by all who brought any thing to sell in the market.

AGOSTA, a sea-port of Sicily, mostly swallowed up by an earthquake in 1763.

AGOUTI, or **AGUTTI**. See **MUS**.

AGRA, the capital town of a province of the same name, in Indostan, and in the dominions of the Great Mogul. It is looked upon as the largest city in these parts, and is in the form of a half-moon. A man on horseback can hardly ride round it in a day. It is surrounded with a wall of red stone, and with a ditch 100 feet wide. The palace is prodigiously large, and the seraglio commonly contains above 1000 women. There are upwards of 800 baths in this town; but that which travellers most admire, is the mausoleum of one of the Mogul's wives, which was twenty years in building. The indigo of Agra is the most valuable of all that comes from the East Indies. This town is seated on the river Jemma, about fifty miles above its confluence with the Tehemel, and is 300 miles N. E. of Surat. Lat. 26. 29. N. lon. 79. 12. E.

To **AGRACE**, *v. a.* [from *a* and *grace*.] To grant favours to; to confer benefits upon: a word not now in use.

AGRAMMATIST, *f.* [from *a*, priv. and *γραμμα*, a letter.] An illiterate man.

AGRARIAN LAWS, *f.* among the Romans, those relating to the division and distribution of lands; of which there were a great number; but that called the *Agrarian Law*, by way of eminence, was published by Spurius Cassius, about the year of Rome 268, for dividing the conquered lands equally among all the citizens, and limiting the number of acres which each citizen might enjoy.—The Roman lands were of several kinds; some conquered from the enemies; and not yet brought to the public account; others brought indeed to the public, but clandestinely usurped by private great men; lastly, others purchased with the public money, in order to be divided. Agrarian laws, either for dividing lands taken from the enemy, or the public lands, or those purchased with the public money, were easily passed without disturbance; but those whereby private rich men were to be deprived of their lands, and the common people put in possession of what

what had been held by the nobility, were never attempted without great disturbances. Several have pleaded for the necessity of agrarian laws among us: but no author has entered so deeply into the subject as Mr. Harrington in his Oceana.

AGREDA, a town of Spain, in Old Castile, near the frontiers of Arragon, and about three leagues south-west of Tarazon.

To AGREE, *v. n.* [*agrer*, Fr. from *gr*, liking or goodwill; *galia* and *gratus*, Lat.] To be in concord; to live without contention; not to differ. To grant; to yield to; to admit, with the particles *to* or *upon*.—And persuaded them to agree to all reasonable conditions. *2 Maccabees*, xi. 14.—We do not prove the origin of the earth from a chaos; seeing that is agreed on by all that give it any origin. *Burnet*.—To settle amicably. To settle terms by stipulation; to accord: followed by *with*.—Agree with thine adversary quickly, whilst thou art in the way with him; lest at any time the adversary deliver thee to the judge, and the judge deliver thee to the officer, and thou be cast into prison. *Matt. v. 25*.—To settle a price between buyer and seller.—Friend, I do thee no wrong: didst not thou agree with me for a penny. *Matt. xx. 13*.—To be of the same mind or opinion. To concur; to co-operate. To settle some point among many, with *upon* before a noun.—Strifes and troubles would be endless, except they gave their common consent all to be ordered by some whom they should agree upon. *Hooker*.—To be consistent; not to contradict. To suit with; to be accommodated to: with *to* or *with*. To cause no disturbance in the body.—I have often thought, that our prescribing asses milk in such small quantities is injudicious; for, undoubtedly, with such as it agrees with, it would perform much greater and quicker effects in greater quantities. *Arbutnot*.

To AGREE, *v. a.* To put an end to a variance. To make friends; to reconcile:

The mighty rivals, whose destructive rage
Did the whole world in civil arms engage,
Are now agreed. *Roscommon*.

AGREEABLE, *adj.* [*agrable*, Fr.] Suitable to; consistent with; conformable to. It has the particle *to* or *with*.—This paucity of blood is agreeable to many other animals, as frogs, lizards, and other fishes. *Brown*.—What you do, is not at all agreeable either with so good a Christian, or so reasonable and so great a person. *Temple*.—In the following passage the adjective is used by a familiar corruption for the adverb *agreeably*.—Agreeable hereunto, perhaps it might not be amiss, to make children, as soon as they are capable of it, often to tell a story. *Locke*.—Pleasing; that is suitable to the inclination, faculties, or temper: It is used in this sense both of persons and of things.

AGREEABLENESS, *f.* Consistency with; suitability to: with the particle *to*.—Pleasant tastes depend not on the things themselves; but their agreeableness to this or that particular palate, wherein there is great variety. *Locke*.—The quality of pleasing. It is used in an inferior sense, to mark the production of satisfaction, calm and lasting, but below rapture or admiration.—It has very much an image of that author's writing, who has an agreeableness that charms us, without correctness; like a mistress whose faults we see, but love her with them all. *Pope*.—Resemblance; likeness; sometimes with the particle *between*.—This relation is likewise seen in the agreeableness between man and the other parts of the universe. *Grew*.

AGREEABLY, *adv.* Consistently with; in a manner suitable to. Pleasingly.

AGREED, *part. adj.* Settled by consent.

AGREEINGNESS, *f.* Consistence; suitability.

AGREEMENT, *f.* [*agrement*, Fr. in law Latin *agreementum*, which Coke would willingly derive from *aggregatio mentium*.] Concord.—What agreement is there between the hyna and the dog? and what peace between the rich and the poor? *Eccclus. xiii. 18*.—Resemblance of one thing

to another.—The division and quavering which please so much in music, have an agreement with the glittering of light, as the moon-beams playing upon a wave. *Bacon*.—Compact; bargain; conclusion of controversy; stipulation.—Make an agreement with me by a present, and come out to me, and then eat ye every man of his own vine, and every one of his fig-tree. *2 Kings*, xviii. 31.

AGREEMENT, in law, is of three kinds:—1. An agreement executed already at the beginning; as where money is paid for the thing agreed on, or other satisfaction made. 2. An agreement after an act done by another; as where one doth such a thing, and another person agrees to it afterwards, which is executed also. 3. An agreement executory, or to be performed in future. This last sort of agreement may be divided into two parts; one certain at the beginning; the other, when, the certainty not appearing at the first, the parties agree that the thing shall be performed upon the certainty known. *Terms of the Law*.

An agreement put in writing only for remembrance, doth not change its nature; but, if it be put in writing, sealed and delivered, it is of greater force. *Hob. 79*.

By the statute of frauds, 29 Car. II. c. 3. all agreements for lands shall be in writing, signed by the parties, otherwise they shall only have effect as estates at will. And no action shall be brought, to charge any person upon any special promise to answer for the debt of another person, or upon any contract of marriage, or upon any agreement not to be performed within a year, unless the same be put in writing, and signed by the party charged therewith.

AGRESTIC, or AGRESTICAL, *adj.* [from *agrestis*, Lat.] Having relation to the country; rude; rustic.

AGRIA, called by the Germans Eger, is a small but strong town in Upper Hungary, and is a bishop's see. It is situated on a river of the same name, and has a citadel called Eriaw. It was besieged by the Turks in 1552, with 70,000 men: but they lost 8000 in one day; and were obliged to raise the siege, though the garrison consisted only of 2000 Hungarians, assisted by the women, who performed wonders on this occasion. However, it was afterwards taken by Mahomet III. in 1596; but was retaken by the emperor in 1687; since which time it has continued under the dominion of the house of Austria. It is forty-seven miles north-east of Buda, and fifty-five south-west of Cassovia. Lat. 48. 10. N. lon. 20. 10. E.

AGRIA, *f.* in medicine, is a malignant pustule, of which there are two sorts; one is small, and casts a roughness or redness over the skin, slightly corroding it, smooth about its centre, spreads slow, and is of a round figure; this sort is cured by rubbing it with the saliva before having breakfasted; the second sort ulcerates, with a violent redness and corrosion, so as to make the hair fall off. It is of an unequal form, and turns leprous; its cure is the application of pellitory of the wall in the manner of a poultice.

AGRICOLA (Cneus Junius), born at Ferjus in Provence, was, in Vespasian's time, made lieutenant to Vettius Bolanus in Britain; and, upon his return, was ranked by that emperor among the patricians, and made governor of Aquitania. This post he held three years; and, upon his return, was chosen consul, and afterward appointed governor of Britain, where he greatly distinguished himself. He reformed many abuses occasioned by the avarice or negligence of former governors, put a stop to extortion, and caused justice to be impartially administered. Vespasian dying about this time, his son Titus, knowing the great merit of Agricola, continued him in the government. In the spring, he marched towards the north, where he made some new conquests, and ordered forts to be built for the Romans to winter in. He spent the following winter in concerting schemes to bring the Britons to conform to the Roman customs. He thought the best way of diverting them from rising and taking arms, was to soften their rough manners, by proposing to them new kinds of pleasure, and inspiring them with a desire of imitating the Roman manners. Soon after this, the country was adorned with magnificent temples, ports,

cos, baths, and many other fine buildings. The British nobles had at length their sons educated in learning; and they, who before had the utmost aversion to the Roman language, now began to study it with great assiduity: they were likewise the Roman habit; and, as Tacitus observes, they were brought to consider those things as marks of politeness, which were only so many badges of slavery. Agricola, in his third campaign, advanced as far as the Tweed; and, in his fourth, he subdued the nations betwixt the Tweed and the friths of Edinburgh and Dumbritten, into which the rivers Glottra and Bodotria discharge themselves; and here he built fortresses to shut up the nations yet unconquered. In his fifth, he marched beyond the friths; where he made some new acquisitions, and fixed garrisons along the western coasts, over against Ireland. In his sixth campaign he passed the river Bodotria, ordering his fleet, the first which the Romans ever had in that country, to row along the coasts, and take a view of the northern parts. In the following spring, the Britons raised an army of 30,000 men; and the command was given to Galgacus, who, according to Tacitus, made an excellent speech to his countrymen on this occasion. Agricola likewise addressed his men in very strong and eloquent terms. The Romans gained the victory, and 10,000 of the Britons are said to have been killed. This happened in the reign of the emperor Domitian; who, growing jealous of the glory of Agricola, recalled him, under pretence of making him governor of Syria. Agricola died soon after; and his death is suspected to have been occasioned by poison given him by that emperor. Tacitus the historian married his daughter, wrote his life, and laments his death in the most pathetic manner.

AGRICOLA (George), a German physician, famous for his skill in metals. He was born at Glaucha, in Misnia, the 24th of March, 1494. The discoveries which he made in the mountains of Bohemia, gave him so great a desire of examining accurately into every thing relating to metals, that, though he had engaged in the practice of physic at Joachimsthal by advice of his friends, he still prosecuted his study of fossils with great assiduity; and at length removed to Chemnitz, where he entirely devoted himself to this study. He wrote several pieces upon this and other subjects; and died at Chemnitz the 21st of November, 1555.

AGRICOLA (John), a Saxon divine, born at Ilsebe, in 1492. He went as chaplain to count Mansfield, when that nobleman attended the elector of Saxony to the diet of Spire in 1526, and that of Ausburg in 1530. He was of a restless ambitious temper, rivalled and wrote against Melancthon, and gave count Mansfield occasion to reproach him severely. He obtained a professorship at Wittemberg, where he taught particular doctrines, and became founder of the sect of Antinomians; which occasioned warm disputes between him and Luther, who had before been his very good friend. But, though he was never able to recover the favour either of the elector of Saxony or of Luther, he received some consolation from the fame he acquired at Berlin: where he became preacher at court; and was chosen in 1548, in conjunction with Julius Phlug and Michael Heldingus, to compose the famous *Interim*, which made so much noise in the world. He died at Berlin in 1566.

AGRICULTATION, *f.* [from *agri colare*, Lat.] Culture of the ground.

AGRICULTURE, *f.* [*agricultura*, Lat.] The art of husbandry, tillage, cultivation, improvement of the land, &c. For a complete Treatise on this important art, with all the late discoveries and improvements, see the article **HUSBANDRY**.

AGRIFOLIUM, or **AQUIFOLIUM**, *f.* in botany. See **ILEX**.

AGRIGENTUM, anciently a city of Sicily, part of the site of which is now occupied by a town called Girgenti. According to ancient authors, Dedalus, the most famous mechanician of fabulous antiquity, fled to this

spot for protection against Minos, and built many wonderful edifices for Cocalus king of the island. Long after his flight, the people of Gela sent a colony thither 600 years before the birth of Christ; and from the name of a neighbouring stream called the new city Acragas, whence the Romans formed their word Agrigentum. These Greeks converted the ancient abode of the Siculi into a citadel, to guard the magnificent city which they erected on the hillocks below.

An advantageous situation, a free government with all its happy effects, and an active commercial spirit, exalted their commonwealth to a degree of riches and power unknown to the other Greek settlements, Syracuse alone excepted. But the prosperity of Agrigentum appears to have been but of short duration, and tyranny soon destroyed its liberties.

Phalaris was the first that reduced it to slavery. His name is familiar to most readers on account of his cruelty, and the brazen bull in which he tortured his enemies. See **PHALARIS**.—Phalaris met with the common fate of tyrants, and after his death the Agrigentines enjoyed their liberty for 150 years; at the expiration of which term Thero usurped the sovereign authority. The moderation, justice, and valour, of this prince, preserved him from opposition while living, and have rescued his memory from the obloquy of posterity. He joined his son-in-law Gelo, king of Syracuse, in a war against the Carthaginians; in the course of which victory attended all his steps, and Sicily saw herself for a time delivered from her African oppressors. Soon after his decease, his son Thrasyldeus was despoiled of the diadem, and Agrigentum restored to her old democratical government. Ducetius next disturbed the general tranquillity. He was a chief of the mountaineers, descendants of the Siculi; and was an overmatch for the Agrigentines while they were unsupported by alliances, but sunk under the weight of their union with the Syracusans. Some trifling altercations dissolved this union, and produced a war, in which the Agrigentines were worsted, and compelled to submit to humiliating terms of peace. Repentment led them to embrace with joy the proposals of the Athenians, then meditating an attack upon Syracuse. Their new friends soon made them feel that the sacrifice of liberty and fortune would be the price of their protection; and this consideration brought them speedily back to their old connections. But, as if it had been decreed that all friendship should be fatal to their repose, this reconciliation and its effects drew upon them the anger of the Carthaginians. By this enemy their armies were routed, their city taken, their race almost extirpated, and scarcely a vestige of magnificence was left. Agrigentum lay fifty years buried under its own ruins; when Timoleon, after triumphing over the Carthaginians, and restoring liberty to Sicily, collected the descendants of the Agrigentines, and sent them to re-establish the dwellings of their forefathers. Their exertions were rewarded with astonishing success; for Agrigentum rose from its ashes with such a renewal of vigour, that in a very short time we find it engaged in the bold scheme of seizing a lucky moment, when Agathocles and Carthage had reduced Syracuse to the lowest ebb, and arrogating to itself supremacy over all the Sicilian republics. Xenodocus was appointed the leader of this arduous enterprise; and, had his latter operations been as fortunate as his first campaign, Agrigentum would have acquired such a preponderance of reputation and power, that the rival states would not even have dared to attack it. But a few brilliant exploits were succeeded by a severe overthrow; the Agrigentines lost courage, disagreed in council, and humbly sued for peace to Agathocles. This commonwealth afterwards took a strong part with Pyrrhus; and, when he left Sicily to the mercy of her enemies, threw itself into the arms of Carthage. During the first Punic war, Agrigentum was the head-quarters of the Carthaginians, and was besieged by the Roman consuls, who after eight months blockade took it by storm. It nevertheless changed mas-

ters several times during the contest between these rival states, and in every instance suffered the most cruel outrages. After this period very little mention of it occurs in history, nor do we know the precise time of the destruction of the old city and the building of the new one. See GIRGENTI.

The principal part of the ancient city lay in the vale; the present town, called Girgenti, occupies the mountain on which the citadel of Cocalus stood.

It was difficult to be more judicious and fortunate in the choice of situation for a large city. The inhabitants were here provided with every requisite for defence, pleasure, and comfort of life; a natural wall, formed by abrupt rocks, presented a strong barrier against assailants; pleasant hills sheltered them on three sides without impeding the circulation of air; before them a broad plain watered by the Acragas, gave admittance to the sea-breeze, and to a noble prospect of that awful element; the port or emporium lay in view at the mouth of the river, and probably the road across the flat was lined with gay and populous suburbs.

The hospitality and parade for which the Agrigentines are celebrated in history were supported by an extensive commerce; by means of which, the commonwealth was able to resist many shocks of adversity, and always to rise again with fresh splendour. It was, however, crushed by the general fall of Grecian liberty; the feeble remnants of its population, which had survived so many calamities, were at length driven out of its walls by the Saracens, and obliged to lock themselves up for safety among the bleak and inaccessible rocks of the present city.

At the north-east angle of the ancient limits, upon some foundations of large regular stones, a church has been erected; a road appears hewn in the solid rock for the convenience of the votaries that visited this temple in ancient days. It was then dedicated to Ceres and her daughter Proserpine, the particular patronesses of Sicily. Bishop Blaife succeeded to their honours.

At the south-east corner, where the ground, rising gradually, ends in a bold eminence, which is crowned with majestic columns, are the ruins of a temple said to have been consecrated to Juno. To the west of this stands the building commonly called the *Temple of Concord*; the stone of which, and the other buildings, is the same as that of the neighbouring mountains and cliffs, a conglutination of sea-sand and shells, full of perforations, of a hard and durable texture, and a deep reddish brown colour. This Doric temple has all its columns, entablature, pediments, and walls, entire; only part of the roof is wanting. It owes its preservation to the piety of some Christians, who have covered half the nave, and converted it into a church consecrated under the invocation of St. Gregory bishop of Girgenti.

Proceeding in the same direction, you walk between rows of sepulchres cut in the rock wherever it admitted of being excavated by the hand of man, or was so already by that of nature. Some masses of it are hewn into the shape of coffins; others drilled full of small square holes employed in a different mode of interment, and serving as receptacles of urns. One ponderous piece of the rock lies in an extraordinary position; by the failure of its foundation, or the shock of an earthquake, it has been loosened from the general quarry, and rolled down the declivity, where it now remains supine with the cavities turned upwards. Only a single column marks the confused heap of moss-grown ruins belonging to the temple of Hercules. It stood on a projecting rock above a chasm in the ridge, which was cut through for a passage to the emporium.

In the same tract, over some hills, is situated the building usually called the *Tomb of Thero*. It is surrounded by aged olive-trees, which cast a wild irregular shade over the ruin. The edifice inclines to the pyramidal shape, and consists at present of a triple plinth, and a base sup-

porting a square pedestal: upon this plain solid foundation is raised a second order, having a window in each front, and at each angle two Ionic pilasters crowned with an entablature of the Doric order. Its inside is divided into a vault, a ground room, and one in the Ionic story, communicating with each other by means of a small internal stair-case.

In the plain are seen the fragments of the temple of Esculapius; part of two columns and two pilasters, with an intermediate wall, support the end of a farm-house, and were probably the front of the cella. Pursuing the track of the walls towards the west, you arrive at a spot which is covered with the gigantic remains of the temple of Jupiter the Olympian, minutely described by Diodorus Siculus. It may literally be said that it has not one stone left upon another; and it is barely possible, with the help of much conjecture, to discover the traces of its plan and dimensions. Diodorus calls it the largest temple in the whole island: but adds, that the calamities of war caused the work to be abandoned before the roof could be put on; and that the Agrigentines were ever after reduced to such a state of poverty and dependence, that they never had it in their power to finish this superb monument of the taste and opulence of their ancestors. The length of this temple was 370 Greek feet, its breadth sixty, and its height 220, exclusive of the foundations or basement story; the extent and solidity of its vaults and underworks were wonderful; its spacious porticoes and exquisite sculpture were suited to the grandeur of the whole. It was not built in the usual style of Sicilian temples with a cella of massive walls and a pterygium, but was designed in a mixed taste with half columns let into the walls on the outside, the inside exhibiting a plain surface.

The next ruin belongs to the temple of Castor and Pollux; vegetation has covered the lower parts of the building, and only a few fragments of columns appear between the vines. This was the point of the hill where the wall stopped on the brink of a large fish-pond spoken of by Diodorus: it was cut in the solid rock thirty feet deep, and water was conveyed to it from the hills. In it was bred a great quantity of fish for the use of public entertainments; swans and various other kinds of wild fowl swam along its surface, for the amusement of the citizens, and the great depth of water prevented an enemy from surprising the town on that side. It is now dry, and used as a garden. On the opposite bank are two tapering columns without their capitals, most happily placed in a tuft of carob trees. Monte Toro, where Hanno encamped with the Carthaginian army, before the Roman consuls drew him into an engagement that ruined his defensive plan, is a noble back ground to this picturesque group of objects.

The whole space comprehended within the walls of the ancient city abounds with traces of antiquity, foundations, brick-arches, and little channels for the conveyance of water; but in no part are any ruins that can be presumed to have belonged to places of public entertainment. This is the more extraordinary, as the Agrigentines were a sensual people, fond of shows and dramatic performances, and the Romans never dwelt in any place long without introducing their savage games. Theatres and amphitheatres seem better calculated than most buildings to resist the outrages of time; and it is surprising that not even the vestiges of their form should remain on the ground.

AGRIMONIA, *f.* [from its abounding (*agris*) in the fields.] In botany, a genus of the dodecandria digynia class, ranking in the natural order of fenticosæ. The generic characters are—Calyx: perianthium one-leaved, five-cleft, acute, small, superior, permanent, fenced with an outer calyx. Corolla: petals five, flat, emarginate; claws narrow, inserted into the calyx. Stamina: filaments capillary, shorter than the corolla, inserted into the calyx; anthers small, twin, compressed. Pistillum: germ inferior; styles simple, the length of the stamens; stigmas obtuse. Pericarpium: none; calyx contracted at the neck, and

and hardened. Seeds: two, roundish.—*Essential Character.* Calyx five-cleft, fenced with another; petals five; seeds two, at the bottom of the calyx.

Species. 1. *Agrimonia eupatoria*, or common agrimony: stem-leaves pinnate, the end-lobe petiolate, fruits hispid. This species is a native of woods, shady places, hedges, and borders of corn-fields, in Great Britain, and most parts of Europe. It is perennial, and flowers in June and July. The root in spring is sweet-scented, and the flowers fresh gathered smell like apricots. Kalm informs us, that the Canadians use an infusion of the root in burning fevers, with great success. Dr. Hill affirms, that an infusion of six ounces of the crown of the root, in a quart of boiling water, sweetened with honey, and half a pint of it drunk three times a day, is an effectual cure for the jaundice. He advises to begin with a vomit, afterwards to keep the bowels soluble, and to continue the medicine so long as any symptoms of the disease remain. The leaves make a pleasant tea, said to be serviceable in hæmorrhages, and in obstructions of the liver and spleen. The country people also use them sometimes by way of cataplasm in contusions and fresh wounds. When this plant is coming into flower, it will dye wool a good bright full Nankeen colour: gathered in September, it yields a darker yellow. It gives a good dye at all times, and, being a common plant easily cultivated, deserves to have trials made of it by the dyers. In the Berlin acts it is recommended for dressing leather. Sheep and goats eat it, but kine, horses, and swine, refuse it.

2. *Agrimonia repens*, or creeping agrimony: stem-leaves pinnate, the end-lobe sessile, fruits hispid. This is of humble growth, seldom rising above two feet high; the pinnae of its leaves are longer and narrower than those of the former, and the spikes of flowers very short and thick. The roots spreading widely, it multiplies faster than the common sort; the seeds also are much larger and rougher. This was sent by M. Tournéfort to the royal garden at Paris; and from hence other botanic gardens have been supplied with it. It much resembles the foregoing, but the stems are shorter, thicker, and hirsute; the stipules are the length of the interstices, are reflected, and almost cover the whole stem. The end-lobe is not pedicelled, and the spike is short, dense, sessile, with bractes the length of the flower.

3. *Agrimonia decumbens*: leaves pinnate hirsute, stem procumbent, fruits every way hispid-hooked. A native of the Cape of Good Hope.

4. *Agrimonia agrimonoides*, or three-leaved agrimony: stem-leaves ternate, fruits smooth. Native of Italy and Carniola, in moist woods, and among bushes.

5. *Agrimonia parviflora*, or small-flowered agrimony: stem-leaves pinnate, leaflets many lanceolate, petals half as long again as the calyx, fruits hispid. Native of North America, and flowers in July.

Propagation and Culture. These are hardy perennial plants, which will thrive in almost any soil or situation, and require no other care than to keep them clear from weeds. They may be propagated by parting their roots, which should be done in autumn, when their leaves begin to decay, that the plants may be well established before the spring. They should not be planted nearer than two feet, that their roots may have room to spread. They may also be propagated by seeds, which should be sown in autumn; for, if they are kept out of the ground till spring, they seldom come up the same season.

AGRIMONIA, *f.* in botany. See *BIDENS* and *TRIUMFETTA*.

AGRIMONOIDES, *f.* in botany. See *AGRIMONIA*.

AGRIMONY (Bastard-Hemp), *f.* in botany. See *AGERATUM*.

AGRIMONY (Hemp), *f.* in botany. See *EUPATORIUM*.

AGRIMONY (Water-Hemp), *f.* in botany. See *BIDENS*.

AGRIONIA, *f.* in Grecian antiquity, festivals annually celebrated by the Bœotians in honour of Bacchus. At

these festivals, the women pretended to search after Bacchus as a fugitive; and, after some time, gave over their enquiry, saying, that he was fled to the Muses, and was concealed among them.

AGRIOPHAGI, *f.* in antiquity, a name given to those who fed on wild beasts. The word is Greek, compounded of *αγριος*, "wild, savage," and *φαγω*, "I eat." The name is given, by ancient writers, to certain people, real or fabulous, said to have fed altogether on lions and panthers. Pliny and Solinus speak of Agriophagi in Ethiopia, and Ptolemy of others in India on this side the Ganges.

AGRIPPA, *f.* in midwifery, a term applied to children brought forth with their feet foremost.

AGRIPPA (Herod), the son of Aristobulus and Mariamne, and grandson to Herod the Great, was born in the year of the world 3997, three years before the birth of our Saviour, and seven years before the vulgar æra. After the death of Aristobulus his father, Josephus informs us, that Herod his grandfather took care of his education; and sent him to Rome to make his court to Tiberius. The emperor conceived a great affection for Agrippa, and placed him near his son Drusus. Agrippa very soon won the graces of Drusus, and of the empress Antonia. But, Drusus dying suddenly, all those who had been much about him were commanded by Tiberius to withdraw from Rome, lest the sight and presence of them should renew his affliction. Agrippa, who had indulged his inclination to liberality, was obliged to leave Rome overwhelmed with debts, and in a very poor condition. He did not think it fit to go to Jerusalem, because he was not able to make a figure there suitable to his birth. He retired, therefore, to the castle of Massada, where he lived rather like a private person than a prince. Herod the Tetrarch, his uncle, who had married Herodias his sister, assisted him for some time with great generosity. He made him principal magistrate of Tiberias, and presented him with a large sum of money: but all this was not sufficient to answer the excessive expences and profusion of Agrippa; so that Herod growing weary of assisting him, and reproaching him with his bad œconomy, Agrippa took a resolution to quit Judea and return to Rome. Upon his arrival, he was received into the good graces of Tiberius, and commanded to attend Tiberius Nero, the son of Drusus. Agrippa, however, having more inclination for Caius the son of Germanicus, and grandson of Antonia, chose rather to attach himself to him; as if he had some prophetic views of the future elevation of Caius, who at that time was beloved by all the world. The great assiduity and agreeable behaviour of Agrippa so far engaged this prince, that he kept him continually about him.

Agrippa being one day overheard by Eutyches, a slave whom he had made free, to express his wishes for Tiberius's death and the advancement of Caius; the slave betrayed him to the emperor; whereupon Agrippa was loaded with fetters, and committed to the custody of an officer. Tiberius soon after dying, and Caius Caligula succeeding him, the new emperor heaped many favours and much wealth upon Agrippa; changed his iron fetters into a chain of gold; set a royal diadem upon his head; and gave him the tetrarchy which Philip, the son of Herod the Great, had been possessed of, that is, Batanea and Trachonitis. To this he added that of Lyfania; and Agrippa returned very soon into Judea to take possession of his new kingdom.

Caius being soon after killed, Agrippa, who was then at Rome, contributed much by his advice to maintain Claudius in possession of the imperial dignity, to which he had been advanced by the army. But in this affair Agrippa acted a part wherein he shewed more cunning and address than sincerity and honesty; for, while he made a show of being in the interest of the senate, he secretly advised Claudius to be resolute, and not to abandon his good fortune. The emperor, as an acknowledgement for his kind offices, gave him all Judea and the kingdom of Chalcis, which

which had been possessed by Herod his brother. Thus Agrippa became on a sudden one of the greatest princes of the east; and was possessed of as much, if not more, territories than what had been held by Herod the Great his grandfather. He returned to Judea, and governed it to the great satisfaction of the Jews. But the desire of pleasing them, and a mistaken zeal for their religion, induced him to commit an unjust action, the memory of which is preserved in Scripture, Acts xii. 1, 2, &c. for about the feast of the passover, in the year of Christ 44, St. James major, the son of Zebedee and brother to St. John the Evangelist, was seized by his order and put to death. He proceeded also to lay hands on St. Peter, and imprisoned him, waiting till the festival was over, that he might have him executed. But, God having miraculously delivered St. Peter from the place of his confinement, the designs of Agrippa were frustrated. After the passover, this prince went from Jerusalem to Cæsarea, and there had games performed in honour of Claudius. Here the inhabitants of Tyre and Sidon waited on him to sue for peace. Agrippa being come early in the morning to the theatre, with a design to give them audience, seated himself on his throne, dressed in a robe of silver tissue, worked in the most admirable manner. The rising sun darted on it with its rays, and gave it such a lustre as the eyes of the spectators could not endure. When therefore the king spoke to the Tyrians and Sidonians, the parasites around him began to say, that it was the voice of a god and not that of a man. Instead of rejecting these impious flatteries, Agrippa received them with an air of complacency; but at the same time observed an owl above him on a cord. He had seen the same bird before when he was in bonds by order of Tiberius; and it was then told him, that he should be soon at liberty: but that, whenever he saw the same thing a second time, he should not live above five days afterwards. He was therefore extremely terrified; and he died at the end of five days, racked with tormenting pains in his bowels, and devoured with worms. Such was the death of Herod Agrippa, after a reign of only seven years.

AGRIPPA II. son of the preceding, was made king of Chalcide; but, about four years after, he was deprived of that kingdom by Claudius, who gave him in the place of it other provinces. In the war Vespasian carried on against the Jews, this prince sent him a succour of 2000 men; by which it appears, that, though a Jew by religion, he was yet entirely devoted to the Romans, whose assistance indeed he wanted, to secure the peace of his own kingdom. He lived to the third year of Trajan, and died at Rome, A. C. 100. He was the seventh and last king of the family of Herod the Great. It was before him, and Berenice his sister, that St. Paul pleaded his cause at Cæsarea.

AGRIPPA (Marcus Vespasianus), son-in-law to Augustus, of mean birth, but one of the most considerable generals among the Romans. Augustus's victory over Pompey and Mark Antony was owing to his counsel. He adorned the city with the pantheon, baths, aqueducts, &c.

AGRIPPA (Henry Cornelius), a man of considerable learning, and a great magician according to report, was born at Cologne, the 14th of September, 1486, of a noble family. He was very early in the service of the emperor Maximilian; acted at first as his secretary; but, being no less soiled for the sword than the pen, he afterwards took to the profession of arms, and served that emperor seven years in Italy, where he distinguished himself in several engagements, and received the honour of knighthood for his gallant behaviour. To his military honours he was desirous likewise to add those of the universities, and accordingly took the degrees of doctor of laws and physic. He was a man of an extensive genius, and well skilled in many parts of knowledge, and a variety of languages. His insatiable curiosity, the freedom of his pen, and the inconstancy of his temper, involved him in many misfortunes: he was continually changing his situation; always engaging himself in some difficulty or other; and,

to complete his troubles, he drew upon himself the hatred of the ecclesiastics by his writings. In order to ingratiate himself into the favour of Margaret of Austria, governess of the Low Countries, he composed a treatise "On the Excellence of Women;" but the persecution he met with from the monks prevented him from publishing it, and obliged him to go over to England, where he wrote a Commentary upon St. Paul's Epistles. Upon his return to Cologne, he read public lectures upon those questions in divinity which are called *Quodlibetales*.

In the year 1515, he read lectures upon Mercurius Trismegistus at Pavia. He left this city the same year, or the year following. By his second book of Letters we find, that his friends endeavoured to procure him some honourable settlement at Grenoble, Geneva, Avignon, or Metz: he chose the last of these places; and in 1518, was employed as syndic, advocate, and counsellor, for that city. The persecutions raised against him by the monks, because he had refuted a vulgar notion about St. Anne's three husbands, and because he protected a countrywoman who was accused of witchcraft, obliged him to leave the city of Metz. Agrippa retired to Cologne in the year 1520, leaving without regret a city which those turbulent inquisitors had rendered averse to all polite literature and real merit. He left his own country in 1521, and went to Geneva: here his income must have been considerable; for he complains of not having enough to defray his expenses to Chamberi, in order to solicit a pension from the duke of Savoy. In this however his hopes were disappointed; and, in 1523, he removed to Fribourg, in Switzerland. The year following he went to Lyons, and obtained a pension from Francis I. He was appointed physician to the king's mother; but this did not turn out so much to his advantage as might be expected, nor did he attend her at her departure from Lyons, in August 1525, when he went to conduct her daughter to the borders of Spain. He was left behind at Lyons, and was obliged to implore the assistance of his friends in order to obtain his salary; and, before he received it, had the mortification of being informed that he was struck off the list. The cause of his disgrace was, that, having received orders from his mistress to examine by the rules of astrology what success would attend the affairs of France, he too freely expressed his dislike that she should employ him in such idle curiosities, instead of things of consequence: at which the lady was highly offended; and became yet more irritated against him, when she understood that his astrological calculations promised new successes to the constable of Bourbon. Agrippa, finding himself thus abandoned, gave way to the utmost rage and impetuosity of temper: he wrote several menacing letters, and threatened to publish some books, wherein he would expose the secret history of those courtiers who had worked his ruin: nay, he proceeded so far as to say, that he would for the future account that prince, to whom he had been counsellor and physician, as a cruel and perfidious Jezebel.

He now resolved to remove to the Low Countries; this he could not do without a passport, which he at length obtained, after many tedious delays, and arrived at Antwerp in July 1528. The duke de Vendome was the principal cause of these delays; for he, instead of signing the passport, tore it in pieces in a passion, protesting he would never sign it for a conjurer. In 1529, Agrippa had invitations from Henry king of England, from the chancellor of the emperor, from an Italian marquis, and from Margaret of Austria, governess of the Low Countries: he preferred the last, and accepted of being historiographer to the emperor, which was offered him by that prince. He published, by way of introduction, the History of the Government of Charles V. Soon after, Margaret of Austria died, and he spoke her funeral oration. His treatise "Of the Vanity of the Sciences," which he published in 1530, greatly enraged his enemies; and that which he soon after printed at Antwerp, "Of the Occult Philosophy," afforded them fresh prettexts for defaming his reputation,

putation. It was lucky for him that cardinal Campejus, the pope's legate, and the cardinal de la Mark, bishop of Liege, spoke in his favour. Their kind offices, however, could not procure him his pension as historiographer, nor prevent him from being thrown into prison at Brussels, in the year 1531. But he soon regained his liberty, and the year following paid a visit to the archbishop of Cologne, to whom he had dedicated his "Occult Philosophy," and from whom he had received a very obliging letter in return. The inquisitors endeavoured to hinder the impression of this work when he was about to print a second edition with emendations and additions; however, notwithstanding all their opposition, he finished it in 1533. He staid at Bonne till 1535; when he returned to Lyons, he was imprisoned for what he had written against the mother of Francis I. but he was soon released from his confinement, at the desire of several persons, and went to Grenoble, where he died the same year. Agrippa was accused of having been a magician and forcerer, and in compact with the devil; but we shall not offer such an affront to the understandings of our readers as to aim at clearing him from this imputation. However, as Mr. Bayle says, if he was a conjurer, his art availed him little, for he was often in danger of wanting bread. Besides the works already mentioned of Agrippa, he wrote also a Commentary upon the Art of Raimund Lull, and a Dissertation on Original Sin, wherein he asserts, that the fall of our first parents was owing to their immodesty and lust. We must not omit mentioning the Key he wrote to his "Occult Philosophy," which he reserved only for his friends of the first rank, and he explained it in a manner not very different from the doctrines of the Quietists. There was an edition of his works, printed at Lyons, 1550, in three volumes, 8vo.

AGRIPPINA, daughter of Germanicus, sister of Caligula, and mother of Nero; a woman of wit, but excessively lewd. She was thrice married, the last time to Claudius her own uncle, whom she poisoned to make way for Nero her son. Nero afterwards caused her to be murdered in her chamber, when she bade the executioner stab her first in the belly that had brought forth such a monster.

AGRIPPINA COLONIA UBIORUM, an ancient city, now Cologne: so called from Agrippina, who had a colony sent thither at her request by the emperor Claudius, to honour the place of her birth. See COLOGNE.

AGRIPPINIANS, in church-history, the followers of Agrippinus bishop of Carthage, in the third century, who first introduced and defended the practice of rebaptization.

AGROM, a disease frequent in Bengal and other parts of the Indies, wherein the tongue chaps and cleaves in several places, being extremely rough withal, and sometimes covered with white spots. The Indians are very fearful of this disease, which they attribute to extreme heat of the stomach. Their remedy is, to drink some chalybeate liquors, or the juice of mint.

AGROSTEMMA, *f.* [*αγρου στεμμα*, the garland of the field.] In botany, a genus of the decandria pentagynia class, ranking in the natural order of caryophyllei. The generic characters are—Calyx: perianth one-leaved, coriaceous, tubulous, five-toothed, permanent. Corolla: petals five; claws the length of the tube of the calyx: border spreading, obtuse. Stamina: filaments awl-shaped, five alternately later than the other five, inserted into each claw of the petals. Antheræ simple. Pistillum: germ ovate. Styles, filiform, erect, the length of the stamens. Stigmas, simple. Pericarpium: capsule oblong-ovate, covered, one-celled, five-valved. Seeds: very many, kidney-shaped, dotted. Receptacles: free, as many as seeds; the interior ones gradually longer.—*Essential Character.* Calyx, one-leaved, coriaceous. Petals, five, clawed; border obtuse, undivided. Capsule, one-celled.

Species. 1. *Agrostemma githago*, corn-campion, or cockle: hirsute, calyx longer than the corolla, petals entire or slightly emarginate, and naked. Cockle is a com-

mon weed in corn-fields, enlivening them at the expence of the careless husbandman, along with poppy and blue-bottle; and flowering in June or July.

2. *Agrostemma coronaria*, or rose-campion: tomentose, leaves ovate-lanceolate, petals slightly emarginate, crowned, ferrate. This species is a native of Italy, the Valais, and Siberia, and is biennial. The single rose-campion has been long an inhabitant of the English gardens, whereby, its seed having scattered, it is become a kind of weed. There are three varieties of this plant, one with deep red, another with flesh-coloured, and a third with white, flowers, but these are of a small esteem; for the double rose-campion, being a fine flower, has turned the others out of most good gardens.

3. *Agrostemma flos jovis*, or umbellate rose-campion: tomentose, petals emarginate, flowers in a corymb. This flowers in July, and the seeds ripen in September. It grows naturally on the Swiss and Piedmontese mountains, and in the Palatinate.

4. *Agrostemma cœli rosa*, or smooth-campion: smooth, leaves linear-lanceolate, petals emarginate, crowned. It is a native of Italy, Sicily, and the Levant; and, being a plant of little beauty, is only preserved in botanic gardens for the sake of variety.

Propagation and Culture. The single rose-campions propagate fast enough by their seeds, and come up better from self-sown seed than when they are sown by hand. The variety with double flowers, never producing any seeds, is propagated by parting the roots; the best time for this is in autumn, after the flowers are past; and, in doing this, every head which can be slipped off with roots should be parted. These must be planted in a border of fresh undunged earth, at the distance of six inches one from the other, observing to water them gently until they have taken root; after which they will require no more, for much wet is very injurious to them; as is also dung. In this border they may remain until spring, when they should be removed into the borders of the flower-garden, where they will be very ornamental during the time of flowering, which is July and August.—The umbellate rose-campion must have a shady situation, and will thrive best in a moist soil.

AGROSTIS, *f.* [*αγρος*, a field.] In botany, a genus of the tryandria digynia class, of the natural order of graminæ or grasses. The generic characters are—Calyx: a one-flowered, bivalve, acuminate glume. Corolla: bivalve, acuminate, one valve larger than the other. Stamina: filaments longer than the corolla, with forked antheræ. Pistillum: germ roundish; styles reflex, villous, with stigmas longitudinally hispid. Pericarpium: corolla growing to the seed, not gaping. Seed: roundish, pointed at both ends, the corolla adhering closely to it.—*Essential Character.* Calyx, bivalve, one-flowered, a little less than the corolla. Stigmas, longitudinally hispid.

Description. It is well observed by Dr. Stokes, that this is an artificial genus; that some of the species have the structure of *Bromus* and others of *Avena*; and, that in general they are very ill ascertained. The absence or presence of the awn in the corolla, which is fixed upon as a primary mark of distinction, is inconstant; and therefore he recommends particular attention to be paid to the open or closed state in which the valves of the calyx are found, immediately after the shedding of the pollen and the ripening of the seed; and also whether the flowers are scattered or clustered. Some of the species are referred by Swartz to *andropogon*; and of others he has formed a new genus under the name of *chloris*.

Species. 1. Awned. 1. *Agrostis spica venti*, or silky bent-grass: the outer petal has a very long stiff awn; the panicle is spreading. In this species the leaves are from a line and half to three lines in breadth. Panicle very large, enormously many-flowered, often nodding, green when young, purple when ripe. Annual, and frequent in sandy corn-fields, flowering from June to August.

2. *Agrostis interrupta*, or interrupted-spike bent-grass: the

the outer petal awned; the panicle attenuated, contracted, interrupted. According to Haller this is a variety of the former. It is a native of France, Italy, Switzerland, Carniola, and Germany. Annual.

3. *Agrostis miliacea*, or millet bent-grass: the outer petal terminating in a straight stiff awn of a moderate length. This resembles the first, but the awn is only the length of the flowers. It is a native of Montpellier, Spain, Siberia.

4. *Agrostis bromoides*, or bromo-like bent-grass: panicle simple, narrowed; corolla pubescent; awn straight, longer than the calyx. It grows wild about Montpellier. Perennial.

5. *Agrostis australis*, or southern bent-grass: the panicle approaching to a spike; the seed ovate, pubescent; awn the length of the calyx. This is a native of Portugal.

6. *Agrostis arundinacea*, or reedy bent-grass: panicle oblong, outer petal villous at the base, and furnished with a writhed awn, longer than the calyx. It grows to the height sometimes of four, but most frequently two, feet; very erect, with two or three knots. The goat will almost die of hunger rather than eat it. The Calmuc Tartars weave mats of it, and thatch their huts with it. It grows in many parts of Europe. Perennial.

7. *Agrostis calamagrostis*, or branching bent-grass: panicle thickened; whole of the outer petal woolly, awned at the tip; culm branching. This resembles the former, and is a native of Germany, Switzerland, and about Verona.

8. *Agrostis serotina*, or late bent-grass: floscules oblong mucronate; culm covered with very short leaves. Observed by Seguier near Verona.

9. *Agrostis rubra*, or red bent-grass: flowering part of the panicle very spreading; outer petal smooth; awn terminal, spiral, recurved. It is common in Sweden and Scotland.

10. *Agrostis spiciformis*, or spiky bent-grass: panicle resembling a spike; flowers two-awned: one awn inserted into the receptacle, jointed and longer than the other, which is straight, and inserted below the tip of the corolla, which is rough. 11. *Agrostis hirsuta*, or hairy bent-grass: panicle approaching to a spike, culm and leaves hirsute, glumes of the corolla awned on the back, and bifid at the tip. Both these were found in the island of Teneriffe by Masson.

12. *Agrostis matrella*: the flowers in racemes, outer valve of the calyx bent in, the tip of the keel only gaping. Grows in the sandy lands of Malabar.

13. *Agrostis canina*, or brown bent-grass: calyx elongate, a recurved awn on the back of the petals; culms prostrate, a little branching.

14. *Agrostis stolonifera*, or creeping bent-grass: branches of the panicle spreading, naked; culm creeping; calyxes equal.

15. *Agrostis capillaris*, or fine bent-grass: panicles capillary, spreading, flexuose; calyxes subulate, equal, smooth, coloured. This is common in pastures and by road sides. Perennial.

16. *Agrostis sylvatica*, or wood bent-grass: panicle contracted; calyxes equal, those of the barren flowers shorter than the corolla, those of the fertile ones twice as long. With us it grows in moist woods, as Bishop's wood, and Hornsey wood near London. Perennial.

17. *Agrostis alba*, or white bent-grass: panicles loose; calyxes equal; culm creeping. Grows in ditches, marshes, and moist meadows. Perennial.

18. *Agrostis pumila*, or dwarf bent-grass: panicle on one side, culms erect in bunches. This is a native of Iceland, Sweden, Germany, and Switzerland; England in dry places; also Wales and Scotland. Perennial.

19. *Agrostis minima*, or least bent-grass: panicle filiform. This is a spring plant; it flowers early, and ripens its seed in May. Mr. Hudson says, it flowers in July. It is a native of France and Germany: discovered by Mr. Stillingfleet in Wales. Annual.

20. *Agrostis tenacissima*, or tough bent-grass: panicle

contracted, filiform: flowers linear, valves parallel. It is a native of the East-Indies. Perennial.

21. *Agrostis virginica*, or Virginian bent-grass: panicle contracted, leaves rolled inwards, subulate, rigid, standing out. It is an elegant little plant; the stalk somewhat compressed, and seldom rising above four or five inches from the root.

22. *Agrostis mexicana*, or Mexican bent-grass: panicle oblong heaped, calyx and corolla acuminate and nearly equal. It is very difficult to determine this species. It flowereth the second year, and has the appearance of CINNA. This is a native of South America. Introduced in 1780, by Mr. Gilbert Alexander.

23. *Agrostis purpurascens*, or purple bent-grass: panicle contracted elongate, branches pressed close upright, florets unequal acuminate. A native of Jamaica.

24. *Agrostis indica*, or Indian bent-grass: panicle contracted, racemes lateral, erect, alternate. This species is a native of India, and was introduced here in 1773, by John Earl of Bute.

25. *Agrostis ciliata*, or ciliate bent-grass: glume of the calyx angular, and ciliate. A native of Japan.

26. *Agrostis panicea*, or bearded bent-grass: branches of the panicle divulged; branches of the panicle appressed; panicle subspiked, branches and branchlets fascicled; valves of the calyx, and one of the corolla, awned; that of the corolla short. Linnaeus, who makes two species of this, allows that his *paniceus* resembles his *montpelienensis* very much, but that the whole plant is soft, and only a palm in height. The first grows in marshes and wet pastures; the second in a dry soil; to which their difference is probably owing.

27. *Agrostis lenta*, or forked bent-grass: spikes subtern, umbellate, floscules awnless, oblong, acute, calyxine valves subequal, leaves and sheaths smooth. Native of the East-Indies. Found there by John Gerrard Koenig, M. D. Introduced in 1778, by Sir Joseph Banks. It flowers in July and August. Annual.

28. *Agrostis complanata*, or flat-stalked bent-grass: spikes unbelled, smooth; outer calyxine valves awned; flattened leaves, and sheaths smooth. It is a native of Jamaica. Found by Mr. Gilbert Alexander. Introduced in 1779. It flowers in July and August. Perennial.

29. *Agrostis pungens*, or prickly bent-grass: panicle contracted, leaves involute stiff pungent; the upper ones obliquely opposite; culm branching. A native of Arabia and Barbary. The Arabs use it in the hæmorrhoids. In dry places off the coast of the county of Nice. Perennial.

30. *Agrostis vinealis*, or short-awned bent-grass: culms ascending; calyx coloured, awn nearly straight, from below the middle of the back, about as long as the calyx. It is a native of Switzerland and the north of England.

31. *Agrostis ovata*, or ovate-panicked bent-grass: outer petal awned below the tip: panicle ovate, contracted, spike-form. This is a native of New Zealand.

32. *Agrostis odorata*, or sweet bent-grass: spikes with the florets pointing one way, heaped together, awnless. A native of Cochin China, near the coast. This grass is esteemed by the Cochin Chinese for the excellence and permanency of its odour; they dry it to perfume their clothes with.

33. *Agrostis plicata*, or plaited-leaved bent-grass: leaves plaited; spike linear awnless. This is a native of the suburbs of Canton.

34. *Agrostis cinna*: panicle contracted awnless, flowers acuminate, with one, two, or three, stamens, leaves flat, scabrous. See CINNA.

35. *Agrostis diandra*: panicle elongate contracted, flowers subulate awnless two-stamened, leaves convolute. Sent by Koenig from the East-Indies, under the name of CINNA.

Propagation and Culture. See GRASS.

AGROSTIS, *f.* in botany. See SCHOENUS, AIRA, MILIUM, MELICA, and CENCHRUS.

AGROSTOGRAPHIA,

AGROSTOGRAPHIA, *f.* signifies the history or description of grasses. See **GRASS**.

AGROUND, *adv.* [from *a* and *ground*.] Stranded; hindered by the ground from passing farther.—With our great ships, we durst not approach the coast, we having been all of us *aground*. *Raleigh*.—It is likewise figuratively used for being hindered in the progress of affairs; as, The negociators were *aground* at that objection.

AGRYPNIA, *f.* among physicians, implies an inaptitude to sleep; a troublesome symptom of feverish and other disorders.

AGRYPNIA, in the Greek church, implies the vigil of any of the greater festivals.

AGUE, *f.* [*aigu*, Fr. acute.] An intermitting fever, with cold fits succeeded by hot. The cold fit is, in popular language, more particularly called the *ague*, and the hot the fever. See **MEDICINE**.

AGUE-CAKE, *f.* the popular name for a hard tumor on the left side of the belly, lower than the false ribs, said to be the effect of intermitting fevers.

AGUED, *adj.* Struck with an *ague*; shivering; chill; cold: a word in little use.

AGUE-FIT, *f.* The paroxysm of the *ague*.

AGUE-PROOF, *adj.* Proof against *agues*; able to resist the causes which produce *agues*, without being affected.

AGUE-TREE, *f.* a name given to the *sassafras*, on account of its febrifuge qualities.

AGUEPERSE, a town of France, situated on the Lyons, about fifteen miles north of Clermont.

AGUILLANEUF, or **AUGILLANEUF**, *f.* [from the French *à*, to, *gui*, misleto, and *l'an neuf*, the new year.] A form of rejoicing used among the ancient Franks on the first day of the year. Its origin is traced from a druid-ceremony: the priests used to go yearly in December, which with them was reputed a sacred month, to gather misleto of the oak in great solemnity. The prophets marched in the front, singing hymns in honour of their deities; after them came a herald with a caduceus in his hand; these were followed by three druids abreast, bearing the things necessary for sacrifice; last of all came the chief or arch druid, accompanied with the train of people. The chief druid, climbing the oak, cut off the misleto with a golden sickle, and the other druids received it in a white cloth; on the first day of the year it was distributed among the people, after having blessed and consecrated it by crying *A gui l'an neuf*, to proclaim the new year. This cry is still continued in Picardy, with the addition of *Plantez, Plantez*, to wish a plentiful year. In Burgundy and some other parts, the children use the same word to beg a new year's gift. Of latter times the name *aguillaneuf* was also given to a sort of begging, practised in some dioceses, for church tapers, on new year's day, by a troop of young people of both sexes. It was attended with various ridiculous ceremonies, which occasioned the synods to suppress it.

AGUILLAR, a town of Spain, in the province of Navarre, about twenty-four miles of Estella.

AGUILLAR DEL CAMPO, a town of Old Castile, with the title of marquise, about fifteen leagues north of the city of Burgos.

AGUILON or **AQUILON** (Francis), was a Jesuit of Brussels, and professor of philosophy at Douai, and of theology at Antwerp. He was one of the first that introduced mathematical studies into Flanders; and he wrote a large work on Optics, which was published in folio, at Antwerp, in 1613; and a Treatise of Projections of the Sphere. He promised also to treat upon Catoptrics and Dioptrics; but this was prevented by his death, which happened at Seville, in the year 1617.

AGUIRRA (Joseph Sænz de), a Benedictine, and one of the most learned men of the seventeenth century. He was censor and secretary of the supreme council of the inquisition in Spain, and interpreter of the scriptures in the university of Salamanca. He printed three volumes

in folio upon Philosophy, a Commentary upon Aristotle's ten books of Ethics, and other pieces. He died at Rome August 19, 1699.

To **AGUISE**, *v. a.* [from *a* and *guise*.] To dress; to adorn; to deck: a word not now in use.

AGUIISH, *adj.* Having the qualities of an *ague*:

So calm, and so serene, but now,
What means this change on Myra's brow?
Her *aguish* love now glows and burns,
Then chills and shakes, and the cold fit returns.

Granville.

AGUISHNESS, *f.* The quality of resembling an *ague*.

AGUL, *f.* in botany, a synonyme of the *hedyfarum*. See **HEDYSARUM**.

AGUR. The xxxth chapter of the Proverbs begins with this title: "The words of Agur, the son of Jakeh;" which, according to the signification of the original terms, may be translated, as the Vulgate has it, *Verba congregantis, filii vomentis*; which translation Le Clerc condemns, supposing these to be proper names, which ought not to be translated. These words are rendered by Louis de Dieu, "The words of him who has recollected himself, the son of obedience." The generality of the fathers and commentators will have it, that Solomon describes himself under the name of Agur the son of Jakeh; others conjecture that Agur, as well as Lemuel (in chap. xxxi. 1.) were wise men who lived in the time of Solomon, and were his interlocutors in the book of Proverbs; an opinion which F. Calmet thinks is without the least show of probability, this book being nothing like a dialogue. This last expositor thinks it probable, that Agur was an inspired author different from Solomon, whose sentences it was thought fit to join with those of this prince, because of the conformity of their matter.

AGURAH, *f.* in Jewish antiquity, the name of a silver coin, otherwise called *gerah* and *kefita*.

AGURIUM, or **AGYRIUM**, anciently a town of Sicily, in the Val di Demona, near the river Semetus. The people were called *Populus Agyrinensis* by Cicero; *Agyrinus* by Pliny. It was the birth-place of Diodorus Siculus, as he himself testifies; but he calls it *Argyrium*, as it is now called S. Philippo d'Argirione, which modern name seems to confirm that *Argyrium* is the true reading.

AGUSADURA, *f.* in ancient customs, a fee due from vassals to their lord for the sharpening their ploughing tackle. Anciently the tenants in some manors were not allowed to have their rural implements sharpened by any but whom the lord appointed; for which an acknowledgment was to be paid, called *agusadura*, in some places *agusage*: which some take to be the same with what was otherwise called *reillage*, from the ancient French *reille*, a ploughshare.

AGUTI, *f.* in zoology, the trivial name of a species of the mouse, belonging to the mammalia glires of Linnæus. See **MUS**.

AGYEI, *f.* in antiquity, a kind of obelisks, sacred to Apollo, erected in the vestibles of houses, by way of security.

AGYNEIA, *f.* [*α*, priv. and *γυν*, a wife.] In botany, a genus of the monoecia monadelphia class, ranking in the natural order of tricocceæ. The generic characters are—Male flowers below the female. Calyx: six-leaved; leaflets oblong, obtuse, equal, permanent. Corolla: none. In the male, instead of filaments, a column shorter than the calyx; three or four antheræ, oblong, growing to the column below the top. In the female flowers, germ of the size of the calyx, subovate, obtuse, perforated at top with a six-notched hole; neither style nor stigma. Pericarpium: supposed to be a tricocceous capsule.—*Essential Character.* Calyx six-leaved; corolla none. Male. Antheræ three, growing to the rudiment of a style. Female. Germ perforated at top: without style or stigma.—It is very distinct in the want of a style or stigma.

Species.

Species. 1. *Agyncia* impubes: leaves smooth on both sides. 2. *Agynia pubera*: leaves downy underneath. Both are natives of China.

AGYNIANI, *f.* [*α, priv.* and *γυν, woman.*] In church-history, a sect who condemned all use of flesh, and marriage, as not instituted by God, but introduced at the instigation of the devil. They are sometimes called *Agyni*, and *Agynenses*; and are said to have appeared about the year 694. It is no wonder they were of no long continuance. Their tenets coincide in a great measure with those of the Abellians, Gnostics, Cerdonians, and other preachers of chastity and abstinence.

AGYRTÆ, *f.* [*αγυρται, Gr.* formed of the verb *αγυρω*, I congregate; alluding to the practice of the charlatans, who gather a crowd about them.] In antiquity, a kind of impostors who ran about the country telling fortunes, and pretending to cure diseases by charms, sacrifices, and other religious mysteries; also to expiate the crimes of their deceased ancestors, by virtue of certain odours and fumigations; or to torment their enemies, by the use of magical verses and the like. Among the Greeks, they amount to the same with *Æruscatores* among the Latins, and differ not much from *Gypsies* among us.

AH, *interj.* A word noting sometimes dislike and censure. Sometimes contempt and exultation. Sometimes, and most frequently, compassion and complaint:

Ah me! the blooming pride of May
And that of beauty are but one:

At morn both flourish bright and gay,
Both fade at evening, pale and gone.

Prior.

When it is followed by *that*, it expresses vehement desire:

In goodness, as in greatness, they excel;

Ah! that we lov'd ourselves but half so well. *Dryden.*

- **AHA! AHA!** *interj.* A word intimating triumph and contempt.—They opened their mouths wide against me, and said, *Aha! aha!* our eye hath seen it. *Psal. xxxv. 21.*

AHAB, son of Omri king of Israel, succeeded his father, and surpassed all his predecessors in impiety and wickedness. He married Jezebel the daughter of Ethbaal king of the Zidonians, who introduced the idols of Baal and Astarte among the Israelites, and engaged Ahab in the worship of these false deities. God, being provoked by the sins of Ahab, sent the prophet Elijah to him (1 Kings, xvii. 1, &c.) who declared to him, that there would be a famine of three years continuance. The dearth having lasted three years, the prophet desired Ahab to gather all the people to mount Carmel, and with them the prophets of Baal: when they were thus assembled, Elijah caused fire to descend from heaven upon his sacrifice, after which he obtained of God that it should rain; and then the earth recovered its former fertility. Six years after this, Ben-hadad king of Syria laid siege to Jerusalem. But God, provoked at this proud Syrian, sent a prophet to Ahab, not only to assure him of victory, but to instruct him likewise in what manner he was to obtain it. Ahab was ordered to review the princes of the provinces, which he found to be a choice company consisting of 232 young men, who were to command the people in Samaria, amounting to about 7000 men: with this small army Ahab was directed to fall upon the great host of the Syrians at noon-day, while Ben-hadad and the thirty-two kings that accompanied him were drinking and making merry. Ben-hadad, having notice that they were marching out of the city, ordered them to be brought before him alive, whatever their designs were: but the young men, followed by this small army, advanced; and, killing all that opposed them, such a panic seized the Syrian troops, that they began to fly; and even Ben-hadad himself mounted his horse and fled with his cavalry; which Ahab perceiving, pursued them, killed great numbers of them, and took a considerable booty. After this the prophet came to Ahab, to animate him with fresh courage, and to caution him to keep upon his guard; assuring him that Ben-hadad would

return against him the year following. According to this prediction, at the end of the year he returned and encamped at Aphek, with a resolution to give the Israelites battle. Both armies being ranged in order of battle for seven days successively, at length, upon the seventh day, a battle ensued, wherein the Israelites killed 100,000 of the Syrians, and the rest fled to Aphek; but, as they were pressing to get into the city, the walls of Aphek fell upon them and killed 27,000 more. Ben-hadad throwing himself upon the mercy of Ahab, this prince received him into his own chariot, and made an alliance with him. The year following, Ahab desiring to make a kitchen-garden near his palace, requested of Naboth, a citizen of Jezreel, that he would sell him his vineyard, because it lay convenient for him. But, being refused, he returned in great discontentment to his house, threw himself upon the bed, turned towards the wall, and would eat nothing. Jezebel his wife, coming in, asked the reason of his great concern; of which being informed, she procured the death of Naboth, and Ahab took possession of his vineyard. As he returned from Jezreel to Samaria, the prophet Elijah met him, and said, "Hast thou killed, and also taken possession? Now saith the Lord, In the place where dogs licked up the blood of Naboth, shall dogs lick thy blood, even thine. As for Jezebel, of her the Lord spake, saying, The dogs shall eat Jezebel by the way of Jezreel." These prophecies were literally fulfilled upon both.

AHÆTULA, *f.* the trivial name of a species of the coluber. See **COLUBER**.

AHASUERUS, or **ARTAXERXES**, the husband of Esther; and, according to archbishop Usher and F. Calmet, the scripture name for Darius, the son of Hystaspes, king of Persia; though Scaliger will have Xerxes to be the husband of Esther, or the Ahasuerus of scripture; and Dr. Prideaux believes him to be Artaxerxes Longimanus. See **HISTORY OF PERSIA**.

AHAZ, king of Judah, the son of Jotham, remarkable for his vices and impieties. One of his sons he consecrated, by making him pass through and perish by the fire, in honour of the false god Moloch; and he offered sacrifices and incense upon the high places, upon hills, and in groves. Rezin king of Syria, and Pekah king of Israel, invaded Judea in the beginning of the reign of Ahaz; and, having defeated his army, laid siege to Jerusalem. When they found that they could not make themselves masters of that city, they divided their army, plundered the country, and made the inhabitants prisoners of war. Rezin and his part of the confederate army marched with all their spoil to Damascus; but Pekah with his division of the army having attacked Ahaz, killed 120,000 men of his army in one battle, and carried away men, women, and children, without distinction, to the number of 200,000. But, as they were carrying those captives to Samaria, the prophet Oded, with the principal inhabitants of the city, came out to meet them; and by their remonstrances prevailed with them to set their prisoners at liberty. At the same time the Philistines and Edomites invaded other parts of his land, killed multitudes of the people, and carried off much booty. In this distressed condition, Ahaz, finding no other remedy for his affairs, sent ambassadors to Tiglath-pileser king of the Assyrians; and, to engage him in his interest, he stripped the temple and city of all the gold which he could meet with, and sent it as a present. Accordingly Tiglath-pileser marched to the assistance of Ahaz, attacked Rezin and killed him, took his capital Damascus, destroyed it, and removed the inhabitants thereof to Cyrene.

AHAZIAH, the son and successor of Ahab king of Israel, reigned two years, part of the time alone, and part with his father Ahab, who ordained him his associate in the kingdom a year before his death. Ahaziah imitated his father's impieties, (1 Kings xxii. 52.) and paid his adoration to Baal and Astarte, the worship of whom had been introduced in Israel by Jezebel his mother.

AHAZIAH,

AHAZIAH, king of Judah, the son of Jehoram and Athaliah, succeeded his father in the kingdom of Judah in the year of the world 3119. He walked in the ways of Ahab's house, to which he was allied, his mother being of that family. He reigned only one year, being slain by Jehu the son of Nimshi.

AHEAD, *adv.* [from *a* and *head*.] Farther onward than another. Headlong; precipitantly: used of animals, and figuratively of men.—It is mightily the fault of parents, guardians, tutors, and governors, that so many men miscarry. They suffer them at first to run *ahead*, and, when perverse inclinations are advanced into habits, there is no dealing with them. *L'Esfrange*.

AHEAD, in sea-language, signifies further onward than the ship, or at any distance before her, lying immediately on that point of the compass to which her stem is directed. It is used in opposition to *astern*, which expresses the situation of any object behind the ship.

AHEIGHT, *adv.* [from *a* and *height*.] Aloft; on high: —From the dread summit of this chalky bourn!
Look up *aheight*, the shrill-gorg'd lark so far
Cannot be seen or heard. *Shakespeare*.

AHICCYATLI, *f.* in zoology, the Indian name of a serpent resembling the rattlesnake, only it wants the rattles. It is as fatal in the effect of its poison as any known species of serpent.

AHIJAH, the prophet of Shilo. He is thought to be the person who spoke twice to Solomon from God, once while he was building the temple, 1 Kings vi. 11. at which time he promised him his protection; and at another time after his falling into all his irregularities, when God expressed his indignation with great threatenings and reproaches. Ahijah was one of those who wrote the annals or history of this prince, 2 Chron. ix. 29. The same prophet declared to Jeroboam that he would usurp the kingdom, 1 Kings xi. 29, &c. and that two heifers should alienate him from the Lord, meaning the golden calves erected by Jeroboam, one at Dan, the other at Bethel. About the end of Jeroboam's reign, toward the year of the world 3046, Abijah the son of that prince fell sick; upon which Jeroboam sent his wife to this prophet to enquire what would become of the child. The queen therefore went to Ahijah's house in Shilo, disguised; but the prophet, on hearing the sound of her feet, said, "Come in, thou wife of Jeroboam; why feignest thou thyself to be another? for I am sent to thee with heavy tidings." Then he commanded her to go and tell Jeroboam all the evil that the Lord had declared he would bring upon his house for his impieties; that so soon as she should enter into the city her son Abijah should die, and should be the only one of Jeroboam's house that should receive the honours of a burial.

AHITOPHEL, a native of Gillo, was for some time the counsellor of king David, whom he deserted, by joining in the rebellion of Abshalom. This prince, upon his assuming the crown of Israel, sent for Ahitophel from Gillo, to assist him with his advice; for at that time Ahitophel's counsels were considered as the oracles of God. Nothing gave David more uneasiness than this event; and when Hushai his friend came to wait on him and attend him in his flight, he intreated him to return rather to Jerusalem, and endeavour to frustrate the measures which should be proposed by Ahitophel. When Abshalom was come to Jerusalem, he desired Ahitophel to deliberate with his other counsellors upon the measures which were proper for him to take. Ahitophel advised him in the first place to abuse his father's concubines; so that, when his party should understand that he had dishonoured his father in this manner, they might conclude that there were no hopes of a reconciliation, and therefore espouse his interest more resolutely. A tent, therefore, being prepared for this purpose upon the terrace of the king's palace, Abshalom, in the sight of all Israel, lay with his father's concubines. The next thing Ahitophel proposed was in the terms follow-

ing: "Let me now choose out 12,000 men, and I will arise and pursue after David this night, and I will come upon him while he is weary and weak-handed, and I will make him afraid, and all the people that are with him shall flee, and I will smite the king only; and I will bring back all the people unto thee; the man whom thou seekest is as if all returned; so all the people shall be in peace." This advice was very agreeable to Abshalom. However, Abshalom desired Hushai to be called, to give his opinion. Hushai being come, and hearing what advice Ahitophel had given, said, "The counsel which Ahitophel has given is not good at this time; what, for the present, in my opinion, may do better, is this: Let all Israel be gathered unto thee, from Dan even to Beer-sheba, as the sand that is by the sea for multitude, and put thyself in the midst of them; that wherever David is, we may fall upon him, and overwhelm him with our numbers, as the dew falleth upon the ground." This last advice, being more agreeable to Abshalom, was preferred; upon which Ahitophel saddled his ass, went to his house at Gillo, hanged himself, and was buried in the sepulchre of his fathers.

AHMELLA, *f.* in botany. See **BIDENS**.

AHOLIBAH and **AHOLAH**, are two feigned names made use of by Ezekiel, xxiii. 4. to denote the two kingdoms of Judah and Samaria. Aholah and Aholibah are represented as two sisters of Egyptian extraction. Aholah stands for Samaria, and Aholibah for Jerusalem. The first signifies a *tent*; and the second, *my tent is in her*. They both prostituted themselves to the Egyptians and Assyrians, in imitating their abominations and idolatries; for which reason they were abandoned to those very people for whom they had shewn so passionate and so impure an affection; they were carried into captivity, and reduced to the severest servitude.

AHOUAL, *f.* in botany, the trivial name of a species of the **CERBERA**.

A-HULL, *adv.* in sea-language, the situation of a ship when all her sails are furled on account of the violence of the storm, and when, having lashed her helm on the lee-side, she lies nearly with her side to the wind and sea, her head being somewhat inclined to the direction of the wind.

AHUN, a town in France, in the Upper Marche and generality of Moulins, and is a royal jurisdiction. It is seated on the river Creuse, eight miles south-east of Gueret, thirty north-east of Lomages, and thirty-five south-east of Moulins. Lat. 49. 5. N. lon. 2. 8. E.

AHUYS, a town of Sweden. It is small, but very strong by its situation, and has a good port. It is in the principality of Gothland, in the territory of Bleckingy, near the Baltic Sea, about eighteen miles from Christianstad. Lat. 56. 20. N. lon. 14. 10. E.

AI, anciently a town in Judea, to the north of Jericho, called *Ainæ* by Josephus, and the inhabitants *Ainataæ*. Joshua having sent a detachment of 3000 men against Ai, God permitted them to be repulsed on account of Achan's sin, who had violated the anathema pronounced against the city of Jericho. But after the expiation of this offence, God commanded Joshua to march with the whole army of the Israelites against Ai, and treat this city and the kingdom thereof as he had treated Jericho, with this difference, that he gave the plunder of the town to the people. Joshua sent by night 30,000 men to lie in ambush behind Ai; having first well instructed those who had the command of them in what they were to do; and the next day, early in the morning, he marched against the city with the remainder of his army. The king of Ai, perceiving them, sallied hastily out of the town with all his people, and fell upon the forces of the Israelites, who upon the first onset fled, as if they had been under some great terror. As soon as Joshua saw the enemy all out of the gates, he raised his shield upon the top of a pike, which was the signal given to the ambuscade; whereupon they immediately entered the place, which they found without defence, and set fire to it. The people of Ai, perceiving the smoke ascending, were willing to return, but discovered

those who had set fire to the city in their rear, while Joshua and those who were with him, turning about, fell upon them, and cut them in pieces. The king was taken alive, and afterwards put to death.

AJALON, a town of the tribe of Dan, one of the Levitical. Another in the tribe of Benjamin, in whose valley Joshua commanded the moon to stand still, being then in her decrease, and consequently to be seen at the same time with the sun.

AJAN, a coast and country of Africa, has the river Quilmanci on the south; the mountains from which that river springs, on the west; Abyssinia or Ethiopia, and the Strait of Babelmandel, on the north; and the Eastern or Indian Ocean, on the east. The coast abounds with all necessaries of life, and has plenty of very good horses. The kings of Ajan are often at war with the emperor of the Abyssinians; and all the prisoners they take they sell to the merchants of Cambaya, those of Aden, and other Arabs, who come to trade in their harbours, and give them in exchange, coloured cloths, glass-beads, raisins, and dates; for which they also take back, besides slaves, gold and ivory. The whole sea-coast, from Zanguebar to the Strait of Babelmandel, is called the coast of Ajan; and a considerable part of it is styled the Desert-coast.

AJAX, the son of Oileus, was one of the principal generals that went to the siege of Troy. He ravished Cassandra, the daughter of Priam, even in the temple of Minerva, where she thought to have found sanctuary. It is said, he made a serpent of fifteen feet long so familiar with him, that it ate at his table, and followed him like a dog. The Locrians had a singular veneration for his memory.

AJAX, the son of Telamon, was, next to Achilles, the most valiant general among the Greeks at the siege of Troy. He commanded the troops of Salamis, and performed many great actions, of which we have an account in the *Iliad*, in *Diclys Cretensis*, and in the twenty-third book of Ovid's *Metamorphoses*. He was so enraged that the arms of Achilles were adjudged to Ulysses, that he immediately became mad. The Greeks paid great honours to him after his death, and erected a magnificent monument to his memory upon the promontory of Rhe-tium.

AJAX, *f.* in antiquity, a furious kind of dance, in use among the Grecians; intended to represent the madness of that hero after his defeat by Ulysses, to whom the Greeks had given the preference in his contest for Achilles's arms. Lucian, in his *Treatise of Dancing*, speaks of dancing the *ajax*. There was also an annual feast called *ajantia*, *ajantia*, consecrated to that prince, and observed with great solemnity in the island of Salamis, as well as in Attica; where, in memory of the valour of Ajax, a bier was exposed, set out with a complete set of armour.

AJAZZO, a sea-port town of the island of Corfica, in the Mediterranean, with a bishop's see. Lat. 41. 40. lon. 26. 35.

AJAZZO, a sea-port town of Natolia, in the province of Caranania, anciently Silesia, seated on the coast of the Mediterranean, thirty miles north of Antioch, and fifty west of Aleppo, where the city of Illus anciently stood, and near which Alexander fought his second battle with Darius. Lat. 37. 0. lon. 33. 10.

AICHSTAT, a town of Germany, in Franconia, and capital of a bishopric of the same name. It is remarkable for a curious and highly-valuable piece of workmanship, called the Sun of the Holy Sacrament, which is in the church. It is of massy gold, of great weight, and is enriched with 350 diamonds, 1400 pearls, 250 rubies, and other precious stones. This place is moderately large, and seated in a valley on the river Altmul, ten miles north of Newburgh, and thirty-seven south of Nuremberg. Lat. 49. 0. N. lon. 11. 10. E. The bishopric is forty-five miles in length and seventeen in breadth; and the bishop is chancellor of the church of Mayence or Mentz.

AICUROS, *f.* a species of parrot. See **PSITTACUS**.

To AID, *v. a.* [*aider*, Fr. from *adjutare*, Lat.] To help; to support; to succour:

By the loud trumpet, which our courage *aids*,
We learn that sound as well as sense persuades.

Roscommon.

AID, *f.* Help; support. The person that gives help or support; a helper; auxiliary.—Thou hast said, It is not good that man should be alone; let us make unto him an *aid*,—like unto himself. *Tobit*, viii. 6.

AIDAB, a town on the confines of Abassia, in Africa, opposite to Giiodda; from hence great numbers of Africans take shipping to visit Mecca.

AIDAN, king of Scotland. His father Goran was murdered by conspirators, in the year 535, at which time this prince was very young. Eugenius, nephew to the last king, succeeded to the throne. The queen dowager took the first opportunity of quitting the kingdom, and retiring, with her two sons, Reginans and Aidan, into Ireland; the latter being then about seven years of age. They were very kindly received by Tauthalius the reigning king; and the queen, and her eldest son, died there. Aidan continued there forty-eight years, great part of which time Eugenius reigned; and after him his brother Congallus, who, being conscious of the wrong done to the right heir of the crown, ordered Aidan to be brought home, which was undertaken and performed by the celebrated St. Columb. But, on their arrival in Scotland, they were informed the king was dead, and that his brother Kennatillus was by the Scots put in possession of the throne. After the burial of the deceased prince, Columb went to court with Aidan; and, to the surprise of all people, was received by the new king with much kindness and respect, he telling Aidan, he should assist him in governing the kingdom, which would become his very shortly, to whom of right it pertained. The king, being old and infirm, died soon after, and was succeeded by Aidan, according to Boetius, in the year 578. Aidan went into Galloway, immediately after his coronation, and suppressed certain robbers who had infested that country, and committed great outrages in it; and he instituted annual assizes there, at Lochaber, and Caithness. But some of the young nobility, quarrelling at a hunting match, suddenly interrupted these works of peace. This affray, ending in bloodshed, caused several of them to retire into the dominions of the British king. Aidan, in virtue of a treaty with this prince, often demanded them, and was constantly refused. Incensed at this treatment, he entered his country, took a great number of prisoners, and carried off a quantity of cattle. Brudeus, resenting this, made an attack upon Galloway, and did much mischief. At length a general engagement ensued: the Picts were routed with great slaughter; the Scots lost a number of men, and amongst them Arthur the king's son. St. Columb, hearing of this war, came to the king, and charged him with shewing too much willingness to shed blood; this made so strong an impression on the mind of the prince, that he would not suffer this excellent man to depart till he undertook to negotiate a peace, which he executed with great success. But, some fresh disturbances arising, a pitched battle ensued; and the Saxons and Picts, after an obstinate engagement, were totally routed. He reigned quietly after this for about eleven years, when Ethelfrid prevailed on the Picts to renew the war. Aidan, though very old, marched to the place where he expected the British army to have joined him; but his allies failing, gave his enemies such an advantage over him, that they cut to pieces the chief of his forces; the king himself had a narrow escape. The fall of Theobald, the king's brother, proves this to have been a hard-fought battle: the consequences of which, and the news of the death of St. Columb, hastened the end of the good old king, and brought him to the grave in the year 606, at the age of seventy-eight. He reigned thirty-two years.

AIDAN,

AIDAN, in the seventh century, was bishop of Lindisfarne, or Holy Island, and was originally a monk in the monastery of Hii, or Jona, one of the islands of the Hebrides. At the request of Oswald, king of Northumberland, he came into England in the year 634, and undertook to instruct that prince's subjects in the knowledge of the Christian religion. Oswald was slain in battle, and Aidan continued to govern the church of Northumberland, under his successors, Oswin and Oswi, till Oswin was treacherously murdered, and Aidan survived him but twelve days; he fat sixteen years, and died in August, 651.

AIDANCE, *f.* Help; support: a word little used.

AIDANT, *adj.* [*aidant*, Fr.] Helping; helpful: not in use.

AID-DE-CAMP, *f.* in military affairs, an officer employed to receive and carry the orders of a general.

AIDER, *f.* He that brings aid or help; a helper; an ally.

AIDLESS, *adj.* [from *aid* and *less*, an inseparable particle.] Helpless; unsupported; undefended.

AID-PRAYER, *f.* in law, is a word made use of in pleading, for a petition in court to call in help from another person that hath an interest in the thing contested. As tenant for life, being impleaded, may pray in aid him in the reversion; that is, desire the court that he may be called by writ, to allege what he thinks proper for maintenance of the right of the person calling him, and of his own. *F. N. B.*

AIDS, *f.* in law, were originally mere benevolences, granted by the tenant to his lord, in times of difficulty and distress; but in process of time they grew to be considered as a matter of right, and not of discretion. These aids were principally three:—1. To ransom the lord's person, if taken prisoner. 2. To make the lord's eldest son a knight. 3. To marry the lord's eldest daughter, by giving a suitable portion. The aids for making the eldest son a knight, and for marrying the eldest daughter, were fixed by act of parliament at 20s. being the supposed twentieth part of every knight's fee. The aid for ransoming the lord's person was in its nature uncertain and incapable of being ascertained. 2 *Blackst.* 64.

AIDS, in the manege, are the same with what some writers call *cherishings*, and used to avoid the necessity of corrections. The inner heel, inner leg, inner rein, &c. are called *inner aids*; as the outer heel, outer leg, outer rein, &c. are called *outer aids*.

AIGHENDALE, *f.* the name of a liquid measure used in Lancashire, containing seven quarts.

AIGLE, a bailiwick in the territory of Romand, in Switzerland, consists of mountains and valleys, the principal of which are the Aigle and Bex. Through these is the great road from Vallais into Italy. When we pass by Villeneuve, which is at the head of the lake of Geneva, we enter into a deep valley three miles wide, bordered on one side with the Alps of Switzerland, and on the other with those of Savoy, crossed by the river Rhone. Six miles from thence we meet with Aigle, a large town, seated on a wide part of the valley, where are vineyards, fields, and meadows. The governor's castle is on an eminence that overlooks the town, and has a lofty marble tower. This government has nine large parishes; and is divided into four parts, Aigle, Bex, Olon, and Ormont. This last is among the mountains, and joins to Rougemont. It is a double valley, abounding in pasture-lands. Ivorna, in the district of Aigle, was in part buried by the fall of a mountain, occasioned by an earthquake, in 1584.

AIGLE, a small town, in France, in Upper Normandy, twenty-three miles from d'Evereux, and thirty-eight from Rouen. It is surrounded with walls and ditches, has six gates, three suburbs, and three parishes. It trades in corn, toys, and more particularly in needles and pins. Lat. 48.35. N. lon. 1.5. E.

AIGUESCAUDES, a place in the department of the Lower Pyrenees, remarkable for a warm spring, the waters of which are oily, saponaceous, and spirituous; they

have a foetid smell, and are used both outwardly and inwardly.

AIGUEMORTES, a town in the department of the Mouths of the Rhone. It formerly stood near the sea, and had a harbour; but this is choked up, and the sea has retired two French leagues from the town, leaving it in a morass. Lat. 43.34. N. lon. 4.3. E.

AIGUILLON, a small town of France, in the province of Guienne, situated at the conflux of the rivers Garonne and Lot.

AIGUISCE, in heraldry, denotes a cross with its four ends sharpened, but so as to terminate in obtuse angles. It differs from the cross fitchee, in as much as the latter tapers by degrees to a point, and the former only at the ends.

AIGULET, *f.* [*aigulet*, Fr.] A point with tags; points of gold at the end of fringes.

TO AIL, *v. a.* [*eglan*, Sax. to be troublesome.] To pain; to trouble; to give pain.—And the angel of God called to Hagar out of heaven, and said unto her, What *aieth* thee, Hagar? fear not: for God hath heard the voice of the lad where he is. *Gen.* xxi. 17.—It is used in a sense less determinate for to affect in any manner; as, Something *ails* me that I cannot sit still; What *ails* the man that he laughs without reason? To feel pain; to be incommoded. It is remarkable, that this word is never used but with some indefinite term, or the word *nothing*; as, *What ails him? What does he ail? He ails something; he ails nothing. Something ails him; nothing ails him.* Thus we never say, A fever *ails* him, or He *ails* a fever, or use definite terms with this verb.

AIL, *f.* A disease.

AILAH, thought to be the Elath mentioned in Scripture, a small town of Arabia Petraea, on one of the north bays of the Red Sea, near the road which the pilgrims take from Egypt to Mecca.

AILANTHUS, *f.* [from the Amboina name *Aylanto*, which signifies the tree of heaven; so called from its lofty growth.] In botany, a genus of the polygamia monoeica class, but placed by Schreber in the dioecia decandria class. The generic characters are—I. Male. Calyx: perianthium one-leaved, five-parted, very small. Corolla: petals five, lanceolate, acute, convolute at the base, spreading. Stamina: filaments ten, compressed, the length of the corolla; antheræ oblong, versatile. II. Female. Calyx: as in the male, permanent. Corolla: as in the male. Pistillum: germs 3—5, curved inwards; styles lateral; stigmas capitate. Pericarpium: capsules as many as there are germs, compressed, membranaceous, fabre-shaped, acute, on one of the edges emarginate. Seeds: solitary, lens-shaped, bony, close to the emarginature. III. Hermaphrodite. Calyx: as in the male and female. Corolla: as in the male. Stamina: filaments two or three, as in the male. Pistillum, pericarpium, and seed, as in the female.—*Essential Character.* Male. Calyx five-parted; corolla five-petalled; stamina ten. Female. Calyx and corolla as in the male; germs 3—5; styles lateral; pericarpium membranaceous, one-seeded. Hermaphrodite. Calyx and corolla as in the male; stamina 2—3.

There is but one species, which is called *ailanthus glandulosa*, or tall *ailanthus*. This tree rises with a straight trunk to the height of forty or fifty feet; the bark is grey, slightly furrowed, and has white marks on it; the young twigs are covered with a fine velvet down. Leaves large, smooth, alternate, unequally pinnate, disposed horizontally. Flowers very numerous; they exhale a disagreeable odour. The *ailanthus* grows very fast in our climate; and, being a handsome tree rising to a considerable height, is proper for ornamental plantations. The wood is hard, heavy, glossy like fatten, and susceptible of a very fine polish. Before the fructification was known, this tree passed for a species of *rhus*; and it is memorable among us for the dispute it occasioned between Mr. Ellis and Mr. Miller, which is recorded in the Philosophical Transactions. The latter contended that this tree was the *fast-no-ki*, or spurious

spurious varnish-tree of the Japanese: but it is clear that he was mistaken; for the leaves of that tree are entire, and have none of those singular glands which are found in this; nor does the aïlanthus yield any juice. It is a native of China; and was first raised in England by Mr. Miller and Philip Carteret Webb, Esq. about the year 1751, from seeds sent over by Father d'Incarville. With us it has hitherto produced only male flowers; at Paris and Leyden it has borne female flowers and fruit, but the fruit has not ripened. Some years it bears only male flowers; but about twice in ten years it has both male and female flowers, in France.

AILE, *f.* [of the French *aïeul*, *avus*, a grandfather.] In law, is a writ that lies, where a man's grandfather, or great grandfather (called *besafle*), being seized of lands and tenements in fee-simple on the day that he died, a stranger abateth or entereth the same day, and dispossesses the heir of his inheritance. *F. N. B.*

AILING, *part. adj.* Sickly; full of complaints.

AILMENT, *f.* Pain; disease.

AILMER, or **ÆTHELMARE**, earl of Cornwall and Devonshire, in the reign of king Edgar. It is not known of what family he was. His authority and riches were great, and so also was his piety. He founded the abbey of Cerne, in Dorsetshire; and had so great a veneration for Eadwald, the brother of St. Edmund the Martyr, who had lived a hermit in that country, near the Silver Well, as they called it, that, with the assistance of archbishop Dunstan, he translated his relics to the old church of Cerne.

AILRED, or **EELRED**, abbot of Revesby in Lincolnshire, in the reigns of Stephen and Henry II. He was born in 1109, of a noble family, and educated in Scotland with Henry the son of king David. On his return to England, he became a monk of the Cistercian order, in the monastery of Revesby, of which he afterwards was made abbot. He died on the 12th of January 1166, aged 57, and was buried in his monastery. "He was (says Leland) in great esteem during his life; celebrated for the miracles wrought after his death; and admitted into the catalogue of saints." His principal work is the *Speculum Charitatis*. Leland, Bale, and Pits, mention several manuscripts of his writing, which never were published.

AILSA, an insulated rock on the western coast of Scotland, between the shores of Airshire and Cantire. It is two miles in circumference at the base, is accessible only at one place, and rises to a great height in a pyramidal form. A few goats and rabbits subsist among the short grafs and furze; but the importance of the rock consists in the great variety and boundless numbers of birds, by which it is frequented, particularly the gannets or solan-geese, whose young are used at the best tables, and bring a good price. Other birds are caught for their feathers. The depth of water around the base is from seven to forty-eight fathoms. It is surrounded with excellent banks, well stocked with cod and other white fish.

To AIM, *v. n.* [It is derived by Skinner from *esmer*, to point at.] To endeavour to strike with a missile weapon; to direct towards; with the particle *at*:

Aim'st thou at princes, all amaz'd they said. *Pope.*

To point the view, or direct the steps towards any thing; to tend towards; to endeavour to reach or obtain: with *to* formerly, now only with *at*.—Religion tends to the ease and pleasure, the peace and tranquillity, of our minds, which all the wisdom of the world did always *aim at*, as the utmost felicity of this life. *Tillotson.*

To AIM, *v. a.* To direct the missile weapon; more particularly taken for the act of pointing the weapon by the eye, before its dismissal from the hand.

AIM, *f.* The direction of a missile weapon. The point to which the thing thrown is directed. In a figurative sense, a purpose; a scheme; an intention; a design:

But see how oft ambitious *aims* are crost,
And chiefs contend till all the prize is lost. *Pope.*

The object of a design; the thing after which any one endeavours. Conjecture; guess.

There is a history in all men's lives,
Figuring the nature of the times deceas'd;
The which observ'd, a man may prophesy,
With a near *aim*, of the main chance of things. *Shakespeare.*

AINSWORTH (Dr. Henry), an eminent nonconformist divine, who, about the year 1590, distinguished himself among the Brownists; which drew upon him such troubles, that he was obliged to retire to Holland, and became minister of a church at Amsterdam. His skill in the Hebrew language, and his excellent Annotations on the Holy Scriptures, which are still highly esteemed, gained him great reputation. His learned productions were esteemed even by his adversaries, who, while they refuted his extravagant tenets, yet paid a proper deference to his abilities. But nothing could have effect upon him, or make him return home: so he died in exile. His death was sudden, and not without suspicion of violence: for it is reported, that, having found a diamond of great value, he advertised it; and when the owner, who was a Jew, came to demand it, he offered him any gratuity he would desire. Ainsworth, though poor, requested only of the Jew, that he would procure him a conference with some of his rabbis upon the prophecies of the Old Testament relating to the Messiah, which the Jew promised; but, not having interest to obtain such a conference, it was thought that he contrived to get Ainsworth poisoned. He was undoubtedly a person of profound learning, and deeply read in the works of the rabbis. He had a strong understanding, quick penetration, and wonderful diligence. He published occasionally several treatises, many of which made a great noise in the world.

AINSWORTH (Robert), born at Woodyale in Lancashire in 1660, was master of a boarding-school at Bethnal-green, from whence he removed to Hackney, near London. After acquiring a moderate fortune, he retired, and lived privately till the time of his death, which happened in 1743. We are indebted to him for the best Latin and English Dictionary extant: he published it in quarto, 1736; and in 1752, the fourth edition, under the care of Dr. Ward of Gresham college, and the Rev. William Younge, was enlarged to two vols. folio. He had a turn for Latin and English poetry, as well as for antiquities; and some single single poems of his have been printed in each of those languages. He died at London the 4th of April 1743, aged eighty-three years, and was buried, according to his own desire, at Poplar.

AIR, *f.* [*air*, Fr. *air*, Lat.] The element encompassing the terraqueous globe. See **AEROLOGY**. The state of the air; or the air considered with regard to health. Air in motion; a small gentle wind:

Let vernal *airs* through trembling osiers play,
And Albion's cliffs resound the rural lay. *Pope.*

Scent; vapour. Blast; pestilential vapour.—Stinks which the nostrils straight abhor are not the most pernicious, but such *airs* as have some similitude with man's body; and so insinuate themselves, and betray the spirits. *Bacon.*—Any thing light or uncertain; that is as light as air. The open weather; air unconfined. Vent; utterance; emission into the air. Publication; exposure to the public view and knowledge.—I am sorry to find it has taken *air*, that I have some hand in these papers. The mien, or manner of a person; the look. An affected or laboured manner or gesture; as, a lofty *air*, a gay *air*. *Airs* in horsemanship, denote the artificial or practised motions of a managed horse.

To AIR, *v. a.* To expose to the air; to open to the air.—Fleas breed principally of straw or mats, where there hath been a little moisture, or the chamber and bed-straw kept close, and not *aired*. *Bacon.*—To gratify, by enjoying the open air, with the reciprocal pronoun.—As I was *airing*

airing myself on the tops of the mountains, I fell into a profound contemplation on the vanity of human life. *Ad-dison*.—To air liquors; to warm them by the fire: a term used in conversation. To breed in nests. In this sense, it is derived from *aerie*, a nest. It is now out of use.

AIR, *f.* in medicine, &c. makes one of the six non-naturals.—From observations on bleeding in rheumatisms, and after taking cold, it is evident the air can enter with all its qualities, and vitiate the whole texture of the blood and other juices.—From the palsies, vertigoes, and other nervous affections, caused by damps, mines, &c. it is evident, that air thus qualified can relax and obstruct the whole nervous system. And from the colics, fluxes, coughs, and consumptions, produced by damp, moist, and nitrous, air, it is evident it can corrupt and spoil the noblest organs of the human frame.

Circulation of AIR in Rooms. To render the circulation of air sensible, let the air of a room be heated by a strong fire, whilst the air of a contiguous room is cold; then let the door between these two rooms be opened, in which case the hot air of one room, being lighter, will pass through the upper part of the opening of the door into the cold room; and, on the contrary, the cold air of the other room, being heavier, will pass into the former room through the lower part of the opening; accordingly, it will be found, that applying a lighted candle at the top, in the middle, and at the lower part, of the opening between the two rooms, a strong current of air will appear to pass from the hot into the cold room near the top; a contrary current of air will appear to pass from the latter into the former room near the lower part of the said opening; whilst in the middle there is little or no motion at all, as may be clearly perceived by the direction of the flame of the candle.

It is for the same reason that when the fire is lighted in a chimney, a strong current of air is occasioned to enter the room, which may be felt by applying the hand near the key-hole, or other such small openings, if the doors and windows are shut; for the air over the fire being heated becomes lighter, and ascends into the chimney, consequently other colder air must supply its place, which forces its way through all the small openings it can find. Were a room with a fire in it to be perfectly closed, excepting the chimney, the air in it would soon become unwholesome for respiration, and the fire would be soon extinguished, besides other inconveniences. Hence it appears, that those persons mistake who expect to keep the air of a room sweet and wholesome, especially for convalescents, by accurately stopping all the smallest openings that admit fresh air. When the current of air that enters into a room is on some side of it where it falls immediately upon the persons who sit in the room, then it may be offensive, especially to delicate constitutions. In that case, such opening should be closed: but at the same time another opening should be made, for admitting fresh air, in a more convenient part; for a circulation of air, especially in rooms where a fire is kept, is not only salutary and useful, but absolutely necessary.

It is a vulgar error among many people, to believe that fire purifies the contaminated air, by destroying the noxious particles mixed with it; and for this reason they think, that the fire kept in a room where the air is tainted purifies the room, by rendering the air in it again fit for respiration. Indeed, a fire kept in a room or apartment where the air is tainted, as is the case with hospitals, gaols, and the like, does certainly purify the apartment; and the practice is very useful; but, this effect is only because the fire promotes the circulation of the air, and dries the dampness of rooms, furniture, &c. so that it is not the infected air that is purified, but it is new, fresh, and wholesome air, that by the action of the fire has taken the place of the infected air; which infected air, being rarefied by the heat, has been expelled from the apartment. Fire and combustion in general is so far from purifying contaminated air, that it actually contaminates a

prodigious quantity of it in a short time; so that not only a common fire, but even a lighted candle, when kept in a well-closed room, wherein the external air has not access, instead of purifying, renders the air of that room noxious.

A method has been lately invented, and a patent obtained, by Mr. Joseph Green, of Wandsworth, near London, for warming rooms and buildings with hot air of a more pure quality than has hitherto been used. The principle on which this invention is founded is the heating air, for the purpose of warming buildings, by means of hollow vessels, or pipes, immersed in hot water or steam, whereby too great a degree of heat is avoided, and the air remains unburnt, and fit for respiration. "For this purpose," says the patentee, "I provide a boiler made of iron, copper, or other fit materials, with a cover fastened thereto. Within the boiler I fix a hollow vessel or worm, and sometimes several such vessels or worms, made of lead, copper, earthen ware, or other proper materials; and into each of these hollow vessels or worms I introduce the external or open air, by the medium of a pipe, which I make to pass through a convenient part of the boiler, firmly soldered or cemented into it; and which pipe I communicate with the said vessels or worms. The boiler may be fixed in the ordinary manner in any of the lower apartments, or other convenient part of the house or buildings; or it may be fixed behind a stove or grate, so as to be heated by means of a common fire, in any of the rooms, and the size of it should be regulated by the extent of the building proposed to be warmed. From the hollow vessels or worms, pipes are fixed, and carried, in the most convenient manner, to the different rooms, or parts of the buildings, to which the warm air is to be conveyed. To these pipes are fixed cocks or sliders, in order to admit, or prevent, the introduction of the warm air into any particular room or place; and in some convenient part of the pipes I place a shifting valve, or self-acting cock, to prevent the bursting of the boiler, or pipes, by the force of the steam. The boiler being in part filled with water, a fire is lighted in the furnace, and the water made to boil, or brought to such a degree of heat as may be found necessary; by this heat the air contained in the hollow vessels or worms before-mentioned, being rarefied and warmed, will ascend, and is to be admitted, by means of the above-mentioned cocks or sliders, or by any other convenient mode, into the several apartments to be warmed. When the rooms are at too great a distance from the boiler to be warmed by single pipes, then, in order to prolong the direction of the heat, I either inclose the pipes, through which the warm air is conveyed, in large pipes, to which the steam rises from the boiler, or I introduce the warm air into the larger and the steam into the smaller pipes; by which means the air-pipes are prevented from growing cool so soon as they would do if they were exposed to the action of the open air. I also in certain cases, where I judge it proper and more convenient, place my air-vessel or worm in a vessel distinct from the boiler, but still having a communication therewith for the steam from the boiler to pass, and thus heat the air-vessel or worm by means of steam only; by the above process too great a degree of heat is avoided, and the air remains unburnt, and fit for respiration. The patent for this invention is dated Dec. 9, 1793.

AIR-BALLOONS, a general name given to bags of any light substance filled with inflammable air, or other permanently elastic fluid, whose specific gravity is considerably less than that of common atmospheric air. The consequence of their being filled in this manner is, that, if they are of any considerable magnitude, they ascend in the air to an amazing height; and will not only ascend in this manner by themselves, but carry up along with them great weights, and continue to rise till they attain an height in which the circumambient air is of the same specific gravity with themselves. In this situation they will either float or be driven in the direction of the wind or

current of air in which they are exposed, remaining in these elevated regions till the fluid escapes by the bursting of the bags from the superior elasticity of the fluid, or by its gradual evaporation through the pores of the envelope. The history, principles, &c. of those machines are detailed under the article *AEROSTATION*; in addition to which we shall now give the following particulars. The first voyage performed in an air-balloon in England was by Vincent Lunardi, a native of Italy, who ascended from the Artillery-ground in London, on the 15th of September, 1784. His machine was made of oiled silk, painted in alternate stripes of blue and red; and its diameter was thirty-three feet. From a net, which covered about two-thirds of the balloon, forty-five cords descended to a hoop hanging below the balloon, to which the gallery was attached. The machine had no valve; and its neck, which terminated in the form of a pear, was the aperture through which the inflammable air was introduced, and through which it might be let out. The balloon was filled with air produced from zinc by means of diluted vitriolic acid. And when the aeronaut departed, at two o'clock, he took up with him a dog, a cat, and a pigeon. After throwing out some ballast, to clear the houses, he ascended to a considerable height; and the direction of his motion at first was north-west by west; but, as the balloon rose higher, it came into another current of air, which carried it nearly north. In the course of his voyage the thermometer was as low as twenty-nine degrees, and the drops of water which had collected round the balloon were frozen. About half after three he descended very near the ground, and landed the cat, which was almost dead with cold: then rising, he prosecuted his voyage, till at ten minutes past four o'clock he landed near Ware in Hertfordshire. He descended by means of his oars or wings.

The second aerial voyage in England, was performed by Mr. Blanchard, and Mr. Sheldon professor of anatomy to the Royal Academy, being the first Englishman who ascended with an aerostatic machine. They ascended at Chelsea the 16th of October, at nine minutes past twelve o'clock. Mr. Blanchard, having landed Mr. Sheldon at about fourteen miles from Chelsea, re-ascended alone, and finally landed near Romsey in Hampshire, about seventy-five miles distant from London, having gone nearly at the rate of twenty miles an hour. The wings used on this occasion it seems produced no deviation from the direction of the wind. Mr. Blanchard said that he ascended so high as to feel a great difficulty of breathing: and that a pigeon, which flew away from the boat, laboured for some time to sustain itself with its wings in the rarefied air, but, after wandering a good while, returned, and rested on the side of the boat.

On the 4th of October, Mr. Sadler, an ingenious tradesman at Oxford, ascended at that place with an inflammable-air balloon of his own construction and filling. And again on the 12th of the same month he ascended at Oxford, and floated to the distance of fourteen miles in seventeen minutes, which is at the rate of near fifty miles an hour.

On the 4th of January, 1785, a Mr. Harper ascended at Birmingham with an inflammable-air balloon, and went to the distance of fifty miles in an hour and a quarter, and suffered no other inconvenience than a temporary deafness, and what might be expected from the changes of wet and cold. The thermometer descended from forty to twenty-eight degrees.

On the 19th of January, Mr. Crosbie ascended at Dublin in Ireland, with an inflammable-air balloon, to a great height. He rose so rapidly that he was out of sight in three minutes and a half. By suddenly opening the valve he descended just at the edge of the sea, as he was driving towards the channel, being unprovided for properly passing over to England.

On the 23d of March, Count Zambeccari and Admiral Sir Edward Vernon ascended at London, and sailed

to Horsham in Sussex, at the distance of thirty-five miles, in less than an hour. The voyage proved very dangerous, owing to some of the machinery about the valve being damaged, which obliged them to cut open some part of the balloon when they were about two miles perpendicular height above the earth, the barometer having fallen from 30.4 to 20.8 inches. In descending they passed through a dense cloud, which felt very cold, and covered them with snow. The observations they made were, that the balloon kept perpetually turning round its vertical axis, sometimes so rapidly as to make each revolution in four or five seconds; that a peculiar noise, like rustling, was heard among the clouds, and that the balloon was greatly agitated in the descent.

On May the 5th, Mr. Sadler, and William Windham, Esq. member of parliament for Norwich, ascended at Moulsey-hurst. The machine took a south-east course, and the current of air was so strong that they were in great danger of being driven to sea. They had the good fortune however to descend near the conflux of the Thames and Medway, not a mile from the water's edge. By an accident they lost their balloon: for, while the aeronauts were busied in securing their instruments, the country people, whom they had employed in holding down the machine, suddenly let go the cords, when the balloon instantly ascended, and was driven many miles out to sea, where it fell, and was taken up by a trading vessel. It was afterwards restored again, and another voyage made with it from Manchester to Pontefract, in which Mr. Sadler was still more unfortunate; for no person being near when it descended, and not being able to confine it by his own strength, he was dragged by it over trees and hedges; and at last was forced to quit it at the utmost danger of his life; after which it rose, and was out of sight in a few minutes. It was afterwards found near Gainborough.

On the 12th of May Mr. Crosbie ascended, at Dublin, as high as the tops of the houses; but soon descended again with a velocity that alarmed all the spectators for his safety. On his stepping out of the car, in an instant Mr. McGuire, a college youth, sprang into it, and the balloon ascended with him to the astonishment of the beholders, and presently he was carried with great velocity towards the channel in the direction of Holyhead. This being observed, a crowd of horsemen pursued full speed the course he seemed to take, and could plainly perceive the balloon descending into the sea. Lord H. Fitzgerald, who was among the foremost, instantly dispatched a swift-sailing vessel mounted with oars, and all the boats that could be got, to the relief of the gallant youth; whom they found almost spent with swimming, just time enough to save his life.

On the 19th of July, at twenty minutes past two o'clock, Mr. Crosbie again ascended at Dublin, with intent to cross the channel to Holyhead in England. The usual form of the boat had been changed, for a capacious wicker basket, of a circular form, round the upper edges of which were fastened a great many bladders, which were intended to render his gallery buoyant, in case of a disaster at sea. About 300 pounds of ballast were put into the basket, but the aeronaut discharged half a hundred on his first rise. At first the current of air carried him due west; but it soon changed his course to nearly north-east, pointing almost towards Whitehaven. At upwards of forty miles from the Irish shore, he found himself within clear sight of both lands, and he said it was impossible to give any adequate idea of the unspeakable beauties which the scenery of the sea, bounded by both lands, presented. He rose at one time so high, that by the intense cold his ink was frozen, and the mercury sunk into the ball of the thermometer. He was sick, and felt a strong prepression on the tympanum of the ears. At his utmost height he thought himself stationary; but on liberating some gas he descended to a current of air blowing north, and extremely rough. He now entered a thick cloud, and encountered

countered strong blasts of wind, with thunder and lightning, which brought him rapidly towards the surface of the water. Here the balloon made a circuit, but, falling lower, the water entered his car, and he lost his notes of observation. All his endeavours to throw out ballast were of no avail; the force of the wind plunged him into the ocean; and with much difficulty he put on his cork jacket. The propriety of his idea was now very manifest in the construction of his boat: as by the admission of the water into the lower part of it, and the suspension of his bladders, which were arranged at the top, the water, added to his own weight, became proper ballast; and the balloon maintaining its poise, it became a powerful sail, by means of which, and a snatch-block to his car, he went before the wind as regularly as a sailing vessel. In this situation he found himself inclined to eat, and he took a little fowl. At the distance of a league he discovered some vessels crowding after him; but, as his progress outstripped all their endeavours, he lengthened the space of the balloon from the car, which gave a check to the rapidity of his sailing, and he was at length overtaken and saved by the Dunleary barge, which took him on-board, and steered to Dunleary, towing the balloon after them.

A similar accident happened to Major Money, who ascended at Norwich, on the 22d of July, at twenty minutes past four in the afternoon; when meeting with an improper current, and not being able to let himself down, on account of the smallness of the valve, he was driven out to sea, where, after blowing about for near two hours, he dropped into the water. Here the struggles were astonishing which he made to keep the balloon up, which was torn, and hung only like an umbrella over his head. A ship was once within a mile, but, he adds, whether from want of humanity, or by mistaking the balloon for a sea-monster, they sheered off, and left him to his fate: but a boat chased him for two hours, till just dark, and then bore away. He now gave up all hopes, and began to wish that providence had given him the fate of Pilate de Rozier, (which see under AEROSTATION,) rather than such a lingering death. Exerting himself however to preserve life as long as possible, by keeping the balloon floating over his head, to keep himself out of the water, into which nevertheless he sunk gradually inch by inch, as it lost its power, till he was at length breast-deep in water, when he was providentially taken up by a revenue cutter, at half past eleven at night, but so weak that he was obliged to be lifted out of the car into the ship.

About the latter end of August, the longest aerial voyage hitherto made, was performed by Mr. Blanchard, who ascended at Lille, accompanied by the Chevalier de l'Épinard, and travelled 300 miles in their balloon before it descended. On this occasion, as on some former ones, Mr. Blanchard made trial of a parachute, like a large umbrella, invented to break the fall in case of an accident happening to the balloon: with this machine he dropped a dog from the car after his ascension, which descended gently and unhurt.

October the 5th, Mr. Lunardi made the first aerial voyage in Scotland. He ascended at Edinburgh, and after various turnings, landed near Cupar, in Fife, having described a track of forty miles over the sea, and ten over the land, in an hour and a half. He said the mercury in the barometer sunk as low as 18.3 inches at his greatest elevation.

November the 19th, the celebrated Blanchard ascended at Ghent to a great height, and after many dangers descended at Delft without his car, which he cut away to lighten the machine when he was descending too rapidly, and slung himself by the cords to the balloon, which served him then in the nature of a parachute. On his first ascent, when he was almost out of sight, he let down a dog, by means of a parachute, which came easily to the ground.

November the 25th, Mr. Lunardi ascended at Glasgow, and in two hours he described a track of 125 miles.

It is further remarkable that, being overcome with drowsiness, he says he slept for about twenty minutes in the bottom of the car, during his voyage.

To obviate the danger of a fall, arising from any accident happening to the balloon, some experiments have been made with a parachute, by Mr. Blanchard, whose endeavours and perseverance have continued longer than in any other person: we have accounts of two voyages performed by him; which, being very curious, we shall relate in Mr. Blanchard's own words, taken from his letter, dated Leipzick, October the 9th, 1787, to the editors of the Paris Journal. "I did not mention," says he, "in your interesting paper, my ascension at Strasburg on the 26th of last August: the weather was so horrible that I mounted only for the sake of contenting the astonishing crowd of strangers assembled there from all parts of the country. Every body seemed satisfied at the attempt, but I assure you, gentlemen, that I was far from being pleased with so common an experiment. The only remarkable thing that occurred at that time, was the following circumstance: At the height of about 2000 yards, or a mile and half a quarter, I let down a dog tied to the parachute, who, instead of descending gently, was forcibly carried, by a whirlwind, above the clouds. I met him soon after, bending his course directly downwards, and, as on recollecting his master he began to bark a little, I was going to take hold of the parachute, when another whirlwind lifted him again to a great height. I lost him for the space of six minutes, and perceived him afterwards, with my telescope, as if sleeping in the cradle or basket belonging to the machine. Continually agitated, and impetuously tossed through every point of the compass, by the violence of the different currents of air, I determined to end my voyage on the other side of the Rhine, after having passed vertically over Zell. I descended at a small village with an intention to be assisted a little, and about thirty men soon came within reach of the balloon very a-propos, and fixed me to the ground. The wind was so violent that anchors or ropes would have been of no service. I had however added to the large aerostatic globe a smaller one, of sixty pounds ascensional force, which would have contributed to fix me, when once I let it loose; but, notwithstanding this precaution, the men's assistance was very necessary to me. The parachute was still wavering in the air, and did not come down till twelve minutes after."

"I performed my twenty-seventh ascension at Leipzick, the 29th of September, in the midst of an incredible number of spectators, forming one of the most brilliant assemblies I ever beheld. The sky was as clear and serene as possible, and the air so calm that many of my friends, and multitudes of others, could follow me on horseback, and even on foot. I was sometimes so near them that they thought they could reach me, but I could soon find the means of rising; and once, when they had actually taken hold of the cords, to see me float with the strings in their hands, I suddenly cut them, and mounted again in the air. All these amusing evolutions were in sight of the town and its environs. At length I yielded to the earnest solicitations of the company, and entered the town triumphantly in my car, followed by a concourse of people transported with joy, and amidst the acclamations of thousands. The next day I emptied the inflammable air into another globe, with which I intended to try some experiments; and I let it off with a cradle, in which a dog was fixed. The balloon, having reached a considerable height, made an explosion in its under part, as I had imagined it would, having previously disposed it in a proper manner for that purpose; by which means the little animal fell gently to the ground."

"Having repeated this experiment, at the town's request, I prepared the globe in such a manner as to cause an explosion in its upper part, and added a parachute with two small dogs fixed to it. They went so high, that, notwithstanding the serenity of the sky, the balloon was lost

in its immense expanse. Telescopes of the best sort became useless, and I began to be apprehensive for the death of the little animals, on account of the severity of the cold. They descended however about two hours after, quite safe and well, in the town of Delitzsch, three miles from Leipzick. I went to claim them, and found them again over the town in the air with the parachute."

Mr. Blanchard's thirty-second ascension was made at Brunswick, in the month of August 1788, in which he was much assisted by means of his wings.

In regard to philosophical observations, derived from the new subject of air-balloons, there have been very few made; the novelty of the discovery, and of the prospect enjoyed from the car of an aerostatic machine, have commonly distracted the attention of the aeronauts; not to remark that many of the adventurers were inadequate to the purpose of making improvements in philosophy, being mostly influenced either by pecuniary motives, or the vanity of adding their names to the list of aerial travellers. The agreeable stillness and tranquillity experienced aloft in the atmosphere, have been matter of general observation. Some machines have ascended to a great height, as far, it has been said, as two miles; and they have commonly passed through fogs and clouds, above which they have enjoyed the clear light and heat of the sun, whilst the earth beneath was actually covered by dense clouds, which poured down abundance of rain. In ascending very high, the aeronauts have often experienced a pain in their ears, arising, it is supposed, from the internal air being not of the same density as the air without; but the pain usually went off in a short time: and it seems that this effect is similar to what is experienced by persons who descend by a diving-bell to considerable depths in the sea. The late unfortunate Mr. Spalding, the celebrated diver, spoke of this effect with a marked and philosophical accuracy: after descending two or three fathoms below the surface, he began to feel a pain in his ears, which gradually increased to a very great degree if the descent was too quick; his method was therefore to descend slowly, and to make a stop for some minutes at the depth of five fathoms, which is nearly equal to the pressure of the atmosphere, and where consequently the air in his bell was of double the density of common air at the surface; after resting here awhile, his ears, as he expressed it, gave a crack, and he was suddenly relieved of the pain. He then descended five fathoms more, with the same symptoms, and the same effect: and so on continually, from one five fathoms to another, descending leisurely, and stopping a little at each stage, to give time for his constitution to adapt itself to the degree of condensation of the air; after which he felt no more inconvenience, till he came to ascend again, which was performed with the same caution and circumstances. One experiment is recorded, in which the air of a high region, being brought down, and examined by means of nitrous air, was found to be purer than the air below. The temperature of the upper regions too, it has been found, is much colder than that of the air near the earth; the thermometer, in some aerostatic machines, having descended many degrees below the freezing point of water, while it was considerably higher than that degree at the earth's surface.

AIR-BLADDER, *f.* Any cuticle or vesicle filled with air.—The pulmonary artery and vein pass along the surfaces of these *air-bladders*, in an infinite number of ramifications. *Arbutnot.*—The bladder in fishes, by the contraction and dilatation of which, they vary the properties of their weight to that of their bulk, and rise or fall.—Tho' the *air-bladder* in fishes seems necessary for swimming, yet some are so formed as to swim without it. *Cudworth.*

AIR-BUILT, *adj.* Built in the air, without any solid foundation:

Hence the fool's paradise, the statesman's scheme,
The *air-built* castle, and the golden dream,
The maid's romantic wish, the chemist's flame,
And poet's vision of eternal fame.

Pope.

AIR-DRAWN, *adj.* Drawn or painted in air: a word not used.

AIRER, *f.* He that exposes to the air.

AIR-GUN, *f.* in pneumatics, is a machine for propelling bullets with great violence, by the sole means of condensed air. The first account we meet with of an air-gun, is in the *Elemens d'Artillerie* of David Rivaut, who was preceptor to Louis XIII. of France. He ascribes the invention to one Marin, a burgher of Liseux, who presented one to Henry IV.

To construct a machine of this kind, it is only necessary to take a strong vessel of any sort, into which the air is to be thrown or condensed by means of a syringe, or otherwise, the more the better; then a valve is suddenly opened, which lets the air escape by a small tube in which a bullet is placed, and which is thus violently forced out before the air. It is evident then that the effect is produced by virtue of the elastic property of the air; the force of which is directly proportional to its condensation; and therefore the greater quantity that can be forced into the engine, the greater will be the effect. Now this effect will be exactly similar to that of a gun charged with powder, and therefore we can easily form a comparison between them: for inflamed gunpowder is nothing more than very condensed elastic air; so that the two forces are exactly similar. Now it is shewn by Mr. Robins, in his *New Principles of Gunnery*, that the fluid of inflamed gun-powder, has, at the first moment, a force of elasticity equal to about 1000 times that of common air; and therefore it is necessary that air should be condensed 1000 times more than in its natural state, to produce the same effect as gun-powder. But then it is to be considered, that the velocities with which equal balls are impelled, are directly proportional to the square roots of the forces; so that, if the air in an air-gun be condensed only ten times, then the velocity it will project a ball with, will be, by that rule, one-tenth of that arising from gun-powder; and, if the air were condensed twenty times, it would communicate a velocity of one-seventh of that of gun-powder. But in reality the air-gun shoots its ball with a much greater proportion of velocity than as above, and for this reason, that as the reservoir, or magazine of condensed air, is commonly very large in proportion to the tube which contains the ball, its density is very little altered by expanding through that narrow tube, and consequently the ball is urged all the way by nearly the same uniform force as at the first instant; whereas the elastic fluid arising from inflamed gun-powder is but very small in proportion to the tube or barrel of the gun, occupying at first indeed but a very small portion of it next the but-end: and therefore by dilating into a comparatively large space, as it urges the ball along the barrel, its elastic force is proportionally weakened, and it acts always less and less on the ball in the tube. From which cause it happens, that air, condensed into a good large machine only ten times, will shoot its ball with a velocity but little inferior to that given by the gun-powder. And if the valve of communication be suddenly shut again by a spring, after opening it to let some air escape, then the same collection of it may serve to impel many balls, one after the other.

In all cases in which a considerable force is required, and consequently a great condensation of air, it will be requisite to have the condensing syringe of a small bore, perhaps not more than half an inch in diameter: otherwise the force to produce the compression will become so great, that the operator cannot work the machine; for, as the pressure against every square inch is about fifteen pounds, and against every circular inch about twelve pounds, if the syringe be one inch in diameter, when one atmosphere is injected, there will be a resistance of twelve pounds against the piston; when two, of twenty-four pounds; and, when ten are injected, there will be a force of 120 pounds to overcome; whereas ten atmospheres act against the half-inch piston, whose area is but one-quarter of the former, with one-quarter of the force only, namely, thirty pounds;

A I R

Improved Air Guns.

pounds; and forty atmospheres may be injected with such a syringe, as well as ten with the larger.

There are air-guns of various constructions; an easy and portable one is represented in the annexed Plate, *fig. 1.* which is a section lengthways through the axis, to shew the inside. It is made of brass, and has two barrels; the inner barrel A, of a small bore, from which the bullets are shot; and the larger barrel E S C D R, on the outside of it. In the stock of the gun there is a syringe M N P S, whose rod M, draws out to take in air; and, by pushing it in again, the piston N, drives the air before it, through the valve P, into the cavity between the two barrels. The ball K, is put down into its place in the small barrel, with the rammer, as in another gun. There is another valve at S L, which, being opened by the trigger O, permits the air to come behind the ball, so as to drive it out with great force. If this valve be opened and shut suddenly, one charge of condensed air may make several discharges of bullets; because only part of the injected air will then go out at a time, and another bullet may be put into the place K: but if the whole air be discharged on a single bullet, it will impel it more forcibly. This discharge is effected by means of a lock (*fig. 2.*) when fixed to its place as usual in other guns; for, the trigger being pulled, the cock will go down and drive a lever which opens the valve.

Dr. Macbride mentions an improvement of the air-gun, made by Dr. Ellis, in which the chamber for containing the condensed air is not in the stock, which renders the machine heavy and unweildy, but has five or six hollow spheres belonging to it, of about three inches diameter, fitted to a screw on the lock of the gun. These spheres are contrived with valves, to confine the air which is forced into their cavities, so that a servant may carry them ready charged with condensed air: and thus the gun of this construction is rendered as light and portable as one of the smallest fowling-pieces.

Fig. 3. represents an air-gun made by the late Mr. B. Martin, of London, and now by several of the mathematical-instrument and gun makers of the metropolis; which, for simplicity and perfection, perhaps exceeds any other that has been contrived. A, is the gun-barrel, of the size and weight of a common fowling-piece, with the lock, stock, and ramrod. Under the lock, at B, is a round steel tube, having a small moveable pin in the inside, which is pushed out when the trigger is pulled, by the springwork within the lock; to this tube B, is screwed a hollow copper ball C, perfectly air-tight. This copper ball is fully charged with condensed air by means of a syringe, previous to its being applied to the tube B. Hence, if a bullet be rammed down in the barrel, the copper ball screwed fast, and the trigger be pulled, then the pin in B, will forcibly push open a valve within the copper ball, and let out a portion of the condensed air; which air will rush up through the aperture of the lock, and forcibly act against the bullet, driving it to the distance of sixty or seventy yards, or farther. If the air be strongly condensed at every discharge, only a portion of the air escapes from the ball; therefore, by re-cocking the piece, another discharge may be made; and this repeated fifteen or sixteen times. An additional barrel is sometimes made, and applied for the discharge of shot, instead of the ball above described.

Sometimes, in a more simple construction, the syringe is applied to the end of the barrel C, (*fig. 4.*) the lock and trigger shut up in a brass case D, and the trigger pulled, or the discharge made, by pulling the chain B. In this contrivance there is a round chamber for the condensed air at the end of the spring at E, and it has a valve acting in a similar manner to that of the copper ball. When this instrument is not in use, the brass case D, is made to slide off, and the instrument then becomes a walking-stick: from which circumstance, and the barrel being made of cane, or brass, &c. it has been called the *air-cane*. The head of the cane uncrews and takes off at A, where the extremity of the piston-rod in the barrel is shewn. An

iron rod is placed in a ring at the end of this, and the air is condensed in the barrel in a manner similar to that of the gun above; but its force and action are not near so strong as in the gun.

Magazine AIR-GUN. This is an improvement of the common air-gun, made by that ingenious artist, L. Colbe. By his contrivance, ten bullets are so lodged in a cavity, near the place of discharge, that they may be successively drawn into the barrel, and shot so quickly as to be nearly of the same use as so many different guns; the only motion required, after the air has been injected, being that of shutting and opening the hammer, and cocking and pulling the trigger. *Fig. 5.* is a longitudinal section of this gun, as large in every part as the gun itself; and as much of its length is shewn as is peculiar to this construction; the rest of it being like the ordinary air-gun. A B C, is part of the stock; G, is the end of the injecting syringe, with its valve H, opening into the cavity F F F, between the barrels. K K K, is the small or shooting barrel, which receives the bullets, one at a time, from the magazine D E, being a serpentine cavity, in which the bullets are lodged, and closed at the end D; from whence, by one motion of the hammer, they are brought into the barrel at I, and thence are shot out by the opening of the valve V, which lets in the condensed air from the cavity F F F, into the channel V K I, and so along the inner barrel K K, whence the bullet is discharged. L L, is the key of a cock, having a hole through it; which hole, in the present situation, makes part of the barrel K K, being just of the same bore: so that the air which is let in at every opening of the valve V, comes behind this cock, and, taking the ball out of it, carries it forward, and so out of the mouth of the piece.

To bring in another bullet to succeed I, which is done in an instant, bring the cylindrical cavity of the key of the cock, which made part of the barrel K K K, into the situation M N, so that the part I may be at K; then turning the gun upside-down, one bullet next the cock will fall into it out of the magazine, but will go no farther into this cylindrical cavity, than the two little pieces *ss* will permit it; by which means only one bullet at a time will be taken in to the place I, to be discharged again as before.

AIR-HOLE, *f.* A hole to admit the air.

AIRINESS, *f.* Openness; exposure to the air. Lightness; gaiety; levity.—The French have indeed taken worthy pains to make classic learning speak their language; if they have not succeeded, it must be imputed to a certain talkativeness and *airiness* represented in their tongue, which will never agree with the sedateness of the Romans, or the solemnity of the Greeks. *Felton.*

AIRING, *f.* A short journey or ramble to enjoy the free air. It is a term peculiarly used for the exercising horses in the open air. It purifies the blood; purges the body from gross humours; and, as the jockies express it, teaches the horse how to make his wind rake equally, and keep time with the other motions of his body. It also sharpens the stomach, and keeps the creature hungry; which is a thing of great consequence, as hunters and racers are very apt to have their stomach fall off, either from want of exercise, or from the too-violent exercise which they are often exposed to. It likewise greatly contributes to bring a horse to perfect wind, and sound courage.

AIR-JACKET, *f.* a sort of jacket made of leather, in which are several bags, or bladders, composed of the same materials, communicating with each other. These are filled with air through a leather tube, having a brass stop-cock accurately ground at the extremity, by which means the air blown in through the tube is confined in the bladders. The jacket must be wet, before the air be blown into the bags, or otherwise it will immediately escape through the pores of the leather. By the help of these bladders, which are placed near the breast, the person is supported in the water, without making the efforts used in swimming.

AIRLESS, *adj.* Wanting communication with the free air:

Nor stony tower, nor walls of beaten brass,
Nor *airless* dungeon, nor strong links of iron,
Can be retentive to the strength of spirit. *Shakespeare.*

AIRLING, *f.* [from *air*, for *gayety*.] A young, light, thoughtless, gay, person.

AIR-PIPES, *f.* an invention for drawing foul air out of ships, or any other close places, by means of fire. These pipes were invented by Mr. Sutton, a brewer in London; and from him have received the name of *Sutton's Air-pipes*. The principle on which their operation depends is known to every body, being indeed no other than that air is necessary for the support of fire; and, if it has not access from the places most adjacent, will not fail to come from those that are more remote. Thus, in a common furnace, the air enters through the ash-hole; but, if this is closed up, and a hole made in the side of the furnace, the air will rush in with great violence through that hole. If a tube of any length whatever is inserted in this hole, the air will rush through the tube into the fire, and of consequence there will be a continued circulation of air in that place where the extremity of the tube is laid. Mr. Sutton's contrivance then, as communicated to the Royal Society by Doctor Mead, amounts to this:—"As, in every ship of any bulk, there is already provided a copper or boiling-place proportionable to the size of the vessel; it is proposed to clear the bad air, by means of the fire already used under the said coppers or boiling-places for the necessary uses of the ship.

"It is well known, that, under every such copper or boiler, there are placed two holes, separated by a grate; the first of which is for the fire, and the other for the ashes falling from the same; and that there is also a flue from the fire-place upward, by which the smoke of the fire is discharged at some convenient place of the ship. It is also well known, that the fire once lighted in these fire-places, is only preserved by the constant draught of air through the fore-mentioned two holes and flue; and that, if the said two holes are closely stopped up, the fire, though burning ever so briskly before, is immediately put out.

"But if, after shutting up the above-mentioned holes, another hole be opened, communicating with any other room or airy place, and with the fire, it is clear, the said fire must again be raised and burn as before, there being a like draught of air through the same as there was before the stopping up of the first holes; this case differing only from the former in this, that the air feeding the fire will now be supplied from another place. It is therefore proposed, that, in order to clear the holds of ships of the bad air therein contained, the two holes above-mentioned (the fire-place and the ash-place) be both closed up with substantial and tight iron doors; and that a copper or leaden pipe, of sufficient size, be laid from the hold into the ash-place, for the draught of air to come in that way to feed the fire. And thus it seems plain, from what has been already said, that there will be, from the hold, a constant discharge of the air therein contained; and consequently, that the air, so discharged, must be as constantly supplied by fresh air down the hatches or such other communications as are opened into the hold; whereby the same must be continually freshened, and its air rendered more wholesome and fit for respiration. And if into this principal pipe so laid into the hold, other pipes are let in, communicating respectively either with the well or lower decks; it must follow, that part of the air, consumed in feeding the fire, must be respectively drawn out of all such places to which the communication shall be so made."

This account is so plain, that no doubt can remain concerning the efficacy of the contrivance: it is evident, that, by means of pipes of this kind, a constant circulation of fresh air would be occasioned through those places where it would otherwise be most apt to stagnate and putrefy. Several other contrivances have been used for the same

purpose; and Doctor Hales's ventilators, by some unaccountable prejudice, have been reckoned superior in efficacy and even simplicity to Mr. Sutton's machine, which at its first invention met with great opposition, and even when introduced by Dr. Mead, who used all his interest for that purpose, was shamefully neglected.

A machine capable of answering the same purpose was invented by M. Defaguliers, which he called the *ship's lungs*. It consisted of a cylindrical box set up on its edge, and fixed to a wooden pedestal. From the upper edge of the box issued a square trunk open at the end, and communicating with the cavity of the box. Within this box was placed a cylindrical wheel turning on an axis. It was divided into twelve parts, by means of partitions placed like the radii of a circle. These partitions did not extend quite to the centre, but left an open space of about eighteen inches diameter in the middle; towards the circumference, they extended as far as possible without interfering with the case, so that the wheel might always be allowed to turn freely. Things being thus circumstanced, it is plain, that, if the wheel was turned towards that side of the box on which the trunk was, every division would push the air before it, and drive it out through the trunk, at the same time that fresh air would come in through the open space at the centre, to supply that which was thrown out through the trunk. By turning the wheel swiftly, a strong blast of air would be continually forced out through the square trunk, on the same principles on which a common fanner winnows corn. If the wheel is turned the opposite way, a draught of air may be produced from the trunk to the centre. If this machine, then, is placed in a room where a circulation of air is wanted, and the trunk made to pass through one of the walls; by turning the wheel swiftly round, the air will be forced with great velocity out of that room, at the same time that fresh air will enter through any chinks by which it can have access, to supply that which has been forced out.

It is evident, that the circulation which is promoted by this machine, is entirely of the same kind with that produced by Mr. Sutton's; the turning of the wheel in M. Defaguliers's machine being equivalent to the rarefaction of the air by fire in Mr. Sutton's: but that the latter is vastly superior, as acting of itself, and without intermission, requires no arguments to prove. Mr. Sutton's machine has yet another convenience, of which no other contrivance for the same purpose can boast; namely, that it not only draws out putrid air, but destroys it by causing it to pass through fire; and experience has abundantly shewn, that though putrid air is thrown into a great quantity of fresh air, it is so far from losing its pernicious properties, that it often produces noxious diseases. We do not say, indeed, that putrid air becomes salutary by this means: but it is undoubtedly rendered less noxious than before; though, whether it is equally innocent with the smoke of a fire fed in the common way, we cannot pretend to determine.

Besides this machine by M. Defaguliers, the ventilators of Dr. Hales, already mentioned, and those called *wind-fails*, are likewise used for the same purpose. The former of which is an improvement of the Hessian-bellows: the other is a contrivance for throwing fresh air into those places where putrid air is apt to lodge; but this has the last-mentioned inconvenience in a much greater degree than any of the others, as the blast of fresh air throws out that which was rendered putrid by stagnation, in such a manner as to contaminate all around it. See **WIND-SAILS**.

AIR-PUMP, in pneumatics, is a machine for exhausting the air out of a proper vessel, and so to make what is commonly called a vacuum; though in reality the air in the receiver is only rarefied to a great degree, so as to take off the ordinary effects of the atmosphere. So that by this machine we learn, in some measure, what our earth would be without air; and how much all vital, generative, nutritive, and alterative, powers, depend upon it.

The principle on which the air-pump is constructed, is the

the spring and elasticity of the air; as that on which the common or water pump is formed, is the gravity of the same air; the one gradually exhausting the air from a vessel by means of a piston, with a proper valve, working in a cylindrical barrel or tube; and the other exhausting water in a similar manner.

The air-pump has proved one of the principal means of performing philosophical discoveries, that has been invented by the moderns. The idea of such a machine occurred to several persons nearly about the same time. But the first it seems was completed by Otto Guericke, the celebrated consul of Magdeburg, who exhibited his first public experiments with it, before the emperor and the states of Germany, at the breaking up of the imperial diet at Ratisbon, in the year 1654. But it was not till the year 1672, that Guericke published a description of the instrument, with an account of his experiments, in his *Experimenta Nova Magdeburgica de Vacuo Spacia*; though an account of them had been published by Schottus in 1657, in his *Mechanica Hydraulico Pneumatica*.

Dr. Hook and M. Duhamel ascribe the invention of the air-pump to Mr. Boyle. But that great man frankly confesses that Guericke was beforehand with him in the execution. Some attempts, he assures us, he had indeed made upon the same foundation, before he knew any thing of what had been done abroad: but the information he afterwards received from the account given by Schottus, enabled him, with the assistance of Dr. Hook, after two or three unsuccessful trials, to bring his design to maturity. The product of their labours was a new air-pump, much more easy, convenient, and manageable, than the German one. And hence, or rather from the great variety of experiments to which this illustrious author applied the machine, it was afterwards called *Machine Boyleana*, and the vacuum produced by it *Vacuum Boyleanum*.

Most of the air-pumps that were first made, consisted of only one barrel, or hollow cylinder, of brass, with a valve at the bottom, opening inwards; and a moveable embolus or piston, having likewise a valve opening upwards, and so exactly fitted to the barrel, that when it is drawn up from the bottom, by means of an indented iron rod or rack, and a handle turning a small indented wheel, playing in the teeth of that rod, all the air will be drawn up from the cavity of the barrel; there is also a small pipe opening into the bottom of the barrel, by means of which it communicates with any proper vessel to be exhausted of air, which is called a receiver, from its office in receiving the subjects upon which experiments are to be made in vacuo: the whole being fixed in a convenient frame of wood-work, where the end of the pipe turns up into a horizontal plate, upon which the receiver is placed, just over that end of the pipe.

The other parts of this machine, being only accidental circumstances, chiefly respecting conveniency, have been diversified and improved from time to time, according to the address and several views of the makers. That of Otto Guericke was very rude and inconvenient, requiring the labour of two strong men, for more than two hours, to extract the air from a glass, which was also placed under water; and yet allowed of no change of subjects for experiments.

Mr. Boyle, from time to time, removed several of these inconveniences, and lessened others; but still the working of his pump, which had but one barrel, was laborious, by reason of the pressure of the atmosphere, a great part of which was to be removed at every lift of the piston, when the exhaustion was nearly completed. Various improvements were successively made in the machine by the philosophers about that time, and soon after, who cultivated this new and important branch of pneumatics; as Papin, Merfenne, Mariotte, and others. But still they laboured under a difficulty of working them, from the circumstance of the single barrel, till Papin, in his farther improvements of the air-pump, removed that inconvenience, by the use of a second barrel or piston, contrived to

rise as the other fell, and to fall as it rose; by which, and the great improvements made by Mr. Hauksbee, the pressure of the atmosphere on the descending piston always nearly balanced that of the ascending one; so that the winch, which worked them up and down, was easily moved by a very gentle force with one hand: and, besides this, the exhaustion was hereby made in less than half the time.

Some of the Germans, and others likewise, made improvements in the air-pump, and contrived it to perform the counter office of a condenser, in order to examine the properties of the air depending on its condensation.

Mr. Boyle contrived a mercurial gauge or index to the air-pump, which is described in his first and second *Physico-Mechanical Continuations*, for measuring the degrees of the air's rarefaction in the receiver. This gauge is similar to the barometer, being a long glass tube, having its lower end immersed in an open basin of quicksilver, but its other end, which was open also, communicating with the receiver; which, being exhausted, this tube is equally exhausted of air at the same time, and the external air presses the quicksilver up into the tube, to a height proportioned to the degree of exhaustion.

Mr. Vream, an ingenious pneumatic operator, made an improvement in Hauksbee's air-pump, by reducing the alternate up-and-down motion of the hand and winch to a circular one. In his method, the winch is turned quite round, and yet the pistons are alternately raised and depressed; by which the trouble of shifting the hand backwards and forwards, as well as the loss of time, and the shaking of the pump, are prevented.

The air-pump, thus improved, is represented in the annexed Plate, *fig. 1.* where A, is the receiver to be exhausted, ground truly level at the bottom, set over a hole in the top of the pump, from which descends the bent pipe B, to the cistern C, with which the two barrels D D, communicate, in which the pistons are worked by a toothed wheel, by turning the handle E; by which the racks F F, with the pistons, are worked alternately up and down. G G, is the gauge-tube, immersed in a basin of quicksilver H, at bottom, and communicating with the receiver at top; from which however it may be occasionally disengaged, by turning a cock. And I, is another cock, by turning of which, the air is again let into the exhausted receiver; into which it is heard to rush with a considerable hissing noise.

Notwithstanding the great excellency of Mr. Hauksbee's air-pump, it was still subject to inconveniences, from which it was in a great measure relieved by some contrivances of Mr. Smeaton, which are described at large in the *Philos. Transf.* for the year 1752. The principal improvements suggested by Mr. Smeaton, relate to the gauge, the valves of the piston, and the piston going closer down to the bottom of the barrel; for his pump has only one. By the last of these, the air was extracted more perfectly at each stroke. By the second, he remedied an inconvenience arising from the valve-hole of the piston being too wide properly to support the bladder-valve which covered it: instead of the usual circular orifice. Mr. Smeaton perforated the piston with seven small and equal hexagonal holes, one in the centre, and the other six around, forming together the appearance of a transverse section of a honey-comb; the bars or divisions between which, served to support the pressure of the air on the valve. His gauge consists of a bulb of glass, of a pear-like shape, and capable of holding about half a pound of quicksilver: it is open at the lower end, the other terminating in a tube hermetically sealed; and it has annexed to it a scale, divided into parts of about one-tenth of an inch, and answering to the 1000th part of the whole capacity. During the exhaustion of the receiver, the gauge is suspended in it by a wire; but when the pump has been worked as much as necessary, the gauge is pushed down, till the open end be immersed in a basin of quicksilver placed underneath. The air is then let into the receiver again,

and the quicksilver driven by it from the basin up into the gauge, till the air remaining in it become of the same density as the air without; and, as the air always takes the highest place, the tube being uppermost, the expansion will be determined by the number of divisions occupied by the air at the top. This air-pump is made to act also as a condensing engine, as some German machines had done before, by the very simple apparatus of turning a cock.

By means of this gauge, Mr. Smeaton judged that his machine was incomparably better than any former ones, as it seemed to rarefy the air in the receiver 1000, or even 2000, times, while the best of the former construction only rarefied about 140 times; and so the case has since been always understood, an implicit confidence being placed in Mr. Smeaton's accuracy, till the fallacy was accidentally detected in the manner related at large by Mr. Nairne, in the *Philos. Transf.* for the year 1777. This accurate and ingenious artist, wanting to make trial of Mr. Smeaton's pear-gauge, executed an air-pump of his improved construction, in the best manner possible; which, in various experiments made with it, appeared, by the pear-gauge, to rarefy the air to an amazing degree indeed, being at times from 4,000 to 10,000, or 50,000, or even 100,000, times rarefied. But, upon measuring the same expansion by the usual long and short tube gauges, which both accurately agreed together, he found that these never shewed a rarefaction of more than 600 times; widely different from the same as measured by the pear or internal gauge, by experiments often repeated.

"Finding (says Mr. Nairne) still this disagreement between the pear-gauge and the other gauges, I tried a variety of experiments; but none of them appeared to me satisfactory, till one day in April, 1776, shewing an experiment with one of these pumps to the Hon. Henry Cavendish, Mr. Smeaton, and several other gentlemen of the Royal Society, when the two gauges differed some thousand times from one another, Mr. Cavendish accounted for it in the following manner:—'It appeared (he said) from some experiments of his father's, Lord Cavendish, that water, whenever the pressure of the atmosphere on it is diminished to a certain degree, is immediately turned into vapour, and is as immediately turned back again into water on restoring the pressure. This degree of pressure is different according to the heat of the water: when the heat is 72° of Fahrenheit's scale, it turns into vapour as soon as the pressure is no greater than that of three quarters of an inch of quicksilver, or about one-fortieth of the usual pressure of the atmosphere; but, when the heat is only 41°, the pressure must be reduced to that of a quarter of an inch of quicksilver before the water turns into vapour. It is true, that water exposed to the open air, will evaporate at any heat, and with any pressure of the atmosphere; but that evaporation is intirely owing to the action of the air upon it; whereas the evaporation here spoken of, is performed without any assistance from the air. Hence it follows, that when the receiver is exhausted to the above-mentioned degree, the moisture adhering to the different parts of the machine will turn into vapour, and supply the place of the air, which is continually drawn away by the working of the pump; so that the fluid in the pear-gauge, as well as that in the receiver, will consist in a good measure of vapour. Now, letting the air into the receiver, all the vapour within the pear-gauge will be reduced to water, and only the real air will remain uncondensed; consequently the pear-gauge shews only how much real air is left in the receiver, and not how much the pressure or spring of the included fluid is diminished; whereas the common gauges shew how much the pressure of the included fluid is diminished, and that equally, whether it consists of air or of vapour."

Mr. Cavendish having explained so satisfactorily the cause of the disagreement between the two gauges, Mr. Nairne considered that, if he were to avoid moisture as much as possible, the two gauges should nearly agree. And in fact they were found to do so, each shewing a rare-

refaction of about 600, when all moisture was perfectly cleared away from the pump, and the plate and the edges of the receiver were secured by a cement instead of setting it upon a soaked leather, as in the usual way. But, by future experiments, Mr. Nairne found that the same excellent machine would not exhaust more than fifty or sixty times; when the receiver was set upon leather soaked in water, the heat of the room being about 57°. And from the whole, Mr. Nairne concludes that the air-pump of Otto Guericke, and those contrived by Mr. Gratorix and Dr. Hook, and the improved one by M. Papin, both used by Mr. Boyle; as also Hawksbee's, & Gravefande's, Muchenbroeck's, and of all those who have used water in the barrels of their pumps, could never have exhausted to more than between forty and fifty, if the heat of the place was about 57°; and although Mr. Smeaton, with his pump, where no water was in the barrel, but where leather soaked in a mixture of water and spirit of wine was used on the pump-plate, to set the receiver upon, may have exhausted all but a thousandth, or even a ten-thousandth, part of the common air, according to the testimony of his pear-gauge; yet so much vapour must have arisen from the wet leather, that the contents of the receiver could never be less than a seventieth or eightieth part of the density of the atmosphere. But, when nothing of moisture is used about this machine, it will, when in its greatest perfection, rarefy its contents of air about 600 times.

It is evident that by means of these two gauges we can ascertain the several quantities of vapour and permanent air which make up the contents of the receiver, after the exhaustion is made as perfect as can be; for the usual external gauge determines the whole contents, made up of the vapour and air, whilst the pear-gauge shews the quantity of real permanent air; consequently the difference is the quantity of vapour.

The principal cause which prevents this pump from exhausting beyond the limit above-mentioned, is the weakened elasticity of the air within the receiver, which, decreasing in proportion as the quantity of the air within is diminished, becomes at last incapable of lifting up the valve of communication between the receiver and the barrel; and consequently no more air can then pass from the former to the latter.

Several ingenious persons have used their endeavours to remove this imperfection in the best air-pumps. Amongst these, one Mr. Haas has succeeded tolerably well; having, by means of a contrivance to open the communication valve in the bottom of the barrel, made his machine so perfect, that, when every thing is in the greatest perfection, it rarefies the contents of the receiver as far as 1000 times, even when measured by the exterior gauge.

But the imperfections of the air-pump have more recently been removed by an ingenious contrivance of Mr. Cuthbertson, a mathematical-instrument maker at Amsterdam, now of London, whose air-pump has neither cocks nor valves, and is so constructed, that what supplies their place has the advantages of both, without the inconveniences of either. He has also made improvements in the gauges, by means of which he determines the height of the mercury in the tube, by which the degree of exhaustion is indicated, to the hundredth part of an inch. And to obviate the inconvenience of the elastic vapour arising from the wet leather, upon which the receiver is placed, for common experiments, he recommends the use of leather dressed with allum, and soaked in hog's lard, which he found to yield very little of this vapour; but, when the utmost degree of exhaustion is required, his advice is, to dry the receiver well, and set it upon the plate without any leather, only smearing its outer edges with hog's lard, or with a mixture of three parts of hog's lard and one of oil. But the use of the leather has long been laid aside by our English instrument-makers, a circumstance which probably had not come to Mr. Cuthbertson's knowledge. An account of this instrument, and of some experiments performed

AIR .

Improved Air Pumps.

London Published as the Act directs, Feb. 20th 1796, by W. Miller.

J. Pass. sculp.

performed with it, was published at Amsterdam in the year 1787; from which experiments it appears that, by a coincidence of the several gauges, a rarefaction of 1200 times was shewn; but, when the atmosphere was very dry, the exhaustion has been so complete, that the gauges have shewn the air in the receiver to be rarefied above 2400 times.

Fig. 2, in the annexed Plate, is a perspective view of Mr. Cuthbertson's air-pump, with its two principal gauges screwed into their places. These need not be used together, except in cases where the utmost exactness is required. In common experiments one of them is removed, and a stop-screw put in its place. *Fig. 3*, represents a cross-bar, for preventing the barrels from being shaken in working the pump, or by any accident. Its proper place in the pump is shewn by the dotted lines; where it is confined, and kept close down on the barrels, by two slips of wood A A, which must be drawn out, as well as the screws B B, when the pump is to be taken asunder.

There are made also, by different persons, portable or small air-pumps, of various constructions, to set upon a table, to perform experiments with, as represented in the Plate, *fig. 4*. In these, the gauge is varied according to the fancy of the maker, but commonly it consists of a bent glass tube, like a syphon, open only at one end. The gauge is placed under a small receiver communicating, by a pipe, with the principal pipe leading from the general receiver to the barrels. The close end of the gauge, of three or four inches long, before the exhaustion, has the quicksilver forced close up to the top by the pressure of the air on the open end; but, when the exhaustion is considerably advanced, it begins to descend, and then the difference of the heights of the quicksilver in the two legs, compared with the height in the barometrical tube, determines the degree of exhaustion. So if the difference between the two be one inch, when the barometer stands at 30°, the air is rarefied thirty times; but, if the difference be only half an inch, the rarefaction is sixty times, and so on.

In whatever manner or form this machine be made, the use and operation of it are always the same. The handle, which works the piston, is moved up and down in the barrel, by which means a barrel of the contained air is drawn out at every stroke of the piston, in the following manner: by pushing the piston down to the bottom of the barrel, where the air is prevented from escaping downwards, by its elasticity it opens the valve of the piston, and escapes upwards above it into the open air; then raising the piston up, the external atmosphere shuts down its valve, and a vacuum would be made below it, but for the air in the receiver, pipe, &c. which now raises the valve in the bottom of the barrel, and rushes in and fills it again, till the whole air in the receiver and barrel be of one uniform density, but less than it was before the stroke, in proportion as the sum of all the capacities of the receiver, pipe, and barrel, together, is to the same sum wanting the barrel. And thus is the air in the receiver diminished at each stroke of the piston, by the quantity of the barrel or cylinder full, and therefore always in the same proportion: so that, by thus repeating the operation again and again, the air is rarefied to any proposed degree, or till it has not elasticity enough to open the valve of the piston or of the barrel, after which the exhaustion cannot be any farther carried on: the gauge, in comparison with the barometer, shewing at any time what the degree of exhaustion is, according to the particular nature and construction of it.

But, supposing no vapour from moisture, &c. to rise in the receiver, the degree of exhaustion, after any number of strokes of the piston, may be determined by knowing the respective capacities of the barrel and the receiver, including the pipe, &c. For as we have seen above that every stroke diminishes the density in a constant proportion, namely, as much as the whole content exceeds that of the cylinder or barrel; and consequently the sum of as many diminutions as there are strokes of the piston, will

shew the whole diminution by all the strokes. So, if the capacity of the barrel be equal to that of the receiver, in which the communication-pipe is always to be included; then, the barrel being half the sum of the whole contents, half the air will be drawn out at one stroke; and consequently the remaining half, being dilated through the whole or first capacity, will be of only half the density of the first: in like manner, after the second stroke, the density of the remaining contents will be only half of that after the first stroke, that is, only one-fourth of the original density; continuing this operation, it follows that the density of the remaining air will be one-eighth after three strokes of the piston, one-sixteenth after four strokes, $\frac{1}{32}$ after five strokes, and so on, according to the powers of the ratio $\frac{1}{2}$; that is, such power of the ratio as is denoted by the number of the strokes.

Some of the principal effects and phenomena of the air-pump, are the following:—That, in the exhausted receiver, heavy and light bodies fall equally swift; so, a guinea and feather fall from the top of a tall receiver to the bottom exactly together. That most animals die in a minute or two: but, however, That vipers and frogs, though they swell much, live an hour or two; and, after being seemingly quite dead, come to life again in the open air. That snails survive about ten hours; efts, or slow-worms, two or three days; and leeches five or six. That oysters live for twenty-four hours. That the heart of an eel, taken out of the body, continues to beat for good part of an hour, and that more briskly than in the air. That warm blood, milk, gall, &c. undergo a considerable intumescence and ebullition. That a mouse or other animal may be brought, by degrees, to survive longer in a rarefied air than it naturally does. That air may retain its usual pressure, after it is become unfit for respiration. That the eggs of silk-worms hatch in vacuo. That vegetation stops. That fire extinguishes; the flame of a candle usually going out in about one minute; and charcoal in about five minutes. That red-hot iron, however, seems not to be affected; and yet sulphur or gunpowder are not lighted by it, but only fused. That a match, after lying seemingly extinct a long time, revives again on re-admitting the air. That a flint and steel strike sparks of fire as copiously, and in all directions, as in air. That magnets, and magnetic-needles, act the same as in air. That the smoke of an extinguished luminary gradually settles to the bottom in a darkish body, leaving the upper part of the receiver clear and transparent; and that on inclining the vessel sometimes to one side, and sometimes to another, the smoke preserves its surface horizontal, after the nature of other fluids. That heat may be produced by attrition. That camphire will not take fire; and that gun-powder, though some of the grains of a heap of it be kindled by a burning-glass, will not give fire to the contiguous grains. That glow-worms lose their light in proportion as the air is exhausted, and at length become totally obscure; but, on re-admitting the air, they presently recover it all. That a bell, on being struck, is not heard to ring, or very faintly. That water freezes. But that a syphon will not run. That electricity appears like the aurora borealis. With multitudes of other curious and important particulars, to be met with in the numerous writings on this machine, namely, besides the Philosophical Transactions of most Academies and Societies, in the Writings of Torricelli, Pascal, Merfenne, Guericke, Schottus, Boyle, Hook, Duhamel, Mariotte, Hauksbee, Hales, Muschenbroeck, Gravesande, Desaguliers, Franklin, Cotes, Helsham, and a great many other authors. See also the article PNEUMATICS.

AIR-SHAFTS, among miners, denote holes or shafts let down from the open air to meet the adits and furnish fresh air. The damps, want and impurity of air, which occur, when adits are wrought thirty or forty fathoms long, make it necessary to let down air-shafts, in order to give the air liberty to play through the whole work, and thus discharge bad vapours, and furnish good air for respiration: the

expende of which shafts, in regard to their vast depths, hardness of the rock, drawing of water, &c. sometimes equals, nay exceeds, the ordinary charge of the whole adit. Sir Robert Murray describes a method, used in the coal-mines at Liege, of working mines without air-shafts.

When the miners at Mendip have sunk a groove, they will not be at the charge of an air-shaft till they come at ore; and for the supply of air have boxes of elm exactly closed, of about six inches in the clear, by which they carry it down about twenty fathoms. They cut a trench at a little distance from the top of the groove, covering it with turf and rods disposed to receive the pipe, which they contrive to come in sideways to their groove, four feet from the top; which carries down the air to a great depth. When they come at ore, and need an air-shaft, they sink it four or five fathoms distant, according to the convenience of the breadth, and of the same fashion with the groove, to draw as well ore as air.

AIR-THREADS, in natural history, a name given to the long filaments, so frequently seen in autumn floating about in the air. These threads are the work of spiders, especially of that species called the long-legged field-spider; which, having mounted to the summit of a bush or tree, darts from its tail several of these threads, till one is produced capable of supporting the creature in the air: on this it mounts in quest of prey, and frequently rises to a very considerable height. See *ARANEÆ*.

AIR-TRUNK, is a contrivance by Dr. Hales to prevent the stagnation of putrid effluvia in gaols, and other places where a great number of people are crowded together in a small space. It consists of a long square trunk open at both ends; one of which is inserted into the ceiling of the room, the air of which is required to be kept pure; and the other extends a good way beyond the roof. Thro' this trunk a continued circulation is carried on: and the reason is, that the putrid effluvia which do so much mischief when collected, being much lighter than the pure atmosphere, arise to the top of the room; and, if they there find a vent, will continually go out through it. These effluvia arise in very considerable quantity, being calculated by the late Dr. Keil at no less than thirty-nine ounces from one man in twenty-four hours.

These trunks were first made trial of by Mr. Yeoman, over the House of Commons, where they were nine inches wide within; and over the court of King's Bench in Westminster-hall, where they were six inches wide. They are sometimes made wider, and sometimes narrower: but the wider they are the longer they ought to be, more effectually to promote the ascent of the vapour. The reason why vapours of this kind ascend more swiftly through a long trunk than a short one, is, that the pressure of fluids is always according to their different depth, without regard to the diameter of their basis, or of the vessel which contains them; and, upon this principle, a gallon of water may be made to split a strong cask. See *HYDROSTATICS*. When the column of putrid effluvia is long and narrow, the difference between the column of atmosphere pressing on the upper end of the trunk, and that which presses on the lower end, is much greater than if the column of putrid effluvia was short and wide; and, consequently, the ascent is much swifter. One pan of a single pair of scales, which was two inches in diameter, being held within one of these trunks over the House of Commons, the force of the ascending air made it rise so as to require four grains to restore the equilibrium, and this when there was no person in the house; but, when it was full, no less than twelve grains were requisite to restore the equilibrium; which clearly shews that these trunks must be of real and very great efficacy.

AIR-VESSEL, in hydraulics, is a vessel of air within some water-engines, which being compressed, by forcing in a considerable quantity of water, by its uniform spring, forces it out at the pipe in a constant uninterrupted stream, to a great height.

Air-vessel too, in the improved fire-engines, is a metal-

lic cylinder, placed between the two forcing-pumps, by the action of whose pistons the water is forced into this vessel, through two pipes, with valves; then the air, previously contained in it, is compressed by the water, in proportion to the quantity admitted, and this air, by its spring, forces the water through a pipe by a constant and equal stream; whereas, in the common squirting engine, the stream is discontinued between the several strokes. See *HYDRAULICS*.

AIR-VESSELS, in botany, are spiral ducts in the leaves, &c. of plants, supposed to be analagous to the lungs of animals, in supplying the different parts of a plant with air.

AIRY, *adj.* [from *air*; *aërius*, Lat.] Composed of air. Relating to the air; belonging to the air.—There are fishes that have wings, that are no strangers to the *airy* region. *Boyle*.—High in air. Open to the free air. Light as air; thin; unsubstantial; without solidity.—I hold ambition of so *airy* and light a quality, that it is but a shadow's shadow. *Shakespeare*.—Wanting reality; having no steady foundation in truth or nature; vain; trifling.—I have found a complaint concerning the scarcity of money, which occasioned many *airy* propositions for the remedy of it. *Temple*.—Fluttering; loose; as if to catch the air; full of levity.—By the name of ladies, he means all young persons, slender, finely shaped, *airy*, and delicate: such as are nymphs and Naiads. *Dryden*.—Gay; sprightly: full of mirth; vivacious; lively; spirited; light of heart.—He that is merry and *airy* at shore when he sees a sad tempest on the sea, or dances when God thunders from heaven, regards not when God speaks to all the world. *Taylor*.

AIR, *f.* in mythology, was adored by the Heathens under the names of Jupiter and Juno; the former representing the superior and finer part of the atmosphere, and the latter the inferior and grosser part. The augurs also drew presages from the clouds, thunder, lightning, &c.

AIR, in painting, &c. denotes the manner and very life of action; or it is that which expresses the disposition of the agent. It is sometimes also used in a synonymous sense with gesture or attitude.

AIR, in music, is taken in different senses. It is sometimes contrasted with harmony; and, in this sense, it is synonymous with melody in general. Its proper meaning is, A tune which is set to words, or to short pieces of poetry that are called *songs*. In operas, we give the name of *air* to such pieces of music as are formed with measures and cadences, to distinguish it from the recitative; and, in general, every piece of music is called an air, which is formed for the voice, or even for instruments, and adapted to stanzas, whether it forms a whole in itself, or whether it can be detached from any whole of which it forms a part, and be executed alone. If the subject admits of harmony, and is set in parts, the air is, according to their number, denominated a *duett*, a *trio*, a *quartetto*, &c. We need not follow Rousseau, and the other philologists, in their endeavours to investigate the etymon of the word *air*. Its derivation, though found and ascertained, would contribute little to illustrate its meaning in that remote sense, to which, through a long continuance of time, and the various vicissitudes of language, it has now passed. The curious may consult the same article in the *Dictionnaire de Musique*, by M. Rousseau.

In modern music, there are several different kinds of *airs*, each of which agrees to a certain kind of dancing, and from these dances the airs themselves take their specific names. The airs of our operas, are, if we may be permitted the expression, the canvass or substratum upon which are painted all the pictures of imitative music; melody is the design, and harmony the colouring; every picturesque object selected from the most beautiful parts of nature, every reflected sentiment of the human heart, are the models which the artist imitates; whatever gains attention, whatever interests the soul, whatever charms the ear, or causes emotion in the heart, these are the objects of his imitation. See *IMITATION*. An air which delights the

the ear, and discovers the learning of the composer; an air invented by genius, and composed with taste, is the noblest effort of music: it is this which explores the compass, and displays the delicacy, of a beautiful voice; it is in this where the charms of a well-conducted symphony shine; it is by this, that the passions, excited and inflamed by nice gradations, reach and agitate the soul through the avenues of external sense. After hearing a beautiful air, the mind is acquiescent and serene: the ear is satisfied, not disgusted: it remains impressed on the fancy, it becomes a part of our essence, we carry it with us, we are able to repeat it at pleasure: without the ability acquired by habit to breathe a single note of it, we execute it in our imagination in the same manner as we heard it upon the theatre: one sees the scene, the actor, the theatre; one hears the accompaniments and the applauses. The real enthusiast in music never forgets the beautiful airs which he has heard; when he chooses, he causes the opera to re-commence.

AIR, or **AYR**, a town of Scotland, capital of an extensive county of the same name. It stands on the river Air, and was formerly a place of good trade, and seat of fisheries; all of which have vanished, and the people now live by one another. Air appears, from history and other documents, to have been a considerable place at the time of the Norman conquest. About a mile north from the town there is a lazaret-house, commonly called the King's Chapel, which king Robert de Bruce set apart for the maintenance of lepers.

AIRA, *f.* [*αἶρα*, Gr.] In botany, a genus of the triandria digynia class, of the natural order of gramina or grasses. The generic characters are—Calyx: a two-flowered two-valved glume; valves ovate-lanceolate, acute, equal. Corolla: bivalve; valves like those of the calyx; nectary two-leaved; leaflets acute, gibbous at the base. Stamina: filaments capillary, the length of the flower, with oblong antheræ, forked at each end. Pistillum: germ ovate; styles setaceous spreading, with pubescent stigmas. Pericarpium: none. Seed: subovate, covered by the corolla.—*Essential Character.* Calyx two-valved, two-flowered, without any rudiment of a third.

Species. I. Naked or awnless. 1. *Aira arundinacea*, or reedy aira-grafs: panicle oblong, on one side, imbricate; leaves flat. Found by Tournefort in the Levant, and by Loureiro in Cochinchina.

2. *Aira minuta*, or minute aira-grafs: panicle loose, almost level-topped, very branching. An annual grass, found by Loefling in Spain. It differs from that which is figured by Buxbaum, only in being much smaller, and not an inch high.

3. *Aira aquatica*, or water aira-grafs: panicle spreading, flowers smooth, longer than the calyx, leaves flat. In the water this grass runs to a considerable distance, throwing off roots and young shoots as it passes along; the stalk is hollow, and remarkably tender. It is easily known by the purple or bluish colour of the panicles; the flowers also have a sweet taste. It flowers in June and July, but it is not worth cultivating. *Poa aquatica* is a much stronger plant. There is a variety of this (according to Schreber) in dry soils, which has the calyxes five-flowered, and the flowers very remote from each other.

II. Awned. 4. *Aira subspicata*, or spiked aira-grafs: leaves flat, panicle spiked, flowers awned on the middle; awn reflex, loose. Found on the mountains of Switzerland, Savoy, Denmark, and Lapland. Perennial.

5. *Aira cæspitosa*, or turf aira-grafs: leaves flat; panicle spreading; petals villous and awned at the base; awn straight, short. In moist meadows it sometimes produces three or four floscules in one calyx. In marshes it is frequently viviparous. Growing in tufts, it occasions irregularities, tussocks, or hassocks, as they are vulgarly called in meadows. Cows, goats, and swine, eat it, but horses are not fond of it. Found in meadows, fields, and woods. Perennial.

6. *Aira flexuosa*, or heath aira-grafs: leaves setaceous, culms almost naked, panicle divaricated, peduncles flexuose. This species is eaten by horses, kine, and sheep. It is a native of heaths, barren pastures, and rocky moors. Perennial.

7. *Aira montana*, or mountain aira-grafs: leaves setaceous, panicle narrowed, flowers hairy at the base and awned, awn twisted and very long. According to Haller, Leers, &c. this is only a variety of the foregoing. Mr. Hudson has a variety of this which he calls *setacea*. Native of high heaths and barren pastures, and is perennial. Sheep are very fond of it.

8. *Aira Alpina*, or Alpine aira-grafs: leaves subulate, panicle dense, flowers hairy at the base and awned; awn short. Grows on the mountains of Germany, Savoy, and Lapland.

9. *Aira villosa*, or villose aira-grafs: leaves subulate, panicle long and narrow; flowers sesquialteral, shaggy, awned; awn straight, short. Found at the Cape of Good Hope by Thunberg.

10. *Aira canescens*, or grey aira-grafs: leaves setaceous, the upper one involving the panicle at bottom like a spathe. Native of sandy shores, the walls of Basil, and the sandy fields of Germany and Piedmont.

11. *Aira præcox*, or early aira-grafs: leaves setaceous, sheaths angled, flowers panicle-spiked, and awned at the base. This species has a sweet taste; cows are very fond of it; horses and sheep eat it. It is found in ditches, on banks of streams, and in wet meadows; flowering in June and July.

12. *Aira coryphyllea*, or silver aira-grafs: leaves setaceous, panicle divaricated, flowers awned distant. Native of sandy pastures and heaths of England, France, Switzerland, Piedmont, Germany, and Denmark. Annual.

13. *Aira Antartica*, or South-Sea aira-grafs: leaves flat; panicle compound, spreading; calyxes three flowered; floscules awned in the middle; awn elongated straightish. Native of New Zealand.

14. *Aira involucrata*, or involucred aira-grafs: panicle spreading, involucred with bristles at the base; floscules awnless. It is annual, and flowers in June and July. Native of Spain, near Madrid, on barren hills.

Propagation and Culture. See GRASS.

AIRA, *f.* in botany. See **MELICA**, **POA**, **CYNOSURUS**, and **HOLCUS**.

AIRA CAPENSIS, *f.* in botany. See **EHRHARTA**.

AIRA INDICA, *f.* in botany. See **PANICUM**.

AIRA VARIA, *f.* in botany. See **CYNOSURUS**.

AIRANI, *f.* in church-history, an obscure sect of Arians, in the fourth century, who denied the consubstantiality of the Holy Ghost with the Father and the Son. They are otherwise called *Airanista*; and are said to have taken their name from one *Airas*, who distinguished himself at the head of this party, in the reigns of Valentinian and Gratian.

AIRE, a town of France, in Proper Gascony, of which it is the capital; was a bishop's see. It is seated on the river Adour, on the declivity of a mountain. E. lon. 0. 3. N. lat. 43. 47.

AIRE, a strong town in the Netherlands, in the county of Artois, with a castle. It was taken by the French in 1710, and was confirmed to them by the treaty of Utrecht. It is seated on the river Lis, twenty-two miles south of Dunkirk, and communicates with St. Omer's by a canal cut from the river Aa. E. lon. 2. 31. N. lat. 50. 38.

AIRS, in the manege, are the artificial motions of taught horses; as the demivolt, curvet, capriole, &c.

AIRY TRIPLICITY, among astrologers, denotes the three signs, gemini, libra, and aquarius.

AISLE, *f.* [Thus the word is written by Addison, but perhaps improperly; since it seems deducible only from, either *aile*, a wing, or *allée*, a path, and is therefore to be written *aile*.] The walks in a church, or wings of a quire.—The abbey is by no means so magnificent as one would expect

expect from its endowments. The church is one huge nef, with a double *aisle* to it; and, at each end, is a large quire. *Addison*.

AISNE, a river of France, which rises in Champaign, and runs W. by Soissons in the Isle of France, falling in the river Oise, a little above Campeigne.

AIT, or **EYGH**, *f.* [supposed, by *Skinner*, to be corrupted from *islet*.] A small island in a river.

AITOCZU, a considerable river of Lesser Asia, which, arising in the mountain Taurus, falls into the south part of the Euxine sea.

AITONIA, *f.* [from Mr. Aiton, late gardener to his majesty at Kew.] In botany, a genus of the monadelphia octandria class, of the natural order of columniferae. The generic characters are—Calyx: perianth one-leaved, erect, four-parted, short, divided into four ovate sharp segments. Corolla: has four, erect, equal, broadly-ovate, concave, very obtuse, petals. Stamina: filaments joined as far as the middle, divided above into eight; awl-shaped, furrowed, standing out of the corolla; and having ovate furrowed antherae. Pistillum: germ superior, ovate, smooth, subangular; style one, filiform, of the same length with the stamens; stigma obtuse, undivided. Pericarpium: an ovate, dry, membranaceous, four-cornered, one-celled, brittle, berry; the corners are produced and sharp. Seeds: many, fixed to a column, globular and smooth. Obf. It varies with five-cleft ten-stamened flowers.—*Essential Character*. Style, one. Calyx, four-parted. Corolla, four-petalled. Berry, dry, quadrangular, one-celled, many-seeded.

There is only one *species*, which is called *aitonia* Capensis, or Cape *aitonia*. The fruit resembles that of the winter cherry. It was found at the Cape by Thunberg; and introduced here in 1774, by Mr. Francis Masson. This shrub is of slow growth with us, and seldom exceeds three feet in height. When it is of sufficient age, it produces flowers and fruit through most of the year. The segments of the calyx and the petals are red at the ends; the fruit is also of a fine red colour, and large.

Propagation and Culture. It is raised only from seeds, which are sparingly produced in this country; and it must be kept in the green-house or Cape-stove.

AJUGA *f.* [*a* priv. and *Juga*, one of Juno's names; from a supposed power of procuring abortion; which however this plant does not possess.] In botany, a genus of the didymia gymnospermia class, of the natural order of verticillatae or labiatae. The generic characters are—Calyx: perianth one-leaved, short, cut half-way into five clefts, with the segments nearly equal. Corolla: monopetalous, ringent; tube cylindric, bent in, upper lip very small, erect, bifid, obtuse; lower large, spreading, trifid, obtuse; middle division very large and obcordate; side-ones small. Stamina: filaments subulate, erect, longer than the upper lip: antherae twin. Pistillum: germ four-parted; style filiform, situation and length as in the stamens; stigmas two, slender, the lowest shorter. Pericarpium: none; the calyx, which is converging, fosters the seeds. Seeds: somewhat oblong.—*Essential Character*. Corolla, upper lip very small. Stamina, longer than the upper lip.

Species. 1. *Ajuga orientalis*, or eastern bugle: flowers inverted. This species has purple flowers. It was first brought into Europe from the Levant, by Tournefort. It has since been observed by Thunberg in Japan, and by Loureiro in Cochinchina. There are two or three varieties differing only in the colours of their flowers.

2. *Ajuga pyramidalis*, or pyramidal bugle: spike a quadrangular villous pyramid, leaves approximating, root-leaves very large, bractes nearly entire. The leaves are often brown, and the plant is biennial. It flowers in April: with us usually later. A native of Italy, France, Germany, Switzerland, Sweden, and Denmark; also of Wales and Scotland.

3. *Ajuga alpina*, or alpine bugle: stem simple, stem-leaves equalling the radical ones. Alpine bugle has the

leaves much longer than those of the common fort; the stalks are weaker, and decline on every side; and the whirls of flowers are much smaller, and more distant. It differs from the second in the leaves being wrinkled, more ovate and crowded, hirsute, the petioles shorter and broader, the spike proceeding immediately from the root. At the top of the root are circles of leaves, whence arise leafy stems, four or six inches high. It also differs from the second, according to Linnæus, in the root-leaves being scarcely larger than the others: flowers on both sides ten, not three; deep blue, not white; bractes green, not coloured. Grows naturally on the Alps, and is admitted into some gardens for the sake of variety, and propagates in plenty by its trailing stalks. It requires a moist shady situation. Introduced here in 1775, by doctors Pitcairn and Fothergill.

4. *Ajuga genevensis*, or geneva bugle: leaves downy streaked with lines, lowermost narrower; calyxes shaggy; bractes generally three-lobed. This species approaches near to the common fort, but the leaves are downy, and the calyxes very rough. There are two varieties of this, one with a white, the other with a red, flower. It grows wild not only about Geneva, but also in many of the southern countries of Europe.

5. *Ajuga reptans*, or common bugle: smooth and creeping by runners. The common bugle has the stalk upright, six inches high, hairy, purple. It flowers from May to June. It grows naturally in woods and moist meadows in most parts of England, and the countries of Europe south of us. It increases gently by the side-shoots, which put out roots at their joints. There are two varieties of this, one with a white, and the other with a pale purple, flower, which grow in several parts of Westmoreland; but these do not differ in any other respect than in the colour of their flowers from the blue sort. The common bugle is recommended as a vulnerary herb, both internally and externally. It is numbered amongst cooling and gently astrigent vegetables. The roots strike a black colour with vitriol of iron. Some foreign physicians of eminence recommended a decoction of this herb in the quinsy, but it is out of use among us. It is constantly found mixed with the vulnerary herbs imported from Switzerland. Official writers call it *consolida media*, or middle confound. This is so common wild, that it is seldom admitted into gardens.

6. *Ajuga decumbens*, or Japanese bugle: decumbent and villous; leaves obovate, toothed. This species has branched, decumbent with the ends standing up, four or five inches in length. Root-leaves many, larger than those on the stem, all petiolate. The flowers in whirls small and blue.

Propagation and Culture. The first sort requires a little protection in winter, the plants should be put into pots filled with a loamy soil; they may stand in a shady situation during summer; but in winter they must be removed under a common frame, where they may enjoy as much free air as possible in mild weather; in hard frosts however they must be covered. It may be propagated by seeds, which should be sown soon after they are ripe, in a pot filled with loam, placed in a shady situation till autumn, and then removed under a frame. In the spring, they should be transplanted into separate pots, as soon as they are strong enough to remove, and treated as directed for the old plants. It may be also increased by offsets: but this is a very slow method, because this species puts out few of them. The sixth sort may be increased and treated in the same manner. As to all the rest, they are hardy, and easily multiplied by the side-shoots: they delight in a moist shady situation, and are apt to spread too much.

AJUGA, *f.* in botany. See **TEUCRIUM**.

AIUS LOCUTIUS, the name of a deity to whom the Romans erected an altar.—The words signify “a speaking voice.”—The following accident gave occasion to the Romans erecting an altar to the Aius Locutius: A plebeian, named

named M. Seditius, acquainted the tribunes, that, in walking the streets by night, he had heard a voice over the temple of Vesta, giving the Romans notice that the Gauls were coming against them. This intimation was, however, neglected; but, after the truth was confirmed by the event, Camillus acknowledged this voice to be a new deity, and erected an altar to it under the name of the Aius Locutius.

AJUTAGE, *f.* [*ajutage*, Fr.] A kind of tube fitted to the mouth of the vessel through which the water of a fountain is to be played. To the different form and structure of ajutages is owing to the great variety of fountains. See **FOUNTAIN** and **HYDROSTATICS**.

AIX, a small ancient town in the duchy of Savoy, with the title of a marquise. It is seated on the lake Bourget, at the foot of a mountain, between Chamberry, Annecy, and Rumilly. Here is a triumphal arch of the ancient Romans, but it is almost entirely ruined. The mineral waters bring a great number of strangers to this place. It was originally called *Aqua Gratiana*, from the hot baths built there by the emperor Gratian. E. long. 7. 10. N. lat. 45. 40.

AIX, an ancient city, the capital of Provence, in France. It has the air of silence and gloom so commonly characteristic of places destitute of commerce or industry. It is, however, a well-built city; and most like Paris of any place in France, as well for the largeness of the buildings as in respect of the politeness of the inhabitants. It is embellished with abundance of fine fountains, and several beautiful squares. The preachers square is on the side of a hill; it is about 160 yards in length, and is surrounded with trees, and houses built with stone three stories high. The guild-hall is at one end of the city, and is distributed into several fine apartments. The hotel of the city is a handsome building, but hid by the houses of the narrow street in which it is placed. The cathedral church is a gothic structure, with tombs of several earls of Provence, and some good pictures by French masters. The Corse, or Orbitelle, is a magnificent walk, above 300 yards long, formed by a triple avenue of elms, and two rows of regular and stately houses. The church of the fathers of the oratory is a handsome building; and not far from thence is the chapel of the blue penitents, which is full of paintings. The convent of preachers is very fine; in their church was a silver statue of the Virgin Mary almost as big as the life. There are other churches and buildings which contain a great number of rarities. The baths without the city have good buildings, raised at a vast expence, for the accommodation of those who drink the waters. Although Aix was the first Roman settlement in Gaul, it is not remarkable for ancient remains. The warm springs, from which it is now known and frequented, induced Sextus Calvinus to found a colony here, to which he gave the name of *Aqua Sextia*. They were supposed to possess particular virtues in cases of debility; and several altars have been dug up sacred to Priapus, the inscriptions on which indicate their gratitude to that deity for his supposed succour and assistance. E. long. 5. 32. N. lat. 43. 32.

AIX, a small island on the coast of France, between the isle of Oleron and the continent. It is twelve miles north-west of Rochfort, and twelve south-south-west of Rochelle. W. long. 1. 4. N. lat. 46. 5.

AIX-LA-CHAPELLE, a fine city of Germany, in the circle of Westphalia and duchy of Juliers.—All authors are agreed about its antiquity, it being mentioned in Cæsar's Commentaries and the Annals of Tacitus. The Romans had colonies and fortresses there, when they were at war with the Germans; but the mineral waters and the hot bath so increased its fame, that, in process of time, it was advanced to the privileges of a city, by the name of *Aquægranii*, that is, the waters of Granian; that which it has now, of Aix-la-Chapelle, was given it by the French, to distinguish it from the other Aix. It is so called, on account of a chapel built in honour of the Holy

Virgin by Charlemagne; who, having repaired, beautified, and enlarged, the city, which was destroyed by the Huns in the reign of Attila in 451, made it the usual place of his residence. The town is seated in a valley surrounded with mountains and woods, and yet the air is very wholesome. It may be divided into the inward and outward city. The inward is encompassed with a wall about three quarters of a league in circumference, having ten gates; and the outward wall, in which there are eleven gates, is about a league and a half in circumference. There are rivulets which run through the town and keep it very clean, turning several mills; besides twenty public fountains, and many private ones. They have stone-quarries in the neighbourhood, which furnish the inhabitants with proper materials for their magnificent buildings, of which the stadt-house and the cathedral are the chief. There are likewise thirty parochial or collegiate churches. The market-place is very spacious, and the houses round it are stately.

Aix-la-Chapelle is a free imperial city, and changes its magistracy every year on the eve of St. John Baptist. The mayor is in the nomination of the elector palatine, in the quality of the Duke of Juliers, as protector of the city. This place is famous for several councils and treaties of peace concluded here; particularly those between France and Spain in 1668, and between Great Britain and France in 1748.

The hot sulphureous waters for which this place has so long been celebrated, arise from several sources, which supply eight baths constructed in different parts of the town. These waters near the sources are clear and pellucid; and have a strong sulphureous smell resembling the washings of a foul gun; but they lose this smell by exposure to the air. Their taste is saline, bitter, and urinous. They do not contain iron. They are also neutral near the fountain, but afterwards are manifestly and pretty strongly alkaline, inasmuch that clothes are washed with them without soap.—On the vaults above the springs and aqueducts of these waters is found, every year, when they are opened, a quantity of fine white-coloured flowers of sulphur, which has been sublimed from the waters. The heat of the water of the hottest spring, by Dr. Lucas's account, raises the quicksilver of Fahrenheit's thermometer to 136—by Mons. Monet's account, to 146—and the heat of the fountain, where they commonly drink, by Dr. Lucas's account, to 112. These waters are powerfully diaphoretic and diuretic; and, if taken in quantity, prove purgative. Of the three hot European waters of note, viz. that of Aix-la-Chapelle, Bourbon, and Bath, the first abounds more eminently with sulphur, whence it is the hottest, the most nauseous, and purgative. The Bath water is, however, the least possessed of these qualities. These waters are efficacious in diseases proceeding from indigestion, and from foulness of the stomach and bowels. In rheumatisms; in the scurvy, scrophula, and diseases of the skin; in hysteric and hypochondriac disorders; in nervous complaints and melancholy; in the stone and gravel; in paralytic complaints; in those evils which follow an injudicious use of mercury; and in many other cases. They ought not, however, to be given in hectic cases where there is heat and fever, in putrid disorders, or where the blood is dissolved, or the constitution much broken down. The time of drinking, in the first season, is from the beginning of May to the middle of June; and, in the latter season, from the middle of August to the latter end of September.

There are galleries or piazzas under which the company walk during the time of drinking, in order to promote the operation of the waters.—The Poor's Bath is free for every body, and is frequented by crowds of poor people. It is scarcely necessary to add, that there are all kinds of amusements common to other places of public resort; but the sharps appear more splendidly here than elsewhere, assuming titles, with an equipage suitable to them.—Aix-la-Chapelle is twenty-one miles from Spa, thirty-

thirty-six from Liege, and thirty from Cologne. E. lon. 5. 48. N. lat. 51. 55.

AIZOON, *f.* [*αἰζών*, *sempervivum* or ever-living.] In botany, a genus of the icofandria pentagynia class, ranking in the natural order of succulentæ. The generic characters are—Calyx: perianthium one-leaved: divided into five lanceolate permanent segments. Corolla: none. Stamina: filaments very many, capillary, inserted by bunches into the sinuses of the calyx. Antheræ simple. Pistillum: germ five-cornered, superior. Styles five, simple. Sigmæ simple. Pericarpium: capsule five-celled, five-valved, swelling and retuse. Seeds: several, roundish, or kidney-shaped.—*Essential Character.* Calyx, five-parted. Petals, none. Capsules, superior, five-celled, five-valved.

Species. 1. Aizoon canariense, or purslane-leaved aizoon: leaves wedge-ovate, flowers sessile. A native of the Canary islands. Annual.

2. Aizoon hispanicum, or Spanish aizoon: leaves lanceolate, flowers sessile. It grows naturally in Spain and Africa. This is also an annual plant, whose branches trail on the ground. The flowers have no beauty; these plants therefore are preserved only by those who are curious in collecting rare plants. A variety of this comes from the Cape, with the stem and leaves shaggy, but the upper surface of the leaves less so.

3. Aizoon-lanceolatum, or panicled aizoon: leaves lanceolate, flowers panicled. It grows naturally at the Cape of Good Hope. This is of humble growth, and perishes soon after the seeds are ripe. Cultivated in 1759, by Mr. Miller. Biennial.

4. Aizoon farmentosum: leaves linear-filiform, panicle dichotomous, flowers solitary, peduncled. 5. Aizoon paniculatum, or panicled aizoon: shaggy; leaves lanceolate; flowers sessile; branches erect. 6. Aizoon perfoliatum, or perfoliate aizoon: downy; leaves inversely-ovate, conjoined, crystalline-dotted; flowers peduncled. 7. Aizoon glinoides, or hairy aizoon: shaggy, herbaceous, procumbent; leaves ovate, flowers sessile, distinct. 8. Aizoon secundum: shag-hoary, herbaceous, procumbent: leaves ovate; flowers sessile, imbricate, one-ranked. 9. Aizoon fruticosum, or shrubby aizoon: shrubby, erect, smooth; leaves lanceolate; flowers sessile. 10. Aizoon rigidum, or stiff aizoon: shrubby, procumbent, downy; leaves ovate; flowers sessile, remote. All these were found at the Cape; the fourth by Sparrman, the rest by Thunberg.

Propagation and Culture. The first sort must be raised on a moderate hot-bed in the spring; and, when the plants are fit to remove, they should be carefully taken up, and planted each in a small pot filled with fresh light earth, and plunged into another moderate hot-bed, observing to shade them from the sun, until they have taken fresh root; after which they must be hardened by degrees to bear the open air, into which they should be removed in June, placing them in a sheltered situation, where they will flower, and ripen their seeds in September, soon after which the plants will perish. The second and third sorts may be propagated in the same manner; and, when the plants have acquired strength, they may be removed into the full ground; but they require a poor sandy soil, for in rich ground they grow very luxuriant in branches, but will not flower till late in the season, and therefore rarely perfect their seeds; but when they are planted in dry sand, or lime-rubbish, they will be more productive of flowers, and less vigorous in their branches. The other species must be managed in the same manner, as other Cape plants.

AIZOON, *f.* in botany. See **SEDUM**.

AKBER, emperor of Indostan, the sixth in descent from Tamerlane, and contemporary with queen Elizabeth, was universally esteemed a great and good prince. He was also successful in war, having in his reign made several conquests, and reduced to obedience almost all the provinces of Indostan which had revolted from his father,

and predecessor, Hemajoon; and his political talents, together with his unremitting attention to the happiness of his subjects, are sufficiently apparent from the regulations which he established for every department of the empire. He was born at Amercote, A. D. 1542, was proclaimed emperor in 1556, and died at Agra in 1605, after a reign of forty-nine years and eight months. The history of this potentate has been written, with great elegance and precision, by the vizier Abul Fazel, under the title of "Ayeen Akbery, or, the Institutes of the emperor Akber."

To AKE, *v. n.* [from *αχέ*, Gr. and therefore more grammatically written *ache*.] To feel a lasting pain, generally of the internal parts; distinguished from smart, which is commonly used of uneasiness in the external parts; but this is no accurate account.—Were the pleasure of drinking accompanied, the very moment, with that sick stomach and *aching* head, which, in some men, are sure to follow, I think no body would ever let wine touch his lips. *Locke*.—It is frequently applied, in an improper sense, to the heart; as, the *heart aches*; to imply grief or fear. *Shakespeare* has used it, still more licentiously, of the soul.—My soul *aches*.

AKENSIDE (Mark), a celebrated physician, and a poet. He was born at Newcastle-upon-Tyne, Nov. 9, 1721; and, after being educated at the grammar-school in Newcastle, was sent to the universities of Edinburgh and Leyden; at which last he took his degree of doctor in physic. He was afterwards admitted by mandamus to the same degree at Cambridge; elected a fellow of the college of physicians, and one of the physicians at St. Thomas's hospital; and, upon the establishment of the queen's household, appointed one of the physicians to her majesty.

Dr. Akenfide was very early introduced to the acquaintance of the most eminent men of his age for learning and ingenuity; with many of whom he became entangled in disputes and altercations, chiefly on subjects of literature and politics, that fixed on his character the stamp of haughtiness and self-conceit, and drew him into disagreeable situations. Hence many, who admired him for his genius and parts, were shy of continuing his intimates.—The value of that precept which exhorts us to live peaceably with all men, or, in other words, to avoid creating enemies, can only be estimated by the reflection on those many amiable qualities against which the neglect of it will preponderate. Akenfide was a man of religion and strict virtue; a philosopher, a scholar, and a fine poet. His conversation was of the most delightful kind; learned, instructive, and, without any affectation of wit, cheerful and entertaining.—He died of a putrid fever, June 23, 1770; and is buried in the parish-church of St. James, Westminster.

AKIBA, a famous rabbin, flourished a little after the destruction of Jerusalem by Titus. He kept the flocks of a rich citizen of Jerusalem till the fortieth year of his age, and then applied himself to study in the academies for twenty-four years; and was afterwards one of the greatest masters in Israel, having had 24,000 scholars. He declared for the impostor Barcochebas, whom he owned for the Messiah; and not only anointed him king, but took upon himself the office of his master of the horse. The troops which the emperor Hadrian sent against the Jews, who under the conduct of this false Messiah had committed horrid massacres, exterminated this faction. Akiba was taken, and put to death with great cruelty. He lived 120 years; and was buried with his wife in a cave upon a mountain not far from Tiberias, and his 24,000 scholars were buried round about him upon the same mountain.

AKIN, *adj.* [from *α* and *κιν*.] Related to; allied by blood: used of persons. Allied to by nature; partaking of the same properties: used of things.—The cankered passion of envy is nothing *akin* to the silly envy of the ass. *L'Estrange*.

AKISSAT, the ancient Thyatira, a city in Natolia, in Asia, situated in a plain eighteen miles broad, which produces

duces plenty of cotton and grain. The inhabitants are said to be nearly all Mahometans, and there are six or seven mosques, which are all of marble. There are remarkable inscriptions on marble in several parts of the town, which are part of the ruins of ancient Thyatira. It is seated on the river Hermus, fifty miles from Pergamos. E. lon. 28. 30. N. lat. 38. 50.

AKOND, an officer of justice in Persia, who takes cognizance of the causes of orphans and widows; of contracts, and other civil concerns. He is the head of the school of law, and gives lectures to the subaltern officers; he has his deputies in all the courts of the kingdom, who, with the second *sadra*, makes all contracts.

AL, an Arabic particle prefixed to words, and signifying much the same with the English particle *the*: Thus they say, alkerries, alkoran, &c. i. e. the kermes, the koran, &c.

AL, or ALD, a Saxon term frequently prefixed to the names of places, denoting their antiquity; as Aldborough, Aldgate, &c.

ALA, a term used by botanists for the hollow of a stalk, which either the leaf, or the pedicle of the leaf, makes with it; or it is that hollow turning, or sinus, placed between the stalk or branch of a plant and the leaf, whence a new offspring usually issues. Sometimes it is used for those parts of leaves otherwise called *lobes* or *wings*.—Those petals of papilionaceous flowers, placed between those other petals called the *vexillum* and *carina*, and which make the top and bottom of the flower, are also called *ala*.

ALÆ is likewise used for those extremely slender and membranaceous parts of some seeds, which appear as wings placed on them; it likewise signifies those membranaceous expansions running along the stems of some plants, which are therefore called *alated stalks*.

ALÆ, in anatomy, a term applied to the lobes of the liver, the cartilages of the nostrils, &c.

ALÆ, in the Roman art of war, were the two wings or extreme parts of the army drawn up in order of battle.

ALABA, one of the three smallest districts of Biscay in Spain, but pretty fertile in rye, barley, and fruits. Here are also very good mines of iron, and it had formerly the title of a kingdom.

ALABANDA, anciently a town of Caria, near the Meander, situate beneath eminences resembling asses with pack-saddles, which gave rise to the jest; and between Amyzo to the west, and Stratonice to the east. Under the Romans they enjoyed a convention of jurisdiction, by Pliny reckoned the fourth in order; hence the proverb in Stephanus, expressing their happiness.

ALABARCHA, in antiquity, a kind of magistrate among the Jews of Alexandria, whom the emperors allowed them to elect, for the superintendency of their policy, and to decide their differences and disputes.

ALABASTER (William), an English divine, born at Hadley in the county of Suffolk. He was one of the doctors of Trinity college in Cambridge; and he attended the earl of Essex as his chaplain in the expedition to Cadiz in the reign of queen Elizabeth. It is said, that his first resolution of changing his religion was occasioned by his seeing the pomp of the churches of the Roman communion, and the respect with which the priests seemed to be treated amongst them. He was, however, soon tired of the Romish communion, and he returned to England in order to resume his former religion. He obtained a prebend in the cathedral of St. Paul, and after that the rectory of Therfield in Hertfordshire. He was well skilled in the Hebrew tongue; but he gave a wrong turn to his genius by studying the Cabala, with which he was strangely infatuated.

ALABASTER, *f.* [*αλαβαστρον*.] In natural history, a species of that genus of stones whose base is calcareous earth. It differs from marble in being combined, not with the aerial, but with vitriolic, acid; therefore, when mixed with any acid, no effervescence appears. It is soluble in about 500 times its weight of water at the temperature of

sixty. It is fusible alone in a long-continued porcelain heat, or by the blow-pipe. Specific gravity 1.87. Texture granular, with shining particles. In composition, and consequently in its chemical properties, it does not differ from gypsum, selenite, and plaister of Paris.

There are three species of alabaster. 1. The snow-white shining alabaster, or lygdinum of the ancients, is found in Taurus, in pieces large enough to make dishes, or the like. It cuts very freely, and is capable of a fine polish. 2. The yellowish alabaster, or phengites of Pliny, found in Greece, Germany, France, and England. 3. Variegated, yellow, and reddish; alabaster; which is the common alabaster of the ancients, and so soft that it may be cut with a knife. The alabasters are frequently used by statuary for small statues, vases, and columns. After being calcined and mixed with water, they may be cast in any mould like plaister of Paris. See GYPSUM. Alabaster, Mr. Boyle observes, being finely powdered, and thus set in a basin over the fire, will, when hot, assume the appearance of a fluid, by rolling in waves, yielding to the smallest touch, and emitting vapour; all which properties it loses again on the departure of the heat, and discovers itself a mere incoherent powder. The fineness and clearness of this stone render it in some measure transparent; whence it has been sometimes also employed for windows. There is a church at Florence still illuminated by alabaster windows. Instead of panes of glass, there are slabs of alabaster near fifteen feet high, each of which forms a single window, through which the light is conveyed. The countries in Europe which abound most in alabaster, are Germany, towards Coblenz; the province of Maconnois, in the neighbourhood of Cluni in France; Italy, towards Rome; where that of Montaiout is particularly remarkable not only for its whiteness, but also for the bigness of its blocks, some of which are so large, that statues as big as the life may easily be cut out of them.

ALABASTER, in antiquity, a term used for a vase wherein odoriferous liquors were anciently put. The reason of the denomination is, that vessels for this purpose were frequently made of the alabaster stone, which Pliny and others represent as peculiarly proper for the purpose. Alabaster is also said to have been used for an ancient liquid measure, containing ten ounces of wine, or nine of oil. In this sense, the alabaster was equal to half the sextary.

ALABASTRUM DENDROIDE, *f.* a kind of laminated alabaster, beautifully variegated with the figures of shrubs, trees, &c. found in great abundance in the province of Hohenstein.

ALACARNES, islands of New Spain, so called from the number of scorpions found there.

ALACK, *interj.* [This word seems only the corruption of *alas*.] An expression of sorrow.

ALACKADAY, *interj.* [This, like the former, is for *alas the day*.] A word noting sorrow and melancholy.

ALACRIOUSLY, *adv.* [from *alacrius*, supposed to be formed from *alacris*.] Cheerfully; without dejection.

ALACRITY, *f.* [*αλακритας*, Lat.] Cheerfulness, expressed by some outward token; sprightliness; gaiety; liveliness; cheerful willingness.

ALADINISTS, *f.* a sect among the Mahometans answering to free-thinkers among us.

ALADULIA, a considerable province of Turkey in Asia, in that part called Natolia. It has the Mediterranean Sea on the south; and the Euphrates, or Prat, on the east, which divides it from Diarbeker. It is divided into two parts: the north, comprehended between Taurus, Antitaurus, and the Euphrates, is a beglerbeglic, which bears the name of Marash, the capital town; and the south, seated between mount Taurus and the Mediterranean, is united to the beglerbeglic of Aleppo. The country is rough, ragged, and mountainous; yet there are good pastures, and plenty of horses and camels. The people are rude and thievish. The capital is Malatigah.

ALAIN (Chartier), secretary to Charles VII. of France, born

born in the year 1386. He was the author of several works in prose and verse; but his most famous performance was his Chronicle of King Charles VII. Bernard de Girard, in his preface to the History of France, styles him, "an excellent historian, who has given an account of all the affairs, particulars, ceremonies, speeches, answers, and circumstances, at which he was present himself, or had information of." Giles Coroxet tells us, that Margaret, daughter to the king of Scotland, and wife to the dauphin, passing once through a hall where Alain lay asleep, she stopped and kissed him before all the company who attended. Some of them telling her, that it was strange she should kiss a man who had so few charms in his person, she replied, "I did not kiss the man, but the mouth from whence proceeds so many excellent sayings, so many wise discourses, and so many elegant expressions." M. Fontenelle, among his Dialogues of the Dead, has one upon this incident, between the princess Margaret and Plato. M. Pasquier compares Alain to Seneca, on account of the great number of beautiful sentences interspersed throughout his writings.

ALAINS, a most barbarous people from the north, who, in the fourth and fifth century, joining themselves to the Goths and Vandals, carried terror and desolation wherever they went, and overspread a great part of the south of Europe, and the north of France.

ALAIS, a town in the department of Gard, near a beautiful plain or meadow, at the foot of the Cevennes. It contains 10,000 inhabitants, and the annual export of raw silk from it, is 1,200,000lbs. From the foot of one of the adjacent mountains, issues a hot medicinal spring, and many openings in the rocks shew that mines have been wrought here. It is 350 miles east of Paris, and thirty-seven north of Montpellier. Lat. 44. 8. N. lon. 4. 10. E.

ALAMANDUS (Lewis), in French *Aleman*, archbishop of Arles, and cardinal of St. Cecilia, was one of the greatest men of the fifteenth century. The cardinal presided in the council of Basil, which deposed Eugenius IV. and elected the antipope Felix V.

ALAMANNI (Lewis) was born at Florence, of a noble family, on the 28th of October, 1495. He was obliged to fly his country for a conspiracy against Julius de Medici, who was soon after chosen pope under the name of Clement VII. During this voluntary banishment, he went into France; where Francis I. from a love to his genius and merit, became his patron. He died at Amboise on the 18th of April 1556, being in the 61st year of his age. He left many beautiful poems, and other valuable performances, in the Italian language. We have also some notes of his upon Homer's Iliad and Odyssey; those upon the Iliad were printed in the Cambridge edition of Homer in 1689, and Joshua Barnes has also inserted them in his fine edition of Homer, in 1711.

ALAMIRE, *f.* The lowest note but one in Guido Arentine's scale of music.

ALAMODALITY, *f.* in a general sense, is the accommodating a person's behaviour, dress, and actions, to the prevailing taste of the times in which he lives.

ALAMODALITY OF WRITING, is the accommodation of mental productions, both as to the choice of subject and the manner of treating it, to the genius or taste of the times, in order to render them more acceptable to the readers.

ALAMODE, *adv.* [*à la mode*, Fr.] According to the fashion; a low word. It is used likewise by shopkeepers for a kind of thin silken manufacture.

ALAMOS (Balthazar), a Spanish writer, born at Medina del Campo, in Castile. After having studied the law at Salamanca, he entered into the service of Anthony Perez, secretary of state under Philip II. He was in high esteem and confidence with his master, upon which account he was imprisoned after the disgrace of this minister. He was kept in confinement eleven years, when Philip III. coming to the throne, set him at liberty. Alamos continued in a private capacity, till the duke of Olivarez, the

favourite of Philip IV. called him to public employments. He was a man of wit as well as judgment, but his pen was superior to his tongue. He died in the 88th year of his age. His Spanish translation of Tacitus, and the aphorisms which he added in the margin, gained him great reputation. This work was published at Madrid in 1614; and was to have been followed, as mentioned in the king's privilege, with a commentary, which, however, has never yet appeared. The author composed the whole during his imprisonment.

ALAN (Cardinal William), was born at Russel in Lancashire, in the year 1532. He went to Oxford at the age of fifteen, and in 1550 was elected fellow of Oriel college. In 1556, being then only twenty-four years old, he was chosen principal of St. Mary's Hall, and one of the professors of the university. In 1558 he was made canon of York; but, upon queen Elizabeth's accession to the throne, he left England, and settled at Louvain in an English college, of which he became the chief support. In 1565 he visited his native country; but, on account of his extreme activity in the propagation of the Roman Catholic religion, he was obliged to fly the kingdom in 1568. He went first to Mechlin, and then to Douai, where he was made doctor of divinity. Soon after, he was appointed canon of Cambrai, and then canon of Rheims. He was created cardinal on the 28th of July 1587, by the title of *St. Martin in Montibus*; and obtained from the king of Spain a rich abbey in the kingdom of Naples, and afterwards the bishopric of Mechlin. It is supposed to have been by the advice and instigation of this priest, that Philip II. attempted to invade England. He died on the 20th of October 1594, aged sixty-three; and was buried in the English college at Rome. He was a man of considerable learning, and an elegant writer. He wrote many books in defence of the Romish religion. The most remarkable are, 1. A Defence of the Twelve Martyrs in one Year. Thomas Alfield was hanged for bringing, and publishing, this and other of Alan's works, into England, in the year 1584. 2. A Declaration of the Sentence of Sextus V. &c. a work intended to explain the pope's bull for the excommunication of queen Elizabeth, and to exhort the people of England to take up arms in favour of the Spaniards. Many thousand copies of this book, printed at Antwerp, were put on board the Armada, to be dispersed by the Catholics in England; but, the enterprise failing, they were afterwards destroyed. 3. Of the Worship due to Saints and their Relics, 1583. This treatise was answered by lord Burleigh, and is esteemed the most elegant of the cardinal's writings.

ALANBY, Cumberland, an agreeable watering-place much resorted to in the bathing season. They are extensive here in the herring fishery, and there is good anchorage in the bay. It is about twenty miles north of Whitehaven and south of Carlisle.

ALAND, a cluster of Swedish islands, at the entrance of the Gulf of Bothnia, in the Baltic Sea. The principal island, which gives name to the rest, is about forty miles long, and from twelve to sixteen broad. It contains fifteen villages, 9000 inhabitants, and lies seventy-five miles east of Stockholm.

ALAND (Sir John Fortescue), LL. D. R. S. S. baron of the Exchequer, puisne judge of both benches to king George I. and a peer of England in the subsequent reign; was born March 7, 1670; second son to Edmund Fortescue, Esq. of London. He was descended from Sir John Fortescue, lord chief justice, and lord high chancellor of England, under king Henry VI. Sir John added his latter name of Aland in compliment to his lady, who was the eldest daughter to Henry Aland, Esq. of Waterford, in Ireland. Sir John Fortescue Aland was entered at Oxford; and, as he was intended for the profession of the law, upon leaving the university, he became a member of the Inner Temple, where he was chosen reader in the year 1716. He was called to the bar about the happy era of the glorious revolution, in which situation he shone with
meridian

meridian lustre. In the year 1714, he was appointed solicitor-general to his royal highness the Prince of Wales, afterwards George II. and in 1718, he was constituted one of the justices of the court of King's Bench in the place of Sir John Pratt. In the year 1728 he was appointed one of the justices of the court of Common Pleas, which he held until the year 1746, when he resigned the same, having sat in the superior courts of Westminster for the long period of thirty years. In honour to the judicial integrity and abilities of Sir John, his majesty was pleased to create him a peer of Ireland, by the style and title of John lord Fortescue Aland, baron Fortescue, of Credan, in the kingdom of Ireland, by privy seal, dated at Kensington, June 26, 1746, 19 George II. and by patent dated at Dublin, August 15, the same year. Sir John left behind him the following juridical writings:—1. The Difference between an absolute and limited Monarchy, as it more particularly regards the English Constitution. 2. Reports of Select Cases in all the courts of Westminster-hall, *tempore* William III. and queen Anne; also, The Opinion of all the Judges of England relating to the great-est Prerogatives of a Queen Consort.

ALAND, *adv.* [from *a* for *at*, and *land*.] At land; landed; on the dry ground.—He only, with the prince his cousin, were cast *aland*, far off from the place whither their desires would have guided them. *Sidney*.

ALANDRA, a small town of Estremadura, on the Tagus, fifteen miles from Lisbon.

ALARAF, *f.* in the Mahometan theology, the partition-wall that separates heaven from hell. The word is plural, and properly written *al araf*; in the singular it is written *al arf*. It is derived from the Arabic verb *arafa*, to distinguish. *Al araf* gives the denomination to the seventh chapter of the Alcoran, wherein mention is made of this wall. Mahomet seems to have copied his *al araf*, either from the great gulf of separation mentioned in the New Testament, or from the Jewish writers, who also speak of a thin wall dividing heaven from hell. Mahometan writers differ extremely as to the persons who are to be found on *al araf*. Some take it for a sort of limbus for the patriarchs, prophets, &c. others place here such whose good and evil works so exactly balance each other, that they deserve neither reward nor punishment. Others imagine this intermediate space to be possessed by those who, going to war without their parents leave, and suffering martyrdom there, are excluded paradise for their disobedience, yet escape hell because they are martyrs.

ALARBES, a name given to those Arabians who live in tents, and distinguish themselves by their dres from the others who live in towns.

ALARES, *f.* in Roman antiquity, an epithet given to the cavalry, on account of their being placed in the two wings of the army.

ALARIC, a famous general of the Goths. He entered Thrace at the head of 200,000 men, and laid waste all the country through which he passed. He marched next to Macedonia and Thessaly: the Thessalians met him near the mouth of the river Peneas, and killed about 3000 of his army; nevertheless he advanced into Greece, and, after having ravaged the whole country, returned to Epirus, loaded with immense spoils: after staying here five years, he resolved to turn his arms to the west. He then marched through Pannonia; and, finding little resistance, entered Italy under the consulship of Stilicho and Aurelianus, A. D. 400. After various battles and treaties, he at last took Rome by treachery, and permitted his soldiers to plunder it, A. D. 409. Alaric, having laid waste a great part of Italy, intended to pass into Sicily; but a storm obliging him to land again, he besieged the city of Cosenza; and, having taken it, he died there in 411, eleven years after he first entered Italy.

ALARM, *f.* [from the French *à l'arme*, to arms; as, *crier à l'arme*, to call to arms.] A cry by which men are summoned to their arms; as, at the approach of an ene-

my. A cry or notice of any danger approaching; as, An *alarm* of fire. Any tumult or disturbance.

ALARM, in the military art, denotes either the apprehension of being suddenly attacked, or the notice thereof, signified by the firing a cannon, firelock, or the like. False alarms are frequently made use of, to harraßs the enemy, by keeping them constantly under arms. Sometimes also this method is taken to try the vigilance of the piquet-guard, and what might be expected from them in case of real danger.

ALARM, in fencing, is the same with what is otherwise called an appeal, or challenge.

To ALARM, *v. a.* To call to arms. To disturb; as, with the approach of an enemy. To surprise with the apprehension of any danger. To disturb in general:

His son, Cupavo, brush'd the briny flood;
Upon his stern a brawny Centaur stood,
Who heav'd a rock, and threat'ning still to throw,
With lifted hands, *alarm'd* the seas below. *Dryden*.

ALARM-BELL, *f.* The bell that is rung upon any sudden emergency, as a fire, mutiny, or the like.

ALARMING, *part. adj.* Terrifying; awakening; surprising; as, An *alarming* message; an *alarming* pain.

ALARM-POST, *f.* The post or place appointed to each body of men to appear at, when an alarm shall happen.

ALARUM, *f.* Corrupted as it seems from ALARM.

ALAS, *interj.* [*helas*, Fr. *cylaes*, Dutch.] A word expressing lamentation, when we use it of ourselves. A word of pity, when used of other persons. A word of sorrow and concern, when used of things.—Thus saith the Lord God, Smite with thine hand, and stamp with thy foot, and say, *Alas!* for all the evil abominations of the house of Israel. *Ezekiel*.

ALAS THE DAY, *interj.* Ah, unhappy day!

ALAS THE WHILE, *interj.* Ah, unhappy time!

ALASCANI, *f.* in church-history, a sect of Antilutherans, whose distinguishing tenet, besides their denying baptism, is said to have been this, that the words, "This is my body," in the institution of the eucharist, are not to be understood of the bread, but of the whole action or celebration of the supper.

ALASCO (John), a Polish nobleman of the 16th century, who, imbibing the reformed opinions, was expelled his country, and became preacher to a Protestant congregation at Embden; but, foreseeing persecution there, came to England about the year 1551, while the reformation was carrying on under Edward VI. The publication of the Interim driving the Protestants to such places as afforded them toleration, 380 were naturalized here, and obtained a charter of incorporation, by which they were erected into an ecclesiastical establishment, independent on the church of England. The Augustine friars' church was granted them, with the revenues, for the maintenance of Alasco as superintendant, with four assistant ministers, who were to be approved by the king: and this congregation lived undisturbed until the accession of Queen Mary, when they were all sent away. They were kindly received and permitted to settle at Embden; and Alasco at last, after an absence of twenty years, by the favour of Sigismund, returned to his own country, where he died in 1560. He had some particular tenets; and his followers are called *Alascani*, in church history.

ALATAMAHA, a large river of North America, which, rising in the Apalachian mountains, runs south-east through the province of Georgia, and falls into the Atlantic Ocean, below the town of Frederica.

ALATE, *adv.* [from *a* and *late*.] Lately; no long time ago.

ALATERNOIDES, *f.* in botany. See PHYLLICA, CLUTIA, CEANOTHUS, and MYRICA.

ALATERNUS, *f.* in botany, the trivial name of a species of the rhamnus. See RHAMNUS and PHYLLICA.

ALAVA, a district of Spain, about twenty miles in length

length and seventeen in breadth, containing very good iron mines.

ALAUDA, or **LARK**, *f.* in ornithology, a genus of birds of the order of passerines; the characters of which are these—The beak is cylindrical, subulated, straight; and the two mandibles or chaps are of equal size. The tongue is bifid, and the hinder claw is straight and longer than the toe. There are twenty-eight species of the *alauda*, of which the following are the most remarkable:

1. The *arvensis*, or common sky-lark. This and the wood-lark are the only birds that sing as they fly; this raising its note as it soars, and lowering it till it quite dies away as it descends. It will often soar to such a height, that we are charmed with the music when we lose sight of the songster; it also begins its song before the earliest dawn. It continues its harmony several months, beginning early in the spring on pairing. In the winter they assemble in vast flocks, grow very fat, and are taken in great numbers for our tables. They build their nest on the ground, beneath some clod, forming it of hay, dry fibres, &c. and lay four or five eggs. These birds are generally taken in the greatest quantity in the neighbourhood of Dunstable; the season begins about the 14th of September, and ends the 25th of February; and during that space about 4000 dozen are caught, which supply the markets of the metropolis. See **BIRD-CATCHING**. Vastly greater numbers than the above, however, are caught at times in different parts of Germany, where there is an excise upon them. Keyser says, that the excise alone produces 6000 dollars (about 900l. sterling) every year to the city of Leipzig; whose larks are famous all over Germany, as having the most delicate flavour. But it is not only at Leipzig that they are taken in such numbers, but also in the country about Naumburg, Merseburg, Halle, and other parts.

2. The *pratensis*, or tit-lark, has the two outward feathers of the wing edged with white, and frequents the meadows. It is found frequently in low marshy grounds; and, like other larks, it builds its nest among the grass, and lays five or six eggs. Like the wood-lark, it sits on trees; and has a most remarkable fine note, singing in all situations, on trees, on the ground, while it is sporting in the air, and particularly in its descent.

3. The *arborea*, or wood-lark, is a native of Europe, and is distinguished by an annular white fillet about the head. It is inferior in size to the sky-lark, and is of a shorter thicker form; the colours are paler, and its note is less sonorous and less varied, though more sweet. It perches on trees, and whistles like the blackbird. It will sing in the night; and, like the common lark, will sing as it flies. It builds on the ground, and lays five eggs. The males of this and the last are known from the females by their superior size.

4. The *campestris* has one half of its chief feathers of the wings brown, except two in the middle which are white, and the throat and breast are yellowish.

5. The *trivialis*, whose chief feathers on the tail are brown, only half of the outermost is white, and the second is white at the end, in the shape of a wedge; there is likewise a double whitish line on the wings. It is a native of Sweden, and perches on the tops of trees.

6. The *cristata*. The chief tail-feathers are black, but the two outermost are edged with white, and the head is crested. It is a native of Europe. It sings well, like the sky-lark; lays four or five eggs; and is said to hatch twice in a year.

7. The *spinoletta*: the chief tail-feathers are black, only the outermost two are obliquely half white. It is a native of Italy.

8. The *alpestris*: the chief wing-feathers are half white, the throat yellow, and it has a black streak under the eyes and on the breast. It inhabits North America, where it is migratory. It visits the neighbourhood of Albany the beginning of May, but goes farther north to breed. In

winter it comes in vast flocks into Virginia and Carolina, returning north in spring. It runs into holes; whence the natives of these last parts have given it the name of *chichup-pi-sue*. The English call it the *ortalon*, and reckon it delicious eating. By some it is called *snow-bird*, as being very plenty in that season.

9. The *magna*, is yellow on the belly, with a crooked black streak on the breast, and the three side-feathers of the tail white. This species is a native of Africa and America.

10. The New Zealand lark, is seven and a half inches in length; the bill is half an inch, of a pale ash-colour, with the upper part black; the upper parts of the body are dusky, edged with pale ash-colour; the breast and belly are white; the legs reddish ash-colour, and the claws black. It inhabits Charlotte Sound, and is called *kogoo aroore*.

ALAUTA, a considerable river of Turkey in Europe, which, after watering the north-east part of Transylvania and part of Wallachia, falls into the Danube opposite Nicopolis.

ALAY, *f.* [signifying in the Turkish language “the triumph.”] A ceremony which accompanies the assembling together the forces of that vast empire upon the breaking out of a war. It consists of the most insipid buffoonery, attended with acts of the most shocking barbarity. That which took place upon occasion of the late war between the Porte and Russia, is described by Baron Tott as follows:

“It consists in a kind of masquerade, in which each trade successively presents to the spectators the mechanical exercise of its respective art. The labourer draws his plough, the weaver handles his shuttle, the joiner his plane; and these different characters, seated in cars richly ornamented, commence the procession, and precede the standard of Mahomet, when it is brought out of the seraglio to be carried to the army, in order to insure victory to the Ottoman troops.

“This banner of the Turks, which they name *Sandjak-Cheriff*, or “The standard of the Prophet,” is so revered among them, that, notwithstanding its reputation has been so often tarnished, it still retains their implicit confidence, and is the sacred signal unto which they rally. Every thing proclaims its sanctity. None but the emirs are allowed to touch it; they are its guards, and it is carried by their chief. The Mussulmen alone are permitted to look upon it. If touched by other hands, it would be defiled; if seen by other eyes, profaned. In short, it is encompassed by the most barbarous fanaticism.

“A long peace had unfortunately caused the ridiculousness, and especially the danger, of this ceremony to be forgotten. The Christians imprudently crowded to see it; and the Turks, who, by the situation of their houses, could make money of their windows, began to profit by the advantage; when an emir, who preceded the banner, proclaimed with a loud voice, ‘Let no infidel dare to profane with his presence the holy standard of the prophet; and let every Mussulman who perceives an unbeliever make it known under pain of reprobation.’

“From that moment no asylum was to be found; even those became informers, who, by letting out their houses, had rendered themselves accomplices in the crime. A religious fury seized on every mind, and put arms in every hand; the more atrocious the cruelty, the more was it meritorious. No regard was paid to sex or age; pregnant women, dragged by the hair, and trodden under feet by the multitude, perished in the most deplorable manner. Nothing was respected by these monsters; and under such auspices the Turks commenced the war.”

ALB, *f.* [*album*, Lat.] In the Romish church, a vestment of white linen hanging down to the feet, and answering to the surplice of the English clergy. In the ancient church, it was usual, with those newly baptized, to wear an alb, or white vestment; and hence the Sunday after Easter

ALAUDA .

G. Edwards del.

J. P. S. sculp.

The Alpestris, or Lark of North America?

London Published at the Adel. directr. 29. Oct. 1796 by J. Wilkes.

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Fig. 1. The Flapping Lark. 2. The Sirli, or African Lark.

Easter was called *dominica in albis*, on account of the albs worn by those baptized on Easter-day.

ALB, is also a name of a Turkish coin, otherwise called asper. See ASPER.

ALBA, anciently a town of the Marfi, in Italy, situated on the north side of the Lacus Fucinus, still retaining its name. It stands upon an eminence, and is noted in Roman history for being the state prison where captive princes were shut up, after being barbarously dragged through the streets of Rome at the chariot wheels of a triumphant consul. Perſes king of Macedon terminated his wretched career in this confinement, with his son, the last hope of an illustrious line of kings. Syphax the Numidian, and Bituinus king of the Aveni, were also condemned to this gaol by the particular clemency of the senate, which sometimes indulged its savage disposition by putting its captives to death. Alba being situated in the centre of Italy, amidst difficult mountainous passes, and far from all means of escape, was esteemed a most proper place for the purpose of guarding prisoners of importance. Artificial strength was added to its natural security by fortifications, which remain to this day in a state that proves their ancient solidity. For the entertainment of the garriſon, which was required in a place of such consequence, an amphitheatre was erected, of which the ruins are still visible, as well as the foundations of a temple, and other buildings of Roman times. Lucius Vitellius, brother to the emperor of that name, had a villa near this place, famous for the variety and excellence of its fruit-trees, which he had brought from Syria. His gardens were the nurseries where several of the most delicious stone-fruits, that are now so common in Europe, were first cultivated and multiplied. It must have been necessary at Alba to shelter trees transplanted from Asia, and to treat them with great tenderness and care, in order to rear them to perfection: for the climate of this high region is extremely rigorous in winter; the cold season lasts long, and is accompanied with violent storms of wind and falls of snow. The lake has been often frozen entirely over.

ALBA (Duke of), was indisputably one of the greatest generals of the sixteenth century. This remarkable person, whose character exhibits such a singular mixture of vices and virtues, was born in the year 1508, and was descended from one of the most illustrious families in Spain. Defined from his youth to the profession of arms, he made his first campaign at the age of seventeen, and the year following was present at the famous battle of Pavia. Even at this early period the duke shewed signs of that cruelty which afterwards rendered him so odious. Strada gives us the following instance of it:—The emperor asking his advice on the manner in which he should punish the revolters, he answered, “That such a rebellious city should be razed to the ground.” Charles, who, notwithstanding his wrath, still preserved an affection for the city in which he was born, ordered the duke to ascend a tower, from which the whole extent of the city might be seen. On his return, he asked him, with a scornful smile, How many Spanish skins would make such a glove; the name of Ghent in French, in which language he addressed him, signifying a glove. Alba, perceiving he had offended the emperor, held down his head without making any reply.

In the year 1542, the duke of Alba, having the command of the fortrefs of Perpignan, which was besieged by the French, defended it with such intrepidity, that the enemy were obliged to raise the siege, and return to France, without having effected any thing. From this time he found himself daily rising in his sovereign's favour, so that he was appointed grand master of the Imperial court; and, in 1546, was made commander in chief of the army in Germany. At the battle of Muleberg he gave proofs of extraordinary courage, and contributed not a little to the victory obtained there. It was reported, that, during the combat, the sun stood still, as if to render the emperor's triumph more complete. Charles had sufficient

weakness and vanity to wish that this ridiculous tale might obtain belief, and he be considered as a second Joshua. In the war with France the duke of Alba commanded the army under the emperor. At the siege of Metz, in 1552, he performed prodigies of valour; though the place was so well defended, that Charles was obliged to abandon the siege.

Whatever favour the duke of Alba had enjoyed under Charles V. his greatness was not at its summit till the reign of Philip II. He was soon the acknowledged favourite of this cruel monarch, with whose sanguinary disposition his own perfectly accorded. In 1559, he was sent to Paris, to espouse the princess Elizabeth in his master's name, and conduct her into Spain. Six years afterwards, when Charles IX. king of France, the queen his mother, and Elizabeth, had an interview at Bayonne, the duke was again appointed to be the conductor of the latter. He appeared with a most splendid equipage; and, at the entertainments made on the occasion, signalised himself greatly by his address and ability.

The Flemings, robbed of their privileges, and, by the establishment of the inquisition, deprived of their dearest possession, liberty, had frequently addressed their complaints to the court of Spain; but their grievances always went unredressed. The repeated contempt they experienced exhausted their patience, and they took up arms. The duke of Feria and the prince Ercoti advised the king to employ gentle methods with them; but the duke of Alba was for compelling the rebels to return to their duty by force. This counsel was too well suited to the character of the king not to meet his approbation; accordingly he gave it the preference, and, without taking time to weigh the matter deliberately, instantly resolved to send into the Netherlands a chosen army under the command of the duke of Alba, to whom he gave an unlimited authority, with the title of governor-general of those countries. For more than six years the duke ruled the Netherlands with a rod of iron. The unfortunate counts Egmont and Horne were the first victims of his rage, losing their lives on the scaffold. Many people of rank expressing themselves to the duke with some surprise at his rigour, he answered coolly, “The heads of a couple of salmon are better than those of a thousand frogs.” Such was his cruelty, that he frequently boasted of having caused upwards of eighteen thousand men to suffer by the hands of the executioner, during his regency.

Notwithstanding the innumerable complaints made against him, the king loaded him with favours, and gave him his confidence in a greater degree than ever. Thus he lived many years, esteemed by his friends, hated in secret by those who envied him, and deified by his flatterers, till an unforeseen accident lost him the king's favour, and banished him from the court. Garcias de Toledo, one of his sons, had seduced a lady of the first rank under a promise of marriage, which he refused to fulfil. The king gave orders, that he should be arrested and confined till he had performed his promise. By the help of his father, who was no less averse to the match than himself, Garcias found means to escape; and, the better to frustrate the king's intention, was immediately married to his cousin, the daughter of the marquis of Villeux. Philip was so highly incensed at this step, that he forbade the duke to appear at court, and banished him to the castle of Uzeda. This was a thunder-stroke to the duke, who was thus obliged to spend near two years in exile.

Immediately on the death of Henry king of Portugal, in 1580, Philip resolved to assert his pretensions to that kingdom. Success could only be hoped for from arms; and for this enterprise who so fit as the duke of Alba, in whom all the talents and qualifications constituting a great general were in the most eminent degree united? Thus, when he least expected it, the banished duke received a visit from two messengers of the king, who demanded, whether his health would permit him to take the command

of the army destined for the conquest of Portugal. Alba answered, without much hesitation, that he was ready to sacrifice in the king's service what little health and strength he had left; and immediately prepared for his departure. His intention was to pay his respects to his sovereign in person; but Philip, who never forgot, and never pardoned, an offence, would not see him, sending him his orders and instructions in writing.

The duke arrived in Portugal, at the head of his army, in the month of June 1580. Almost every town opened its gates to him, and acknowledged Philip as its lawful sovereign. Don Antony, prior of Crato, having assembled a considerable army at Lisbon, and seated himself on the throne of Portugal, it was necessary to repair to that city. To avoid various inconveniences, the duke of Alba resolved on transporting his army to Cascais by water. On his arrival, he found the enemy advantageously posted; i.e. however, prepared to attack them in their entrenchments. The Spaniards, waiting only the word of command, were surprised to learn, that the Portuguese had on a sudden taken flight; the duke was therefore soon in possession of Cascais, where he exercised his usual cruelties. Many places successively experienced the same fate, and Don Antony was attacked, defeated, and his army entirely destroyed. Lisbon immediately surrendered, and the whole kingdom was at the mercy of the conqueror. The issue of this enterprise was a new triumph for the duke, now upwards of seventy years old; but in Portugal, as in the Netherlands, his laurels were tarnished by pride and cruelty. Alba did not long survive the conquest of Portugal, for he died in 1582, at the age of seventy-four.

ALBA FIRMA, *f.* in law, a white rent, paid in silver, in distinction from rent paid in corn, cattle, or the like.

ALBA HELVIORUM, or **ALBAUGUSTA**, afterwards called Vivarium, now Viviers, in the south-east of Languedoc, on the Rhone. In the lower age the inhabitants were called *Albenses*, and their city *Civitas Albensum*, in the *Notitia Galliarum*. Lat. 44. 50. lon. 4. 45. E.

ALBA JULIA, now Weissenburg, a town of Transylvania, on the river Marisus, or Merisch, to the west of Hermanstadt, supposed to be called Alba Julia, after Julia Domna, the mother of Caracalla. It was also called *Apulum Augustum*. Lat. 46. 46. lon. 25. 0. E.

ALBA LONGA, anciently a colony from Lavinium, in Latium, established by Ascanius the son of Æneas, at the foot of Mons Albanus: called Alba from a white sow found by Æneas, which farrowed thirty white pigs on that spot; which circumstance was interpreted to portend the building of a city there in thirty years after. The epithet *Longa* was added on account of its length.

ALBA POMPEIA, on the river Ceba, now Ceva, in Liguria, the birth-place of the emperor Pertinax; a colony either established at first by Pompey, or re-established by him after having been before settled by Scipio. The inhabitants were called *Albenses Pompeiani*. At this day the town is simply called Alba, without any epithet.

ALBA TERRA, *f.* one of the numerous names for the philosophers' stone.

ALBAHURIM, *f. figura sexdecim laterum*, a figure of great importance according to astrological physicians, who built their prognostics on it.

ALBAN (St.) is said to have been the first person who suffered martyrdom for Christianity in Britain; he is therefore usually styled the protomartyr of this island. He was born at Verulam, and flourished towards the end of the 3d century. In his youth he took a journey to Rome, in company with Amphibalus a monk of Caerleon, and served seven years as a soldier under the emperor Dioclesian. At his return home he settled in Verulam; and, through the example and instructions of Amphibalus, renounced the errors of paganism, in which he had been educated, and became a convert to the Christian religion. It is generally agreed, that Alban suffered martyrdom during the great persecution under the reign of Dioclesian; but au-

thors differ as to the year when it happened. The story and circumstances relating to his martyrdom, according to Bede, are as follows:—Being yet a pagan (or at least it not being known that he was a Christian), he entertained Amphibalus in his house. The Roman governor, being informed thereof, sent a party of soldiers to apprehend Amphibalus; but Alban, putting on the habit of his guest, presented himself in his stead, and was carried before that magistrate. The governor having asked him of what family he was? Alban replied, "To what purpose do you inquire of my family? if you would know my religion, I am a Christian." Then, being asked his name, he answered, "My name is Alban; and I worship the only true and living God, who created all things." The magistrate replied, "If you would enjoy the happiness of eternal life, delay not to sacrifice to the great gods." Alban answered, "The sacrifices you offer are made to devils; neither can they help the needy, or grant the petitions of their votaries." His behaviour so enraged the governor, that he ordered him immediately to be beheaded. In his way to execution, he was stopped by a river, over which was a bridge so thronged with spectators that it was impossible to cross it; the saint, as we are told, lifted up his eyes to heaven, and the stream was miraculously divided, and afforded a passage for himself and a thousand more persons. This wonderful event converted the executioner upon the spot, who threw away his drawn sword, and, falling at St. Alban's feet, desired he might have the honour to die with him. This sudden conversion of the headsmen occasioning a delay in the execution till another person could be got to perform the office, St. Alban walked up to a neighbouring hill, where he prayed for water to quench his thirst, and a fountain of water sprung up under his feet: here he was beheaded on the 23d of June. The executioner is said to have been a signal example of divine vengeance; for, as soon as he gave the fatal stroke, his eyes dropped out of his head. We may see the opinion of Milton in regard to this narrative, in his *History of England*. His words are these, speaking of St. Alban, "The story of whose martyrdom, soiled and worse martyred with the fabling zeal of some idle fancies, more fond of miracles than apprehensive of the truth, deserves no longer digression." Between 400 or 500 years after St. Alban's death, Offa, king of the Mercians, built a very large and stately monastery to his memory; and the town of St. Alban's, in Hertfordshire, takes its name from our protomartyr.

ALBANA, anciently a sea-port town of Albania, on the Caspian Sea, between the rivers Casius and Albanus; now called Baehu, or Baehy, giving name to the Caspian Sea, viz. *Mar de Baku*. Lat. 40. 0. lon. 49. 0. E.

ALBANENSES, *f.* in church-history, the same with Albigenes, according to some; according to others, different. Those, however, who are for distinguishing them, attribute the same opinions to both; only making the Albanenses to have been prior in respect of time, as having been found towards the close of the eighth century; whereas the Albigenes appeared not till the twelfth. See **ALBIGENSES**.

ALBANI, *f.* in Roman antiquity, a college of the *salii*, or priests of Mars; so called from mount Albanus, the place of their residence.

ALBANI (Francis), a celebrated painter, born in Bologna, March 17, 1578. His father was a silk-merchant, and intended to bring up his son to that business; but Albani, having a strong inclination to painting, when his father died devoted himself entirely to that art, though then but twelve years of age. He first studied under Denys Calvert; Guido Rheni being at the same time under this master, with whom Albani contracted a very great friendship. Calvert drew but one profile for Albani, and afterwards left him entirely to the care of Guido; under whom he made great improvement, his fellow-disciple instructing him with the utmost attention and good humour. He followed Guido to the school of Caraches: but a little

tle after their friendship for each other began to cool; which was owing perhaps to the pride of Albani, who could not bear to see Guido surpass him, or to the jealousy of Guido at finding Albani make so swift a progress. They certainly endeavoured to eclipse one another; for, when Guido had set up a beautiful altar-piece, Albani would oppose to it some fine picture of his: thus did they behave for some time, and yet spoke of each other with the highest esteem. Albani, after having greatly improved himself under the Caraches, went to Rome, where he continued many years, and married in that city; but, his wife dying, he returned to Bologna, where he entered again into the state of matrimony. His second wife (Doralice) was well descended, and possessed a singular share of beauty and good sense. Hence Albani reaped the advantage of having a most beautiful model; so that he had now no occasion to make use of any other woman to paint a Venus, the Graces, Nymphs, and other deities, whom he took a particular delight in representing. His wife answered this purpose admirably well; for, besides her bloom of youth, and the beauty of her person, he discovered in her so much modesty, so many graces and perfections, so well adapted to painting, that it was impossible for him to meet with a more finished woman. She afterwards brought him several boys, all extremely beautiful and finely proportioned; so that she and her children were the originals of his most agreeable and graceful compositions. Doralice was so conformable to his wishes, that she took a pleasure in setting the children in different attitudes, holding them naked, and sometimes suspended by strings, when Albani would draw them in a thousand different ways. It was from them, too, that the famous sculptors Flaminio and Argaldi modelled their little Cupids. Albani was of a happy temper and disposition; his paintings, says Malvasia, breathing nothing but content and joy. He died the 4th of October, 1660, to the great grief of all his friends and the whole city of Bologna. Malvasia has preserved some verses, intended for his monument, to the following purport: "That the mortal remains of the illustrious Albani, who gave life to shade, lie interred in this tomb; the earth never produced so wonderful an artist, or a hand equal to his immortal one; which gave colours to the soul, and a soul to colours. Prometheus animated clay, and gave life by means of the sun; but Albani animated merely by the assistance of shade." He was very famous in his life-time, and had been visited by the greatest painters. Several princes honoured him with letters; and amongst the rest Charles I. who invited him to England by a letter signed with his own hand.

ALBANIA, a province of Turkey in Europe, on the gulph of Venice, bounded by Livadia on the south, by Thessaly and Macedonia on the east, and on the north by Bosnia and Dalmatia. The people are strong, large, courageous, and good horsemen; but are said to be of a thievish disposition: the Grand Signior procures excellent soldiers from hence, particularly cavalry, known by the name of *Arnauts*. There are several large towns in this province; and the inhabitants are almost all Christians of the Greek church, and descended from the ancient Scythians. Formerly it was part of the kingdom of Macedonia. Their chief manufacture is carpets. Lat. from 39. to 43. N. lon. from 28. to 31. E.

ALBANIA, a country of Asia, bounded on the west by Iberia; on the east by the Caspian Sea; on the north by mount Caucasus; on the south by Armenia, and the river Cyrus, now Kur; which, springing from the Moschian mountains that separate Colchis from Armenia, and watering the country of Mekan, receives the Aragus and Araxes, and falls into the Caspian Sea within a small distance from the southern borders of this country. The whole country, formerly called Albania, now goes under the names of Shirwan and East Georgia, and is extremely fruitful and pleasant. The ancient historians take notice of the Albanian men being tall, strong-bodied, and, ge-

nerally speaking, of a very graceful appearance; far excelling all other nations in comeliness as well as stature. Modern travellers take no notice of the appearance of the men; but extol the beauty of the women, which seems to be unnoticed by the ancients. The Albanians were anciently an independent and powerful people; but we find no mention made of their kings till the reign of Alexander the Great, to whom the king of Albania is said to have presented a dog of an extraordinary fierceness and size.

ALBANO, a town of Italy, on a lake of the same name, in the Campagnio of Rome. It was called by the ancients *Albanum Pompeii*, and built out of the ruins of the ancient Alba Longa, which was destroyed by Tullus Hostilius. It stands within twelve miles south-east of Rome, and for the pleasantness of its situation is the summer retirement of a great many Roman princes. It is likewise the see of a bishop, who is one of the six senior cardinals. The town is famous for its excellent wine, and the ruins of a mausoleum, which, according to the tradition of the inhabitants, was made for Afcenius. The prospect from the garden of the Capuchins is extremely pleasant, taking in the Campagnio of Rome, and terminating in a full view of the Tuscan sea. Close by the town lies the Alban lake, of an oval figure, and about seven miles in circumference, which, by reason of the high mountains round it, looks like the area of a great amphitheatre. It abounds with excellent fish, and over against the hermitage it is said to be unfathomable. The mountain of Albano is called *Monte Cavo*, on the top of which was a celebrated temple dedicated to Jupiter and Juno. Near the Capuchins there is another convent of Franciscans; and not far from thence the palace of cardinal Barberini, remarkable for very pleasant gardens, with the ruins of ancient baths, and several old fragments of mosaic work. E. lon. 13. 10. N. lat. 41. 43.

There is likewise another town of the same name in the Basilicate of the kingdom of Naples, remarkable for the fertility of the surrounding territory, and for the nobility of the inhabitants.

ALBAN'S (St.) a market-town of Hertfordshire, is a great thoroughfare, accommodated with good inns, on the north-west road from London, at the distance of twenty-one miles. This town sends two members to parliament, gives the title of duke to the noble family of Beaulieu, and has one of the best markets for wheat in England. St. Alban's is seated near the ruins of an ancient Roman city, by Tacitus called *Verulam*; and by the Saxons *Watlingcester*, because it is seated on the road called *Watling-street*. Nothing now remains of Verulam but the ruins of old walls; in the fields adjacent to which they continue to find Roman coins, as they formerly found tessellated pavements. In memory of St. Alban, Offa, king of the Mercians, anno 795, erected an abbey, calling it St. Alban's; and near it the town of the same name was afterwards built. The church of the abbey is remaining to this day. When the monasteries were dissolved, the townsmen paid 400l. to prevent its being levelled with the ground, and have since converted it into a parish-church, which, for its largeness, beauty, and antiquity, claims a particular regard. It had a noble font of solid brass, in which the children of the kings of Scotland were used to be baptized; and was brought from Edinburgh, by Sir Philip Lea, when the city was in flames; but in the time of the civil wars it was taken away. About eighty years since, a tomb was discovered in this church, said to be that of Humphry Duke of Gloucester: when the leaden coffin was opened, the body was found entire, being preserved in a sort of pickle. There was a stately cross in the middle of the town, as there were in many other places where queen Eleanor's body rested when it was brought out of the north for interment at Westminster; but it has been some time demolished. The market days are Wednesday and Saturdays. W. lon. 0. 12. N. lat. 51. 44.

ALBANUS MONS, now called *Mont Albano*, sixteen miles from Rome, at the foot of which Alba Longa stood.

ALBANUS MONS, to the north of Istria, called *Albius* by Strabo; the extremity of the Alps, which, together with the mountains to the east, joining it, called *Montes Bebi*, separates the farther Liburnia and Dalmatia from Pannonia.

ALBANY, a British fortress seated on the S. W. of Hudson's bay. W. lon. 84. 20. N. lat. 53. 20.

ALBANY, a city of North America, the capital of one of the ten counties of the province of New York, which goes by the same name, is a well-built place. Here the sachems, or the kings of the Five Nations of Iroquois, met the governors of the British plantations, when they entered into any treaty with them. It contains 600 houses, and 4000 inhabitants, many of whom are the descendants of the first colonists, the Dutch; but, adventurers from various parts are led here, by the advantages for trade, which the place affords, it being situated on one of the finest rivers in the world, and the store-house of the trade to and from Canada and the Lakes. It is 160 miles N. of the city of New York. Lat. 42. 36. N. lon. 75. 20. W.

ALBARA, *f.* in botany. See CANNA.

ALBARAZIN, a strong town, and one of the most ancient, of the kingdom of Arragon in Spain. It is the seat of a bishop, and produces the best wool in all Arragon. It is about 100 miles east of Madrid. E. lon. 2. 10. N. lat. 40. 32.

ALBARI, in antiquity, properly denoted those who gave the whitening to earthen vessels, &c. In which sense they stood contradistinguished from *Dealbatores*, who whitened walls.

ALBARIUM OPUS, in the ancient building, the incrustation or covering of the roofs of houses with white plaster, made of mere lime. This is otherwise called *opus album*.

ALBATEGNI, an Arabic prince of Batan in Mesopotamia, who was a celebrated astronomer, about the year of Christ 880. He is also called *Muhammed ben Geber Albategni*, *Mahomet the son of Geber*, and *Muhammedes Aractensis*. He made astronomical observations at Antioch, and at Racah or Aracta, a town of Chaldea, which some authors call a town of Syria or Mesopotamia. Finding that the tables of Ptolemy were imperfect, he computed new ones, which were long used as the best among the Arabs: these were adapted to the meridian of Aracta or Racah. Albategni composed in Arabic a work under the title of *The Science of the Stars*, comprising all parts of astronomy, according to his own observations and those of Ptolemy. This work, translated into Latin by Plato of Tibur, was published at Nuremberg in 1537, with some additions and demonstrations of Regiomontanus; and the same was reprinted at Bologna, in 1645, with this author's notes. In this work, Albategni gives the motion of the sun's apogee since Ptolemy's time, as well as the motion of the stars, which he makes one degree in seventy years. He made the longitude of the first star of Aries to be $18^{\circ} 2'$; and the obliquity of the ecliptic $23^{\circ} 35'$. And upon Albategni's observations were founded the Alphonsine tables of the moon's motions; as is observed by Nicholas Muler, in the *Tab. Priscæ*, p. 248.

ALBATEI EQUI, an appellation given to such horses, in the games of the ancient circus, as wore white furniture.

ALBATROSS, in ornithology, a species of the diomedea. See DIOMEDEA.

ALBAZIN, a town of Greater Tartary, with a strong castle. It is situated upon the river Amur, and belongs to the Muscovites. E. lon. 103. 30. N. lat. 54. 0.

ALBE, *f.* a small piece of money, current in Germany, worth only a French sol and seven deniers.

ALBEIT, *adv.* [a coalition of the words *all be it so*.] Although; notwithstanding; though it should be.—He, who has a probable belief that he shall meet with thieves in such a road, thinks himself to have reason enough to decline it, *albeit* he is sure to sustain some loss, though yet considerable, inconvenience by his so doing. *South.*

ALBEMARLE, or AUMARLE, a town of France, in Upper Normandy, in the territory of Caux, from whence the noble family of Keppel takes the title of earl. The ferges of this town are in high esteem. It is seated on the declivity of a hill, on the confines of Picardy, thirty-five miles N. E. of Rouen, and seventy N. W. of Paris. E. lon. 2. 21. N. lat. 49. 50.

ALBEMARLE, the most northern part of the province of North Carolina in America.

ALBENGUA, a town of Italy, in the territory of Genoa. It is the see of a bishop; and is a very ancient handsome town, but not well peopled on account of the infalubrity of the air. It is a sea-port, about thirty-eight miles S. W. of Genoa. E. lon. 8. 13. N. lat. 44. 4.

ALBERNUO, a kind of camblet, brought from the Levant by the way of Marseilles.

ALBERONI (Julius) was the son of a gardener near Parma, and when a boy officiated as bell-ringer, and attended upon the parish-church of his village. The rector, finding him a shrewd sharp lad, taught him Latin. Alberoni afterwards took orders, and had a small living, on which he resided, little thinking of the great fortune that was one day to await him. M. Campistron, a Frenchman, secretary to the Duke of Vendôme, who commanded the armies of Louis XIV. in Italy, was robbed, and stripped of his clothes, and of all the money that he had about him, by some ruffians, near Alberoni's village. Alberoni, hearing of his misfortune, took him into his house, furnished him with clothes, and gave him as much money as he could spare for his travelling expences. Campistron, no less impressed with his strength of understanding than with the warmth of his benevolence, took him to the head-quarters, and presented him to his general, as a man to whom he had very great obligations. M. de Vendôme, finding Alberoni to be a man of parts, gave him a petty employment under him, and took him with him to Spain. By degrees he obtained the marshal's confidence, and proposed the daughter of his sovereign the duke of Parma to him, as a fit match for the king of Spain. Alberoni's proposal was attended to, and the princess was demanded in marriage by that monarch, then Philip V. The duke of Parma consented with great readiness to a match that was to procure his daughter the sovereignty of so great a kingdom as that of Spain. When every thing was settled, and immediately before the princess was to set out for her new dominions, the ministry of Spain had heard that the princess was a young woman of a haughty imperious temper, and extremely intriguing and ambitious. They therefore prevailed upon the king to write to the duke, to request another of his daughters in marriage, to whose quiet disposition they could not possibly have any objections. The king did as he was desired, and sent his letter by a special messenger. Alberoni, who was then at Parma, hearing of this, and afraid that all his projects of ambition would come to nothing, unless the princess whom he recommended, and who of course would think herself highly obliged to him for her exalted situation, became queen of Spain, had the messenger stopped at one day's journey from Parma, and gave him his choice, either to delay his coming to Parma for a day, or to be assassinated. He of course chose the first of these alternatives, and the princess set out upon her journey to Spain, and became queen of that country. Alberoni was soon made prime minister of Spain; a cardinal, and archbishop of Valencia; and exercised his ministry with the most complete despotism. One of Alberoni's projects was to dispossess the Duke of Orleans of the regency of France, and to bestow it upon his own sovereign, as the oldest representative of the house of Bourbon; to place the pretender on the throne of England, and add to Spain the kingdom of Naples and Sicily. His project was however discovered by the regent, and one of the conditions he made with the king of Spain was, the banishment of Alberoni from his councils and his kingdom. With this he was obliged to comply, and the cardinal received orders to leave Madrid in

in twenty-four hours, and the kingdom of Spain in fifteen days. Alberoni, who took with him great wealth, was upon the second day of his journey, when it was perceived that he was carrying out of the kingdom with him the celebrated will of Charles II. of Spain, which gave that kingdom to its then sovereign. Persons were detached from Madrid to wrest this serious and important document from him, which it was supposed he intended to take to the emperor of Germany, to ingratiate himself with him. With some violence they effected their purpose, and the cardinal proceeded on his journey to the frontiers of France, where he was received by an officer, sent by the regent to conduct him through that kingdom as a state prisoner. As a true politician, however, yields to circumstances, and is never embarrassed by any change of affairs, Alberoni, on his arrival in France, wrote to the regent, to offer him his services against Spain. To this letter, however, his highness disdained to return any answer. The cardinal's disgrace happened in 1720, and he retired to Parma for some time, till he was summoned by the pope to attend a consistory, in which his conduct was to be examined by some of the members of the Sacred College, respecting a correspondence he was supposed to have kept up with the Grand Seigneur. He was sentenced to be confined one year in the Jesuits College at Rome. After this he returned to Parma, near which city he founded, at a very great expence, an establishment for the instruction of young men destined for the priesthood. In the disastrous campaign of 1746, the buildings were destroyed by the three armies that were in the neighbourhood; and, as the cardinal was not supposed to have been over-delicate in his acquirement of the means by which his establishment was to have been supported, his countrymen did not appear to express much dissatisfaction at the demolition of it. Alberoni, soon after this, went to Rome, and was made legate of Romagna by Clement XII. He died at Rome, in 1752, at the age of eighty-seven years. He preserved inviolate, to the last, the powers of his mind and of his body.

ALBERT, Margrave of Brandenburg, and the last grand master of the Teutonic order, laid aside the habit of his order, embraced Lutheranism, and concluded a peace at Cracow in 1525, by which he was acknowledged duke of the east part of Prussia (formerly called for that reason *Ducal Prussia*), but to be held as a fief of Poland, and to descend to his male heirs. See PRUSSIA.

ALBERTI (Leone Battista), was descended from a noble family in Florence; and perfectly acquainted with painting, sculpture, and architecture. He wrote of all three in Latin; but his studies did not permit him to leave any thing considerable behind him in painting. He was employed by pope Nicholas V. in his buildings, which he executed in a beautiful manner; and his work on architecture, which consists of ten books, is greatly esteemed. He died in 1485.

ALBERTISTS, a sect of scholastics, so named from their leader Albertus Magnus.

ALBERTUS MAGNUS, a very learned man in the thirteenth century, who, among a multitude of books, wrote several upon the various mathematical sciences, as Arithmetic, Geometry, Perspective or Optics, Music, Astrology, and Astronomy.

Albertus Magnus was born at Lavingen on the Danube, in Suabia, in 1205, or according to some in 1193; and he died at a great age, at Cologne, November 15, 1280. Vossius and other authors speak of him as a great genius, and deeply skilled in all the learning of the age. His writings were so numerous, that they make twenty-one volumes in folio, in the Lyons edition of 1615. He has passed also for the author of some writings relating to midwifery, &c. under the title of *De natura rerum*, and *De secretis mulierum*, in which there are many phrases and expressions unavoidable on such a subject, which gave great offence, and raised a clamour against him as the supposed author, and inconsistent with his character, being a Dominican friar, and sometime bishop of Ratisbon; which dignity however he

soon resigned, through his love for solitude, to enter again into the monastic life. But the advocates of Albert assert, that he was not the author of either of these two works. It must be acknowledged however, that there are, in his Comment upon the Master of Sentences, some questions concerning the practice of conjugal duty, in which he has used some words rather too gross for chaste and delicate ears: but they allege what he himself used to say in his own vindication, that he came to the knowledge of so many monstrous things at confession, that it was impossible to avoid touching upon such questions. Albert was certainly a man of a most curious and inquisitive turn of mind, which gave rise to other accusations against him; such as, that he laboured to find out the philosopher's stone; that he was a magician; and that he made a machine in the shape of a man, which was an oracle to him, and explained all the difficulties he proposed: the common cant accusations of those times of ignorance and superstition. But, having great knowledge in the mathematics and mechanics, by his skill in these sciences he probably formed a head, with springs, capable of articulate sounds; like the machines of Boetius and others. John Matthæus de Luna, in his treatise *De Rerum Inventoribus*, has attributed the invention of fire-arms to Albert; but in this he is refuted by Naude, in his *Apologie des Grands Hommes*.

ALBERTUS, a gold coin, worth about fourteen French livres: it was coined by Albertus archduke of Austria.

ALBESIA, in antiquity, a kind of shields otherwise called *Decumana*. See DECUMANA.

ALBI, a city of France, the capital of the Albigeois, in Languedoc. The cathedral is dedicated to St. Cecilia, and has one of the finest choirs in the kingdom. Here was a very valuable silver shrine, of exquisite workmanship, of the Mosaic kind, containing the reliques of St. Clair, the first bishop of this city. It is seated on the river Tarn, thirty-five miles north-by-west of Toulouse, and 250 south of Paris. E. lon. o. 52. N. lat. 43. 56.

The Albigeois is a small territory about twenty-seven miles in length, and twenty in breadth, abounding in corn, woad, grapes, saffron, plums, and sheep; and the inhabitants trade in dried prunes, grapes, a coarse sort of cloth, and wines of Gaillac. They have likewise several coal-mines.

ALBIGENSES, in church-history, a sect or party of reformers, about Toulouse and the Albigeois in Languedoc, who sprung up in the twelfth century, and distinguished themselves by their opposition to the discipline and ceremonies of the Romish church.

This sect had their name, it is supposed, either by reason there were great numbers of them in the diocese of Albi, or because they were condemned by a council held in that city. In effect, it does not appear that they were known by this name before the holding of that council. The *Albigenses* were also called *Albians*, *Albigesi*, *Albi*, and *Albanenses*, though some distinguish these last from them. Other names given to them are, *Henricians*, *Abelardists*, *Bulgarians*, &c. some on account of the qualities they assumed; others on that of the country from whence it is pretended they were derived; and others on account of persons of note who adopted their cause, as Peter de Brius, Arnold de Bresse, Abelard, Henry, &c. Berengarius, if not Wickliff himself, is by some ranked in the number.

The errors imputed to them by their opponents, the monks of those days, were, That they admitted two Christs; one evil, who appeared on earth; the other good, who has not yet appeared: That they denied the resurrection of the body; and maintained human souls to be daemons imprisoned in our bodies, by way of punishment for their sins: That they condemned all the sacraments of the church; rejected baptism as useless; held the eucharist in abhorrence; excluded the use of confessions and penance; maintained marriage unlawful; laughed at purgatory, prayers for the dead, images, crucifixes,

cifixes, &c.—There were likewise said to be two two classes of them; the Perfect, and the Believers. The perfect boasted of their living in continence, of eating neither flesh, eggs, nor cheese. The believers lived like other men, and were even loose in their morals; but they were persuaded they should be saved by the faith of the perfect, and that none were damned who received imposition of hands from them. But from these charges also they are generally acquitted by Protestants; who consider them as the pious inventions of the Romish church, whose members deem it meritorious by any means to blacken heretics.

However this be, the Albigenes grew so formidable that the Catholics agreed upon a holy league or croisade against them. They were at first supported by Raimond count of Toulouse. Pope Innocent III. desirous to put a stop to their progress, sent a legate into their country; which failing, he stirred up Philip Augustus king of France, and the other princes and great men of the kingdom, to make war upon them. Upon this the count of Toulouse, who had sided with them, made his submission to the pope, and went over to the Catholics: but soon after, finding himself plundered by the crusaders, he declared war against them, and was joined by the king of Arragon. His army was defeated at the siege of Muret, where he himself was killed, and the defeat followed by the surrender of the city of Toulouse, and soon after by the conquest of the greatest part of Languedoc and Provence. His son Raimond succeeded him; who agreed with the king and the pope to set up the inquisition in his estates, and to extirpate the Albigenes. In an assembly held at Milan, the archbishop of Toulouse drew up articles; agreeable to which the count made a most ample declaration against them, which he published at Toulouse in 1253. From this time the Albigenes dwindled by little and little, till the times of the reformation; when such of them as were left fell in with the Vaudois, and became conformable to the doctrine of Zuinglius and the disciples of Geneva.

ALBIGENSES is also a name sometimes given to the followers of Peter Vaud, or Waldo; and hence synonymous with what we more properly call *Waldenses*, or Poor Men of Lyons. In this sense the word is applied by Camerarius, Thuanus, and several other writers. The reason seems to be, that the two parties agreed in their opposition to the papal innovations and encroachments, though in divers other respects said to be different enough.

ALBITEMELIUM, ALBINTIMILIUM, or ALBIUM ITEMELIUM, now Vintimiglia, situated in the south-west of the territory of Genoa, near the borders of the county of Nice, with a port on the Mediterranean, at the mouth of the rivulet Rotta, about half way between Monaco and St. Remo. Lat. 43. 17. lon. 7. 40. E.

ALBIOECE, or ALEBECE; otherwise called *Reii Apollinares*, also *Civitas Reiensum*; now Riez, in Provence, about eighteen leagues to the north-east of Toulon, on the north side of the rivulet Verdon, was originally a Roman colony. It is sometimes written Regium. The people were called *Albici* by Cæsar. Lat. 43. 20. lon. 1. 0. E.

ALBINI, *f.* in antiquity, the workmen employed in what was called *Opus Albarium*. They make a different profession from the *dealbatores*, or *whiteners*.

ALBINOS, the name by which the Portuguese call the White Moors, whose colour resembles not that of the Europeans, but their whiteness is similar to that of milk, or to the hairs of a white horse. Their skin is covered with a kind of short white down, but not so thick as to conceal the skin. Their eye-brows are perfectly white, as well as their hair, which is seven or eight inches long, and half crisped; and, what is singular, their eye-lids are oblong, or rather in the form of a crescent, with the points turned down. Their eyes are red, and so weak that they can hardly see any object during the day; they cannot suffer the rays of the sun, and have no distinct vision but from the light of the moon.

Not long ago we had an account from Surinam of a negro of Angola, whose skin and hair were perfectly white, though both his father and mother had very dark complexions. The eyes of this Albino had a constant vibratory motion, and were incapable of distinguishing objects with exactness except in the dark. In the *Journal de Physique* of M. Rosier, for May 1777, M. Diqueuare has published an account of a white negro girl who was born at Dominica, in 1759, of black parents. "She has all the features of the negroes, especially those of Lower Guinea; and her hair, eye-brows, and eye-lashes, are the same in every respect, except the colour. Her hair, though a kind of very short wool, is fair; and her eye-brows, as well as her eye-lashes, are of a yellowish pale colour. The colour of her skin is a dead white; her cheeks, lips, nose, and other sanguine parts, have a slight tint of red, which becomes stronger when she is affected with liveliness or fear. Her eyes are long; the pupils approach, or sometimes recede from, each other, with a continual and involuntary motion; she is weak but not short sighted. Light is disagreeable to her, and towards night she sees neither better nor further than others. She has a timid air, a soft voice, and the smell of green leeks; but her skin is not soft like that of the negroes. Her parents have had several black children; but it is said, that an older one, who was born white, gradually became blacker as he grew up, and at last assumed the colour of the Cabres."—One of these Albinos was brought into England by the late Rev. George Whitfield, from America. It was a female; and she was afterwards exhibited as a great curiosity.

In Saussure's *Voyages dans les Alpes*, is the following account of two boys, at Chamouni, who were called Albinos:—"The elder, who was at the end of the year 1785 about twenty or one-and-twenty years of age, had a dull look, with lips somewhat thick, but nothing else in his features to distinguish him from other people. The other, who is two years younger, is rather a more agreeable figure: he is gay and sprightly, and seems not to want wit. But their eyes are not blue; the iris is of a very distinct rose-colour: the pupil too, when viewed in the light, seems decidedly red; which seems to demonstrate, that the interior membranes are deprived of the uvea, and of that black mucous matter that should line them. Their hair, their eye-brows, and eye-lashes, the down upon their skin, were all, in their infancy, of the most perfect milk-white colour, and very fine; but their hair is now of a reddish cast, and has grown pretty strong. Their sight too is somewhat strengthened; though they exaggerate to strangers their aversion for the light, and half shut their eye-lids to give themselves a more extraordinary appearance. But those who, like me, have seen them in their infancy, before they were tutored to this deceit, and when too few people came to Chamouni to make this affectation profitable to them, can attest that then they were not very much offended with the light of day. At that time, they were so little desirous of exciting the curiosity of strangers, that they hid themselves to avoid such; and it was necessary to do a sort of violence to them before they could be prevailed on to allow themselves to be inspected. It is also well known at Chamouni, that when they were of a proper age they were unable to tend the cattle like the other children at the same age; and that one of their uncles maintained them out of charity, at a time of life when others were capable of gaining a subsistence by their labour.

"I am therefore of opinion, that we may consider these two lads as true Albinos: for, if they have not the thick lips and flat noses of the white negroes, it is because they are Albinos of Europe, not of Africa. This infirmity affects the eyes, the complexion, and the colour of the hair; it even diminishes the strength, but does not alter the conformation of the features. Besides, there are certainly in this malady various degrees: some may have less strength, and be less able to endure the light: but these circumstances in those of Chamouni are marked with characters sufficiently strong to entitle them to the unhappy advantage of being

being classed with that variety of the human species denominated Albinos.

"When nature presents the same appearance often, and with circumstances varied, we may at last discover some general law, or some relation which that appearance has with known causes: but, when a fact is so singular and so rare, it gives but little scope to conjectures: and it is very difficult to verify those by which we attempt to explain it. I at first imagined that this disease might be referred to a particular sort of organic debility; that a relaxation of the lymphatic vessels within the eye might suffer the globules of the blood to enter too abundantly into the iris, the uvea, and even into the retina, which might occasion the redness of the iris and of the pupil. The same debility seemed also to account for the intolerance of the light, and for the whiteness of the hair. But a learned physiologist, M. Blumenbach, professor in the university at Göttingen, who has made many profound observations on the organs of sight, and has considered with great attention the Albinos of Chamouni, attributes their infirmity to a different cause.

"The study of comparative anatomy has furnished him with frequent opportunities of observing this phenomenon; he has found it in brutes, in white dogs, and in owls; he says, it is generally to be seen in the warm-blooded animals; but that he has never met with it in those with cold blood.

"From his observations, he is of opinion, that the redness of the iris, and of the other internal parts of the eye, as well as the extreme sensibility that accompanies this redness, is owing to the total privation of that brown or blackish mucus, that, about the fifth week after conception, covers all the interior parts of the eye in its found state. He observes, that Simon Pontius, in his *Treatise de Coloribus Oculorum*, long ago remarked, that in blue eyes the interior membranes were less abundantly provided with this black mucus, and were therefore more sensible to the action of light. This sensibility of blue eyes agrees very well, says M. Blumenbach, with northern people, during their long twilight; while, on the contrary, the deep black in the eyes of negroes enables them to support the splendor of the sun's beam in the torrid zone.

"As to the connection between this red colour of the eyes and the whiteness of the skin and hair, the same learned physiologist says, that it is owing to a similarity of structure, *consensus ex similitudine fabricae*. He asserts, that this black mucus is formed only in the delicate cellular substance, which has numerous blood-vessels contiguous to it, but contains no fat; like the inside of the eye, the skin of negroes, the spotted palate of several domestic animals, &c. And, lastly, he says, that the colour of the hair generally corresponds with that of the iris.

"At the very time that M. Blumenbach was reading this memoir to the Royal Society of Göttingen, M. Buzzi, surgeon to the hospital at Milan, an elevé of the celebrated anatomist Moscati, published, in the *Opusculi Selecti de Milan*, 1784, a very interesting memoir, in which he demonstrates by dissection what Blumenbach had only supposed.

"A peasant of about thirty years of age died at the hospital of Milan of a pulmonary disorder. His body, being exposed to view, was exceedingly remarkable by the uncommon whiteness of the skin, of the hair, of the beard, and of all the other covered parts of the body. M. Buzzi, who had long desired an opportunity of dissecting such a subject, immediately seized upon this. He found the iris of the eyes perfectly white, and the pupil of a rose-colour. The eyes were dissected with the greatest possible care, and were found entirely destitute of that black membrane which anatomists call the uvea: it was not to be seen either behind the iris or under the retina. Within the eye there was only found the choroid coat extremely thin, and tinged of a pale red colour, by vessels filled with discoloured blood. What was more extraordinary, the skin, when detached from different parts of the body, seem-

ed also entirely divested of the rete mucosum: maceration did not discover the least vestige of this, not even in the wrinkles of the abdomen, where it is most abundant and most visible.

"M. Buzzi likewise accounts for the whiteness of the skin and of the hair, from the absence of the rete mucosum, which, according to him, gives the colour to the cuticle, and to the hairs that are scattered over it. Among other proofs of this opinion, he alleges a well-known fact, that, if the skin of the blackest horse be accidentally destroyed in any part of the body, the hairs that afterwards grow on that part are always white, because the rete mucosum which tinges those hairs is never regenerated with the skin.

"The proximate cause of the whiteness of Albinos, and the colour of their eyes, seems therefore pretty evidently to depend on the absence of the rete mucosum: But what is the remote cause?

"In the first place, it seems probable, that men affected with this infirmity form no distinct species, for they are produced from parents that have dark skins and black eyes. What is it then that destroys the rete mucosum in such persons? M. Buzzi relates a singular fact, which seems to throw some light on this subject.

"A woman of Milan, named Colcagni, had seven sons. The two eldest had brown hair and black eyes; the three next had white skins, white hair, and red eyes; the two last resembled the two eldest. It was said that this woman, during the three pregnancies that produced the Albinos, had a continual and immoderate appetite for milk, which she took in great quantities: but that when she was with child of the other four children, she had no such desire. It is not however ascertained, that this preternatural appetite was not itself the effect of a certain heat, or internal disease, which destroyed the rete mucosum in the children before they were born.

"The Albinos of Chamouni are also the offspring of parents with dark skins and black eyes. They have three sisters by the same father and mother, who are also brunettes. One of them that I saw had the eyes of a dark brown, and the hair almost black. They are said, however, to be all afflicted with a weakness of sight. When the lads are married, it will be curious to observe how the eyes of their children will be formed. The experiment would be particularly decisive if they were married to women like themselves. But this faulty conformation seems to be more rare among women than among men; for the four of Milan, the two of Chamouni, the one described by Maupertuis, the one by Helvetius, and almost all the instances of these singular productions, have been of our sex. It is known, however, that there are races of men and women affected with this disease, and that these races perpetuate themselves in Guinea, in Java, at Panama, &c.

"Upon the whole, this degeneration does not seem to be owing to the air of the mountains; for though I have traversed the greatest part of the Alps, and the other mountains of Europe, these are the only individuals of the kind that ever I met with."

ALBINUS (Bernhard Siegfried), a celebrated physician and anatomist, was born at Francfort on the Oder, in 1697. Though distinguished in every branch of literature, his attention was particularly turned to anatomy and surgery; and his peculiar attachment to these branches of knowledge, which he cultivated under the eye of his father, who was professor of anatomy and surgery at Leyden, gained him the intimate friendship of Ruysch and Raw. From Leyden he went to Paris, where he attended the lectures of Du Verney, Vaillant, and other celebrated professors. But he had scarcely spent a year there, when he was invited by the curators of the university of Leyden to be a lecturer in anatomy and surgery at that place. In 1721, upon the death of his father, he succeeded to the professorship; in which capacity he not only paid the greatest attention to the pupils entrusted to his care, but laboured greatly in the improvement of the medical art. His numerous

merous and splendid publications soon extended his reputation over Europe; and the societies of London, Peterburgh, and Haerlem, cheerfully received him as an associate. In 1745, he was appointed professor of the practice of medicine at Leyden, and was succeeded in the anatomical chair by his brother Frid. Bern. Albinus. He was twice rector of the university, and as often refused that high honour when it was voluntarily offered him. At length, worn out by long service and intense study, he died on September 9, 1770, aged seventy-four.

ALBION, the ancient name of Britain, from the Latin *album*, "white," on account of the chalky cliffs on its sea-coasts.

New ALBION, a name given by Sir Francis Drake to California.

ALBIERO, *f.* in astronomy, a star of the third or fourth magnitude in the constellation CYGNUS.

ALBIS, now the Elbe, which divided ancient Germany in the middle, and was the boundary of the ancient geography of Germany, so far as that country was known to the Romans: all beyond they owned to be uncertain, no Roman except Drusus and Tiberius having penetrated so far as the Elbe. In the year of the building of the city 744, or about six years before Christ, Domitius Ahenobarbus, crossing the river with a few, merited the ornaments of a triumph; so glorious was it reckoned at Rome to have attempted its passage.

ALBISOLA, a small town belonging to the republic of Genoa: here is a porcelain manufacture, and several country-houses of the Genoese nobility. It was bombarded in 1745 by the English. Lat. 44. 15. N. lon. 8. 20. E.

ALBOGALERUS, *f.* in Roman antiquity, a white cap worn by the *flamen dialis*, on the top of which was an ornament of olive-branches.

ALBORA, *f.* a sort of itch, or rather leprosy. Paracelsus says, it is a complication of the morpew, serpigo, and leprosy. When cicatrices appear in the face like the serpigo, and then turn to small blisters of the nature of morpew, it is the albora. It terminates without ulceration, but by fetid evacuations in the mouth and nostrils; it is also seated in the root of the tongue. Internal medicines, as well as corrosive ones, are forbidden.

ALBORAK, *f.* amongst the Mahometan writers, the beast on which Mahomet rode in his journeys to heaven. The Arab commentators give many fables concerning this extraordinary vehicle. It is represented as of an intermediate shape and size between an ass and a mule. A place, it seems, was secured for it in paradise at the intercession of Mahomet; which, however, was in some measure extorted from the prophet, by Alborak's refusing to let him mount him when the angel Gabriel was come to conduct him to heaven.

ALBORO, *f.* in zoology, a name by which the erythrurus, a small red fish caught in the Mediterranean, is commonly known in the markets of Rome and Venice.

ALBOURG, a town of Denmark. See AALBORG.

ALBRICIUS, born at London, was a great philosopher, a learned and able physician, and well versed in all the branches of polite literature. He lived in the eleventh century, and wrote several works in Latin; particularly, 1. Of the Origin of the Gods. 2. The Virtues of the Ancients. 3. The Nature of Poison, &c.

ALBUCA, *f.* [from *albus*, Lat. white.] In botany, a genus of the hexandria monogynia class, ranking in the natural order of lilia or liliaceæ. The generic characters are—Corolla: petals six, oblong-oval, permanent; the three outer spreading, the three inner converging. Stamina: filaments shorter than the corolla, three opposite to the inner petals, linear-fusulate, complicate a little above the base, then flat; three opposite to the outer petals, thicker; antheræ on the former, oblong, fixed to the inflex tip of the filament below the middle, upright; on the latter, similar but effete, or none. Pistillum: germ oblong, triangular; style three-sided; stigma a triangular pyramid. Pericarpium: an oblong, obtuse, triangular,

three-celled, three-valved, capsule. Seeds: numerous, flat, lying over each other, and widening outwards.—*Essential Character.* Corolla six-petalled, the inner ones difform. Stamina, three of the six castrated; stigma surrounded by three cups.

Species. I. Three stamens only fertile. 1. *Albuca altissima*, or tall albuca: interior petals glandulose and bent in at the tip, leaves subulate, channelled-convolute. In this species the leaves are so deeply channelled as to be almost rolled into a cylinder; they are two feet long, and almost three inches broad at the base. It flowers in April and May, and was introduced into England about 1780, by Messrs. Kennedy and Lee.

2. *Albuca major*, or great albuca: interior petals glandulose and bent in at the tip, leaves linear-lanceolate, flatish. Mr. Miller has, by mistake, made this a native of Canada, whereas all the species come from the Cape of Good Hope. It flowers in May.

3. *Albuca minor*, or small albuca: interior petals glandulose and bent in at the tip, leaves linear-subulate, channelled. It flowers in May and June.

4. *Albuca coarctata*, or channel-leaved albuca: interior petals vaulted at the tip; leaves smooth, linear, subulate, channelled; peduncles the length of the bractes. The flowers are yellow, which appear in May. It was introduced here in 1774.

5. *Albuca spiralis*, or spiral-leaved albuca: interior petals vaulted at the tip, leaves spiral.

II. All the stamens fertile. 6. *Albuca fastigiata*, or upright-flowered albuca: interior petals vaulted at the tip, leaves smooth, peduncles very long. It flowers in May, and was introduced in 1774.

7. *Albuca viscosa*, or viscose albuca: interior petals vaulted at the tip, leaves hairy-glandulose. It flowers in May and June, and was introduced about 1779, by John Fothergill, M. D.

8. *Albuca Abyssinica*, or Abyssinian albuca: leaves linear, channelled, smooth.

Propagation and Culture. If the roots are kept in pots, filled with light earth, and sheltered under a hot-bed frame in winter, they will thrive and produce flowers; but the best method is to have a border in the front of a greenhouse, or stove, where the roots of most of the bulbous flowers may be planted in the full ground, and screened in winter from frost; in such situations they thrive much better, and flower stronger, than when kept in pots. Mr. Miller says, that he raised the third sort from seed, and that it generally flowers twice a-year, first in March or April, and again in July or August; but that it did not produce any seeds. He affirms, that the second sort is so hardy, that the roots may be planted about four inches deep in a border of light earth, where they will thrive, and produce their flowers late in the summer.

ALBUGINEA TUNICA, *f.* in anatomy, the third or innermost coat or covering of the testes; it is likewise the name given to one of the coats of the eye.

ALBUGINEOUS, *adj.* [*albugo*, Lat.] Resembling the white of an egg.

ALBUGO, or LEUCOMA, *f.* in medicine, a distemper occasioned by a white opaque spot growing on the cornea of the eye, and obstructing vision.

ALBUM, *f.* in antiquity, a kind of white table or register, wherein the names of certain magistrates, public transactions, &c. were entered. Of these there were various sorts; as the *album decurionum*, *album senatorum*, *album judicum*, *album prætoris*, &c. *Album decurionum* was the register wherein the names of the decuriones were entered, and is otherwise called *matriculatio decurionum*. *Album senatorum*, the list of senators' names, which was first introduced by Augustus, and renewed yearly. *Album judicum*, that wherein the names of the persons of those decuriae who judged at certain times were entered. *Album prætoris*, that wherein the formula of all actions, and the names of such judges as the prætor had chosen to decide causes, were written. The high priest entered the chief

chief transactions of each year into an album, or table, which was hung up in his house for the public use.

ALBUM, in later times, denoted a kind of table, or pocket-book, wherein the men of letters with whom a person had conversed, inscribed their names with some sentence or motto.

ALBUM GRÆCUM, among physicians, the white dung of dogs, formerly prescribed for inflammations of the throat, &c. but now justly despised.

ALBUMAZAR, a learned Arabian astronomer in the tenth century, who wrote a treatise *Of the Revolution of the Years*.

ALBUMEN, the white of an egg. For its nature, origin, and office, see EGG.

The white of an egg, according to Boerhaave, makes an extraordinary menstruum. Being boiled hard in the shell, and afterwards suspended in the air by a thread, it resolves and drops down into an insipid, scentless, liquor, which appears to be that anomalous unaccountable menstruum so much used by Paracelsus; and will, though it contain nothing sharp, oleaginous, or saponaceous, make a thorough solution of myrrh; which is more than either water, oil, spirits, or even fire itself, can effect.

A little putrid white of egg taken into the stomach, occasions a nausea, horror, fainting, vomiting, diarrhoea, and gripes; it inflames the bile, excites heat, thirst, fever; and dissolves the humours like the plague. On the contrary, the white of fresh-laid eggs, if taken while warm from the hen, is extremely nourishing to the infirm; it may be taken in luke-warm milk; but, if any other heat is applied to it, the nutritious quality will be destroyed. The fresh white of egg prevents burns from rising in blisters, if it is used immediately after the accident: it mitigates inflammations of the eyes, and preserves the face from sun-burning. In pharmacy, it is used as a medium to render balsams and turpentine, &c. miscible with aqueous fluids; but, as it disagrees with many stomachs when thus taken, a mucilage of gum-arabic may supply its place, it being as good a medium in similar circumstances, and not apt to offend the tenderest stomach. The eggs of all birds are pretty nearly similar with regard to their flavour and nutritious effects: though some are deeper coloured, and more tenacious, than others. It is surprising what a quantity of egg will be digested by some persons; but in most, this power is very limited; for a smaller bulk of this, than of any other food, will satisfy and occupy the digestive powers of most men. It is a more calefactive food than any other animal substance; and, during digestion, is less stimulant.

ALBUQUERQUE, a small city in Spain, in the province of Estremadura, is seated on an eminence, nine miles from the frontiers of Portugal. It is commanded by an almost impregnable fortress, built on a high mountain, and serving to defend the town. It carries on a great trade in the wool and woollen manufactures. It was taken by the allies of Charles king of Spain in 1705. W. lon. 7. 0. N. lat. 38. 52.

ALBUQUERQUE (Alphonso), a native of Portugal. Little is known of this great commander before he was appointed by king Emanuel to the command of a squadron destined for India, where by his exploits he raised the arms of his country to the highest pitch of glory. His principal expedition was against Goa, which he invested with twenty-three ships, and about 5000 men.—The forts near it on the continent were taken and destroyed; and, learning that the city was in the greatest consternation, he sent deputies to offer the people his protection, and the enjoyment of their religion. The citizens accepted the conditions, and Albuquerque entered Goa the following day, being the 16th of February, 1510. This city has long been the head of the Portuguese dominions in India. Here Albuquerque fixed his winter-quarters, and behaved himself in such a manner as to merit the esteem of every one. But, while he was thus employed, some of the chief Portuguese began to murmur against him. However, by

seizing and imprisoning the leaders, he quieted the disturbance. The enemy, being informed of the dissensions among the Portuguese, made an attack upon the island, and, landing men, laid siege to the city, pressing it hard. The situation of Albuquerque became now truly distressing; an enemy vastly superior without, discontent among his officers within, and his troops greatly diminished. These circumstances determined him to embark on-board his ships, and evacuate the city, which he effected after a fierce combat, having first set fire to the magazines.

He then steered to a place called Repander to winter; but the enemy soon obliged him to remove, and take shelter between the continent and the island of Divar, where he was informed his enemies were also preparing to make an attack upon him. In this extremity, being also very scarce of provisions, he determined to make a desperate effort on a strong castle, called Pangin. Accordingly, having stationed a force to prevent succours being sent to it, he proceeded under cover of the night, and succeeded in surprising the fort and camp of the enemy, both which were taken without much resistance. Such an unexpected turn of good fortune determined him not only to object to offers of peace, but also to make another attack on Goa. In this he succeeded, and killed 3000 of the enemy. This success induced him to aim at greater enterprises. Collecting his forces, he sailed from Goa for the island of Sumatra; and, after concluding a treaty with the princes of that island, he proceeded to the city of Malacca, and made himself master of it. Having settled affairs there, he returned to Goa, laid siege to the city of Benafar, and, having been unsuccessful, consented to a peace with the Zamorin. To this great man the Portuguese owe the foundation of the immense power they once possessed in India; and, had they pursued the maxims he laid down, they might possibly have enjoyed them to this day. He was a man of great humanity, dreaded for his bravery, and beloved for his benevolent disposition. His death was most sincerely felt by all the people of Goa, where he was buried with great funeral honours.

ALBURN, the English name of a compound colour, being a mixture of white and red, or reddish brown. Skinner derives the word, in this sense, from the Latin *albus*, and the Italian *burno*, from *bruno*, "brown."

ALBURNUM, the soft white substance which in trees is found between the liber or inner bark and the wood, and in progress of time, acquiring solidity, becomes itself the wood. From its colour and comparative softness, it has been styled by some writers the fat of trees, *adeps arborum*. The alburnum is found in largest quantities in trees that are vigorous; though in such as languish, or are sickly, there is a great number of beds. In an oak six inches in diameter, this substance is nearly equal in bulk to the wood. In a trunk of one foot diameter, it is as one to three and a half; of two and a half feet diameter, as one to four and a half, &c. but these proportions vary according to the health and constitution of the trees.—The alburnum is frequently gnawed in pieces by insects, which lodge in the substance, and are nourished from it.

ALBURNUS, in zoology, a species of the *cyprinus* of Linnæus. See CYPRINUS.

ALBY, an ancient town in the department of Tarn. There are very beautiful walks in the environs of the town, and the adjacent country is very fertile, producing the various kinds of grain, excellent wines, flax, hemp, saffron, aniseed, coriander and woad; the fine pastures afford wool of a good quality, which is manufactured into stockings, ratteens, shalloons, coarse woollens, &c. and the wax-candles made here are very fine. This town is forty-two miles N. E. of Toulouse, and 335 S. of Paris. Lat. 44. 15. N. lon. 2. 14. E. The Albigenes, so called from their making their first appearance in this city, were a people who, so early as the eleventh century, disputed the authority of the pope; for this he excommunicated them: a very cruel persecution was raised against them by means of a crusade.

ALCA, or *Auk*, in ornithology, a genus of the order of anseres. The beak of this genus is without teeth, short, convex, compressed, and frequently furrowed transversely: the inferior mandible is gibbous near the base; the feet have generally three toes. The species of the alca are twelve; of which the most remarkable are,

1. The *impennis*, northern penguin, or great auk, with a compressed bill furrowed on each side, and an oval spot on each side of the eyes. According to Mr. Martin, this bird sometimes breeds on the isle of St. Kilda, in Scotland. It lays one egg, which is six inches long, of a white colour; some are irregularly marked with purplish lines crossing each other, others blotched with black, and ferruginous about the thicker end: if the egg is taken away, it will not lay another that season. It lays its egg close to the sea-mark, being incapable, by reason of the shortness of its wings, to mount higher. The length of this bird, to the end of its toes, is three feet: but its wings are so small, as to be useless for flight; the length, from the tip of the longest quill-feathers to the first joint, being only four inches and a quarter. This bird is observed by seamen never to wander beyond soundings; and according to its appearance they direct their measures, being then assured that land is not very remote. It sometimes frequents Norway, the Ferroe isles, Iceland, Greenland, and Newfoundland; and feeds much on the lump-fish, father-lasher, and other fish of that size. The young birds eat rose-root, and other plants. The old ones are very rarely seen on-shore, though the young ones are not unfrequently met with. It is a very shy bird. It walks ill; but dives well, and is taken in the manner used for the razor-bill and puffin. The skin between the jaws is blown into a bladder, and used for the darts of the Greenlanders, as is also that of some other birds. The skin of the body is supposed to be used by the Esquimaux Indians for garments.

2. The *alle*, little auk, or black and white diver, with a smooth conical bill, a white streak on the belly and wings, and black feet. The bulk of this species exceeds not that of a blackbird. It is not very common in Britain, being only met with now and then. It seems to be most plentiful towards the north, being met with in various parts as far as Spitzbergen. It is common in Greenland, in company with the black-billed species; feeds on the same food; and lays two bluish white eggs, larger than those of a pigeon. It flies quick, and dives well; and is always dipping its bill into the water while swimming or at rest on the water. It grows fat in the stormy season, from the waves bringing plenty of crabs and small fish within its reach; but from its size it is less sought after than the others. In Greenland it is called the *ice-bird*, being the harbinger of ice. This species is sometimes seen of a pure white.

3. The *arctica*, or puffin, with a compressed bill and four furrows; the orbit of the eyes and temples are white. The legs of this species are very small; and placed so far behind as to disqualify it from standing except quite erect, resting not only on the foot, but the whole length of the leg. This circumstance makes the rise of the puffin from the ground very difficult, and it meets with many falls before it gets on wing; but, when that is effected, few birds fly longer or stronger. These birds frequent the coasts of several parts of Great-Britain and Ireland; but no place in greater numbers than Priestholm-isle, where their flocks may be compared to swarms of bees for multitude. These are birds of passage; they resort there annually about the fifth or tenth of April, quit the place (almost to a bird), and return twice or thrice before they settle to burrow and prepare for ovation and incubation. They begin to burrow the first week in May; but some few save themselves that trouble, and dislodge the rabbits from their holes, taking possession of them till their departure from the isle. Those which form their own burrows, are at that time so intent on the work as to suffer themselves to be taken by the hand. This task falls

chiefly to the share of the males; who also assist in incubation. The first young are hatched the beginning of July. The old ones shew vast affection towards them; and seem totally insensible of danger in the breeding season. If a parent is taken at that time, and suspended by the wings, it will in a sort of despair treat itself most cruelly, by biting every part it can reach; and the moment it is loosed, will never offer to escape, but instantly resort to its unfledged young: this affection ceases at the stated time of migration, which is most punctually about the 11th of August, when they leave such young as cannot fly to the mercy of the peregrine falcon, who watches the mouth of the houses for the appearance of the little deserted puffins, which, forced by hunger, are compelled to leave their burrows. They lay only one egg. The eggs differ much in form: some have one end very acute; others have both extremely obtuse; all are white. Their flesh is excessively rank, as they feed on sea-weeds and fish, especially sprats: but, when pickled and preserved with spices, are admired by those who love high eating. Dr. Caius tells us, that in his days the church allowed them in Lent instead of fish. These birds are common in Ireland; on the island Sherries, three leagues N. N. W. of Holyhead; and in the S. Stack, near Holyhead, they breed in plenty. They inhabit Iceland and Greenland; and breed in the extreme parts of the islands. It is also found in the Ferroe isles, where it is called *lunda*; and in the Farn isles, where it is called *coulteneb*, from the shape of the bill. It goes also by various other names; such as *guldin-head*, *bottle-nose*, and *helegug*, in Wales; at Scarborough, *mullet*; and in Cornwall, *pope*. In America they are said to frequent Carolina in winter; and have been met with in Sandwich Sound by our late voyagers.

4. The *torda*, or razor-bill, with four furrows on the bill, and a white line on each side running from the bill to the eyes. These birds, in company with the guillemot, appear in our seas the beginning of February; but do not settle on their breeding places till they begin to lay, about the beginning of May. They inhabit the ledges of the highest rocks that impend over the sea, where they form a grotesque appearance; sitting close together, and in rows one above another. They properly lay but one egg apiece, of an extraordinary size for the bulk of the bird, being three inches long: it is either white, or of a pale sea-green, irregularly spotted with black; if this egg is destroyed, both the auk and the guillemot will lay another; if that is taken, then a third: they make no nest; depositing their egg on the bare rock; and, though such multitudes lay contiguous, by a wonderful instinct each distinguishes its own. What is also matter of great amazement, they fix their egg on the smooth rock with so exact a balance, as to secure it from rolling off; yet, should it be removed, and then attempted to be replaced by the human hand, it is extremely difficult, if not impossible, to find its former equilibrium. According to Mr. Latham, it is by means of a cement that the bird fixes its egg. The eggs are food to the inhabitants of the coast they frequent; which they get with great hazard, being lowered from above by ropes, trusting to the strength of their companions, whose footing is often so unstable that they are forced down the precipice, and perish together. These birds are found in the north of Europe, also in Iceland, Greenland, and on the coast of Labrador. In Europe they extend along the White Sea into the Arctic Asiatic shores, and from thence to Kamtschatka and the gulph of Ochotka: It is the only one which reaches the inland Baltic; being found there on the Carls-Ozar isles, near Gothland, and the isle of Bondon off Angermania.

5. The *pica*, or black-billed auk, has the bill of the same form with the *torda*, but is entirely black. The cheeks, chin, and throat, are white: in all other respects it agrees with the former species. Mr. Latham is of opinion that it is no other than the young of that species. Mr. Pennant observes; that it is sometimes found on our coasts; but, according to Mr. Latham, it is in the winter.

ALCA.

Edwards del.

Russ sculp.

The Puffin & Razor-Bill.

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ter-season only, when the common sort has quitted them. They are said to be met with on the coast of Candia, and other parts of the Mediterranean. They are common in the bay of Gibraltar, where it is curious to see their activity under water when pursuing the fish; for, as the water in the bay is sometimes clear for a great depth from the surface, these birds may be often seen as it were flying after their prey, with all the agility of a bird in the air, turning in every direction after the fish, with such wonderful address and dexterity as seldom to miss their aim.

6. The cirrhata of Dr. Pallas, or tufted auk, somewhat larger than the common puffin, and the colours much the same; the bill is an inch and three-quarters in length, the same in depth at the base, and crossed with three furrows; over each eye arises a tuft of feathers four inches in length, which falls elegantly on each side of the neck, reaching almost to the back, and are white as far as they are attached to the head, but afterwards of a fine buff yellow; the legs are of a bright red, and the claws black. The female is principally distinguished by having the bill crossed only with two furrows instead of three. This species inhabits the shores of Kamtschatka, the Kurile islands, and those intervening between Kamtschatka and America. In manners it greatly resembles the puffin, living all day at sea, but at no great distance from the rocks; it comes on shore at night, burrows a yard deep under ground, and makes a nest with feathers and sea-plants; is monogamous, and lodges there the whole night with its mate. It lays one white egg, the end of May or beginning of June, which alone is thought fit to be eaten, the flesh of the bird itself being insipid and hard. It feeds on crabs, shrimps, and shell-fish, which last it forces from the rocks with its strong bill.

7. The pttacula, or perroquet auk, of Dr. Pallas, is about the size of the little auk. The bill is much compressed on the sides, in shape convex both above and below, and of a bright red colour; from the remote corner of each eye is a very slender tuft of fine white feathers, hanging down the neck; the head and upper part of the body are dusky; the lower whitish, varied with black edges; the legs are of a dirty yellow, and the webs dusky. This species is found at Kamtschatka, in the isles towards Japan, and on the western shores of America. They are sometimes seen in flocks, but seldom far from land, except when driven by storms. At nights they harbour in the crevices of rocks. They lay an egg almost the size of a hen's, about the middle of June, upon the bare rock or sand, for they make no nest. Like most of the tribe, they are stupid birds, as may be evinced by the method of catching them. One of the natives places himself under a loose garment of fur, of a particular make, with large open sleeves, among the rocks at evening; when the birds, returning to their lodging-places at dusk, run under the skirts, and up the arm-holes, for shelter during the night, and thus becomes an easy prey. Their stupidity likewise occasions them to fly aboard a ship at such times, mistaking it for a roofing-place; whereby navigators have been taught to avoid the danger of falling in too near with land.

ALCACAR, a palace on one side of Toledo, in New Castile. It stands on the top of a steep rock, and commands a prospect of the city, and of the river Tagus, running at its foot through the neighbouring fields.

ALCÆUS, a famous ancient lyric poet, born at Mitylene, in the island of Lesbos. He flourished in the 44th Olympiad, at the same time with Sappho, who was likewise of Mitylene. Alcæus was a great enemy to tyrants, but not a very brave soldier. He was present at an engagement, wherein the Athenians gained a victory over the Lesbians; and here, as he himself is said to have confessed in one of his pieces, he threw down his arms, and saved himself by flight. The poetical abilities of Alcæus are undisputed; and, though his writings were chiefly in the lyric strain, yet his muse was capable of treating the sublime subjects with a suitable dignity.

ALCÆUS, an Athenian tragic poet, and, as some think,

the first composer of tragedies. He renounced his native country Mitylene, and passed for an Athenian. He left ten pieces, one of which was *Pasiphaë*, that which he produced when he disputed with Aristophanes, in the fourth year of the 97th Olympiad.

There is another ALCÆUS mentioned in Plutarch, perhaps the same whom Porphyrius mentions as a composer of satirical iambics and epigrams, and who wrote a poem concerning the plagiarism of Euphorus the historian. He lived in the 145th Olympiad.

We are told likewise of one ALCÆUS, a Messenian, who lived in the reign of Vespasian and Titus. We know not which of these it was who suffered for his lewdness a very singular kind of death, which gave occasion to the following epitaph:

Ἀλκαίῳ ταφος ἔσθ', &c.

This is Alcæus's tomb; who died by a radish,
The daughter of the earth, and punisher of adulterers.

This punishment, inflicted on adulterers, was thrusting one of the largest radishes up the anus of the adulterer: or, for want of radishes, they made use of a fish with jagged fins, and a large head.

ALCAHEST, *f.* An Arabic word, to express an universal dissolvent, pretended to by Paracelsus and Helmont.

ALCAICS, *f.* in ancient poetry, a denomination given to several kinds of verse, from Alcæus, their inventor. The first kind consists of five feet, viz. a spondee, or iambic; an iambic; a long syllable; a dactyle; another dactyle. The second kind consists of two dactyles and two trochees: as, *Exilium impositura cymbæ*. Besides these two, which are called *dactylic alcaics*, there is another styled simply *alcaic*; consisting of an epitrite, a choriambus, another choriambus, and a bacchius.

ALCAIC ODE, *f.* a kind of manly ode composed of several troches, each consisting of four verses; the two first of which are always alcaics of the first kind; the third verse is a diameter hypercatalectic, or consisting of four feet and a long syllable; and the fourth verse is an alcaic of the second kind.

ALCAID, ALCAYDE, or ALCALDE, *f.* [from *al*, Arab. and קריק, Heb. the head.] In the polity of the Moors, Spaniards, and Portuguese, a magistrate, or officer of justice, answering nearly to the French provost and the British justice of the peace. The alcaid among the Moors is vested with supreme jurisdiction, both in civil and criminal cases.

ALCALA DE GUADEIRA, a small town of Spain, in Andalusia, upon the river Guadeira. Here are abundance of springs, from whence they convey water to Seville by an aqueduct. Lat. 37. 15. N. lon. 6. 16. W.

ALCALA DE HENARES, a beautiful and large city of Spain, in New Castile, seated upon the river Henares, which washes its walls. It is built in a very agreeable plain, and is of an oval figure. The streets are handsome and straight; one of them is very long, running from one end of the city to the other. The houses are well built; and there are several squares, the largest of which is an ornament to the city; it is surrounded on all sides with piazzas, where tradesmen have their shops. The university was founded by cardinal Ximenes, archbishop of Toledo, about the beginning of the sixteenth century. The land about Alcala is watered by the Henares, well cultivated, and very fruitful, while that at a distance is dry and sterile; it yields grain in plenty, very good muscat wine, and melons of a delicious kind. Without the walls is a spring, the water of which is so pure and so well tasted, that it is inclosed and shut up for the king of Spain's own use, from whence it is carried to Madrid. This city is ten miles south-west of Guadalaxara, and thirteen miles east of Madrid. Lat. 40. 30. N. lon. 4. 20. W.

ALCALA REAL, a small city of Spain, in Andalusia, with a fine abbey. It is built on the top of a high mountain, and the road to it is incommodious, rough, and unequal. Lat. 37. 18. N. lon. 4. 15. W.

ALCAMER, an ancient and handsome town of the United Provinces, in the environs of which they make the best butter and cheese, and rear the most highly-valued tulips, in Holland. It is seventeen miles north-by-west of Amsterdam. Lat. 52.40. N. lon. 13. 52. E.

ALCALY, **ALCALI**, or **ALKALI**. See **CHEMISTRY**.

ALCANIS, a town of Arragon, in Spain, seated on the river Guadaloupe, twelve miles from Caspe. It was formerly the capital of the king of the Moors. Here is a very remarkable fountain, which throws up water through forty-two pipes. It is surrounded with gardens and fruit-trees, and defended with a good fortress. Lat. 41. 0. N. lon. 0. 5. W.

ALCANNA, *f.* a powder prepared from the leaves of the Egyptian privet, in which the people of Cairo drive a considerable trade. It is much used by the Turkish women to give a golden colour to their nails and hair. In dyeing, it gives a yellow colour when steeped with common water, and a red one when infused in vinegar. There is also an oil extracted from the berries of alcanna, and used in medicine as a calmer.

ALCANTARA, a small but very strong city of Estremadura, in Spain. It gives name to one of the three orders of knighthood. It is seated on the banks of the Tagus, twenty-one miles from Coria, in a very fruitful soil, and is celebrated for its bridge over that river. This was built in the time of the emperor Trajan, as appears by an inscription over one of the arches, by the people of Lusitania, who were assailed to supply the expence. It is raised 200 feet above the level of the water; and, though it consists but of six arches, is 670 feet in length, and twenty-eight in breadth. At the entrance of the bridge, there is a small antique chapel hewn in a rock by the ancient Pagans, who dedicated it to Trajan, as the Christians did to St. Julian. This city was built by the Moors, on account of the convenience of this bridge, which is at a place where the Tagus is very deep, running between two high steep rocks: for this reason, they called it *Al-Cantara*, which, in their language, signifies "the bridge." It was taken from them in 1214, and given to the knights of Calatrava, who afterwards assumed the name of Alcantara. It was taken by the earl of Galloway, in April 1706, and retaken by the French in November following. It is forty-five miles from Madrid, and 125 from Seville. Lat. 39. 30. N. lon. 7. 12. W.

Knights of ALCANTARA, a military order of Spain, which took its name from the above-mentioned city. They make a very considerable figure in the history of the expeditions against the Moors. The knights of Alcantara make the same vows as those of Calatrava, and are only distinguished from them by this, that the cross fleur de lys, which they bear over a large white cloak, is of a green colour. They possess thirty-seven commanderies. After the expulsion of the Moors, and the taking of Granada, the sovereignty of the order of Alcantara and that of Calatrava was settled in the crown of Castile by Ferdinand and Isabella. In 1540, the knights of Alcantara sued for leave to marry, which was granted them.

ALCAREZ, a small city of La Mancha, in Spain, defended by a strong castle, and remarkable for an ancient aqueduct. It stands near the river Guardamena, and the soil about it is very fruitful. They have a breed of small running-horses, which are very fleet and strong. It is twenty-five miles north of the confines of Andalusia, 108 south of Cuenca, and 138 south-by-east of Madrid. Lat. 38. 28. N. lon. 1. 50. W.

ALCASSAR DO SAL, a town of Portugal in Estremadura, which has a castle said to be impregnable. It is indeed very strong, both by art and nature, being built on the top of a rock, which is exceedingly steep on all sides. Here is a salt-work which produces very fine white salt, from whence the town takes its name. Lat. 38. 18. N. lon. 9. 10. W.

ALCASSAR, a city of Barbary, seated about two leagues from Larache, in Aſſa, a province of the kingdom of Fez.

It was of great note, and the seat of the governor of this part of the kingdom. It was built by Jacob Almanzor, king of Fez, about the year 1180, and designed for a magazine and place of rendezvous for the great preparations he was making to enter Granada in Spain, and to make good the footing Joseph Almanzor had got some time before. It is said his father first invaded Spain with 300,000 men, most of whom he was obliged to bring back to Africa to quiet a rebellion that had broken out in Morocco. This done, he returned to Spain again, with an army, as it is said, of 200,000 horse and 300,000 foot. The city is now fallen greatly to decay, so that of fifteen mosques there are only two that they make use of. Here are a great number of flocks, who live very familiarly with the people, walking about the town, possessing the tops of the houses and mosques without molestation; for they esteem them sacred birds, and account it sinful to disturb them. Not far from hence is the river Elnahaffen, famous for the battle fought between Don Sebastian king of Portugal and the Moors; in which the Portuguese were defeated and their king slain. Lat. 35. 15. N. lon. 12. 35. W.

ALCAVALA, *f.* in the Spanish finances, was at first a tax of ten per cent. afterwards of fourteen per cent. and is at present of only six per cent. upon the sale of every sort of property, whether moveable or immoveable; and it is repeated every time the property is sold. The levying of this tax requires a multitude of revenue-officers sufficient to guard the transportation of goods, not only from one province to another, but from one shop to another. It subjects every farmer, every manufacturer, every merchant, and shopkeeper, to the continual visits and examination of the tax-gatherers. Through the greater part of a country in which a tax of this kind is established, nothing can be produced for distant sale. The produce of every part of the country must be proportioned to the consumption of the neighbourhood. It is to the alcavala, accordingly, that Ustaritz imputes the ruin of the manufactures of Spain. He might have imputed to it likewise the declension of agriculture, it being imposed not only upon manufactures, but upon the rude produce of the land.

ALCAZA LEGUER, a town of Africa, in the kingdom of Fez, and in the province of Ilabat. It was taken by Alphonso, king of Portugal, in 1468; but soon after that, it was abandoned to the Moors. It is seated on the coast of the straits of Gibraltar. Lat. 38. 0. N. lon. 5. 30. W.

ALCAZER, a town of Spain, in New Castile, seated on the river Guardamena, which has a fortress on a high hill for its defence, and lies in a very fruitful country. It is 100 miles north-west of Carthage. Lat. 38. 15. N. lon. 2. 10. W.

ALCE, **ALCES**, or **ELK**, *f.* in zoology, the trivial name of a species of the cervus, belonging to the order of mammalia pecora. See **CERVUS**.

ALCEA, *f.* [from *αλκυ*, *robur*: on account of its supposed strength as a remedy in the dysentery, &c.] In botany, a genus of the monadelphia polyandria class, and of the natural order of columneræ. The generic characters are—Calyx: double, each one-leaved; the outer cut half-way into six parts, permanent, and very spreading; the inner cut half-way into five parts, larger, and permanent. Corolla: of five obcordate, emarginate, spreading, petals, coalescing at their bases. Stamina: filaments uniting into a sort of five-angled cylinder at bottom, loose at top, and inserted into the corolla; antheræ almost kidney-shaped. Pistillum: germ orbiculate; style cylindric, short; stigmas about twenty, setaceous, the length of the style. Pericarpium: many jointed arils in a ring round a columnar flattened receptacle, parting and opening on the inside. Seed: one, flat, kidney-shaped, in each aril.—*Essential Character*. Calyx double, outer six-cleft; arils many, one-seeded.

Species. 1. *Alcea rosea*, or common hollyhock: leaves finuate-angular. 2. *Alcea scicifolia*, or fig-leaved hollyhock: leaves palmate. The first and second are distinct species, whose difference in the form of their leaves always

ways continues. The leaves of the first sort are roundish, and cut at their extremity into angles; whereas those of the second are deeply cut into six or seven segments, so as to resemble a hand. Linnæus however doubts whether they are distinct species, and seems to think the second is a variety of the first. Allione says that the hollyhock grows wild in the county of Nice. Both sorts were cultivated by Gerard in 1597. The colours of their flowers being accidental, and the double flowers being only varieties which have risen from culture, we have not enumerated them here, but shall only mention the various colours which are commonly observed; these are, white, pale, red, deep-red, blackish-red, purple, yellow, and flesh-colour. Although these varieties of double hollyhocks are not constant, yet, where the seeds are carefully saved from the most double flowers, the greatest number of the plants will arise nearly the same as the plants from which they were taken, both as to their colour and the fulness of their flowers, provided no plants with single or bad-coloured flowers are permitted to grow near them. Therefore, so soon as any such appear, they should be removed from the good ones, that their farina may not spread into the other flowers, which would cause them to degenerate. The first species grows naturally in China. Linnæus refers it to Siberia. A dwarf sort, with beautiful double variegated flowers, has been in great esteem for some years past, under the name of Chinese hollyhock. These plants, although natives of warm countries, yet are hardy enough to thrive in the open air in England, and have for many years been some of the greatest ornaments in the garden, toward the latter part of the summer; but, since they have become very common, have not been regarded so much as they deserve, partly from their growing too large for small gardens, and their requiring tall stakes to secure them from being broken by strong winds. But in large gardens, where they are properly disposed, they make a fine appearance; for, as their spikes of flowers grow very tall, there will be a succession of them, on the same stems, more than two months; the flowers on the lower part of the spike appearing in July, and, as their stalks advance, new flowers are produced till near the end of September. When they are planted in good ground, their stalks often rise to the height of eight or nine feet, so that near six feet of each will be garnished with flowers; which, when double and of good colours, will make a fine appearance, especially if the various colours are properly intermixed.

3. *Alcea Africana*, or African hollyhock: leaves three-lobed crenated, flowers solitary axillary, both calyxes fix-parted. This species is a native of the eastern shore of Africa.

Propagation and Culture. They are propagated by seeds, which, as has already been observed, should be carefully saved from those plants whose flowers are the most double, and of the best colours. If these are preserved in their covers until spring, the seeds will be better, provided they are gathered very dry, and care be taken that no damp comes to them in winter, which will cause their covers to be mouldy, and thereby spoil the seeds. The seeds should be sown on a bed of light earth, about the middle of April, and must be covered about half an inch deep: some persons sow them in shallow drills, and others scatter the seeds thinly over the whole bed. When they are sown in the former method, the plants generally come up thick, and will require to be transplanted sooner than those which are sown in the latter. By the first, the seeds may be more equally covered, and kept clean with less trouble, because the ground between the drills may be hoed. When the plants have put out six or eight leaves, they should be transplanted into nursery-beds, at a foot distance from each other, observing to water them until they have taken good root; after which they will require no farther care, but to keep them clean from weeds till October, when they should be transplanted where they are to remain. Some persons let their plants remain a year longer in the nursery-beds to see their flowers, before they remove them

to the flower-garden; but, when this is intended, the plants should be planted at a greater distance in the nursery-beds, otherwise they will not have room to grow. However, the plants should be removed the first autumn, for young plants more surely grow than those which are older; and, if the seeds are carefully saved, there will not be one in ten of the plants come single or of bad colours.

ALCEA, *f.* in botany. See *HIBISCUS* and *MALVA*.

ALCEA FLORIDANA, *f.* in botany. See *GORDONIA*.

ALCEDO, or *KINGFISHER*, *f.* in ornithology, a genus of the order of *picæ*. The alcedo has a long, strait, thick, triangular, bill; with a fleshy, plain, short, flat, tongue. Of this genus there are a great many species, with one or other of which almost every part of the world is furnished. Most of them frequent rivers, and live on fish, the singularity of catching which is admirable: sometimes hovering over the water, where a shoal of small fishes is seen playing near the surface; at other times waiting with attention, on some low branch hanging over the water, for the approach of a single one who is so unlucky as to swim that way; in either case dropping like a stone, or rather darting with rapidity, on its prey; when, seizing it crosswise in his bill, it retires to a resting-place to feast on it; which it does piecemeal, bones and all, without reserve, afterwards bringing up the indigestible parts in pellets, like birds of prey. The wings of most of the genus are very short; yet the birds fly rapidly, and with great strength. It may be remarked, that, throughout this genus, blue, in different shades, is the most predominant colour. The species found in the South-Sea Islands are held in a kind of superstitious veneration by the natives of the places they severally inhabit, perhaps on account of their being frequently seen flying about the morais or burial-places. That which inhabits Otaheite, where it is called *Erooro*, is accounted particularly sacred, and not allowed to be taken or killed.

1. The *ispida*, or common kingfisher, is not much larger than a swallow; its shape is clumsy; the bill disproportionately long; it is two inches from the base to the tip; the upper chap black, and the lower yellow. But the colours of this bird atone for its inelegant form: the crown of the head and the coverts of the wings are of a deep blackish green, spotted with bright azure: the back and tail are of a most resplendent azure; the whole under-side of the body is orange-coloured; a broad mark of the same passes from the bill beyond the eyes; beyond that is a large white spot: the tail is short, and consists of twelve feathers of a rich deep blue; the feet are of a reddish yellow, and the three joints of the outermost toe adhere to the middle toe, while the inner toe adheres only by one. From the diminutive size, the slender short legs, and the beautiful colours, of this bird, no person would be led to suppose it one of the most rapacious little animals that skims the deep. Yet it is for ever on the wing in quest of fish; which it takes in surprising quantities, when we consider its size and figure. It takes its prey after the manner of the osprey, balancing itself at a certain distance above the water for a considerable space, then darting into the deep, and seizing the fish with inevitable certainty. While it remains suspended in the air, in a bright day, the plumage exhibits a beautiful variety of the most dazzling and brilliant colours. This striking attitude did not escape the notice of the ancients; for Ibycus, as quoted by Athenæus, styles those birds *αλκυονες πανσιπτειροι*, "the halcyons with expanded wings." It makes its nest in holes in the sides of cliffs, which it scoops to the depth of three feet; and lays from five to nine eggs, of a most beautiful semi-transparent white. The female begins to lay early in the season, and excludes her first brood about the beginning of April. The male, whose fidelity exceeds even that of the turtle, brings her large provisions of fish while she is thus employed; and she, contrary to most other birds, is found plump and fat at that season. The male, that used to twitter before this, now enters the nest as quietly and as privately as possible.

The young ones are hatched at the expiration of twenty days; but are seen to differ as well in their size as in their beauty. This species is the *αλκυοναφω*, or mute halcyon of Aristotle, which he describes with more precision than is usual with that great philosopher. After his description of the bird follows that of its nest; than which the most inventive of the ancients have delivered nothing that appears at first sight more fabulous and extravagant. He relates, that it resembled those concretions that are formed by the sea-water; that it resembled the long-necked gourd; that it was hollow within; that the entrance was very narrow, so that, should it overset, the water could not enter; that it resisted any violence from iron, but could be broken with a blow from the hand; and that it was composed of the bones of the *βελον*, or sea-needle. The nest had medical virtues ascribed to it; and from the bird was called *halcyoneum*. In a fabulous age, every odd substance that was flung ashore received that name; a species of tubular coral, a sponge, a zoophyte, and a miscellaneous concrete, having by the ancients been dignified with that title from their imaginary origin. Yet much of this seems to be founded on truth. The form of the nest is justly described; and the materials which Aristotle says it was composed of, are not entirely of his own invention. Whoever has seen the nest of the kingfisher will observe it strewn with the bones and scales of fish; the fragments of the food of the owner and its young. On the foundation laid by the philosopher, succeeding writers formed other tales extremely absurd; and the poets, indulging the powers of imagination, dressed the story in all the robes of romance. This nest was a floating one:

Incubat halcyone pendentibus æquore nidis.

Ovid. Met. lib. xi.

It was therefore necessary to place it in a tranquil sea, and to supply the bird with charms to allay the fury of a turbulent element during the time of its incubation; for it had, at that season, power over the seas and the winds.

Χ' αλκυονες φορησεντι τα κυματα, την τε θαλασσαν,
Τον τε νοτον, τον τ' ευρον, ος εσχάτα φυνια κινει
Αλκυοντες, γλαυκαίς Νηρησι ται τε μαλιστα
Ορνιδαν επιλαδεν.

Theocrit. Idyl. vii. l. 57.

May *halcyons* smooth the waves, and calm the seas,
And the rough south-east sink into a breeze;
Halcyons, of all the birds that haunt the main,
Most lov'd and honour'd by the Nereid train. *Fawkes.*
These birds were equally favourites with Thetis as with the Nereids:

Dilectæ Thetidi halcyones.

Virg. Georg. i. 399.

as if to their influence these deities owed a repose in the midst of the storms of winter, and by their means were secured from those winds that disturb their sub-marine retreats, and agitated even the plants at the bottom of the ocean. Such are the accounts given by the Roman and Sicilian poets. Aristotle and Pliny tell us, that this bird is most common in the seas of Sicily; that it sat only a few days, and those in the depth of winter, and during that period the mariner might sail in full security; for which reason they were styled *halcyon days*:

Perque dies placidos hiberno tempore septem
Incubat halcyone pendentibus æquore nidis:
Tum via tuta maris: ventos custodit, et arcet
Æolus egressu.

Ovid. Met. lib. xi.

Alcyone, compressed,
Seven days sits brooding on her watery nest,
A wintry queen; her fire at length is kind,
Calms every storm, and hushes every wind. *Dryden.*

In after-times, these words came to express any season of prosperity; these were the *halcyon days* of the poets; the brief tranquillity, the *septem placidi dies*, of human life. —As the ancients have had their fables concerning this bird, so have the modern vulgar. It is an opinion gene-

rally received among them, that the flesh of the kingfisher will not corrupt, and that it will even banish all vermin. This has no better foundation than that which is said of its always pointing, when hung up dead, with its breast to the north. The only truth which can be affirmed of this bird when killed is, that its flesh is utterly unfit to be eaten; while its beautiful plumage preserves its lustre longer than that of any other. This bird is found not only in Britain, but throughout Europe, Asia, and Africa; as specimens have been received from both China, Bengal, and Egypt. Belon also remarks his having met with it in Romania and Greece; and Scopoli notices it as a bird of Carniola, where he says it remains the whole year as in England. M. D'Aubenton has kept these birds for several months, by means of small fish put into basons of water, on which they have fed; for on experiment they have refused all other kinds of nourishment.

2. The rudis, or Egyptian kingfisher, as described by Hasselquist, is the size of the Royton crow. The bill is blackish, more than half an inch broad at the base, and two inches in length; the head, shoulders, and back, are brown, marked with oblong ferruginous spots; the throat is of a ferruginous white; the belly and thighs are whitish, marked with longitudinal broadish cinereous spots; the upper tail coverts quite white; the quills spotted with white on the inner webs, chiefly at the tips; the tail is ash-coloured; the legs are of a pale green; and the claws blackish. It inhabits Lower Egypt, about Cairo; builds in sycamore and date trees; and feeds on frogs, insects, and small fish, which last it meets with in the fields when they are overflowed. Its cry is not unlike that of the common crow.

3. Le taparara of Buffon is about the size of a starling. The upper mandible of the bill is black, the lower red; the hind part of the neck, the back, and scapulars, are of an elegant blue; the rump and upper tail coverts bright beryl-blue; the under parts of the body are white; the wing coverts blue; and the legs red. Inhabits Cayenne and Guiana, at which last place the natives call all the kingfisher tribe by the name *taparara*. In this part of South America, which contains many rivers full of fish, kingfishers, as might be expected, abound in vast numbers; but, what is remarkable, they never herd together, always being found single, except in breeding-time, which is about the month of September. They lay their eggs in the holes of banks, like the kingfisher of Europe. The cry of this bird imitates the word *carac*.

4. The torquata, or cinereous kingfisher, is about the size of a magpie, and fifteen inches and a half in length. The bill is three inches and a half long, and brown; the base of the lower mandible reddish; the head is crested; the upper parts of the head and body are bluish ash; the under parts chestnut; the throat is whitish, descending down the neck, and passing behind like a collar, ending towards the back in a point; the under tail coverts are of a pale fulvous, transversely-striated with black; smaller wing coverts varied with bluish, ash, black, and yellowish; the legs are red, and the claws blackish. It inhabits Martinico and Mexico; at which last it is called *achalatalalli*. This bird migrates into the northern parts of Mexico at certain seasons only, and is supposed to come there from hotter regions.

[The jacamars are much allied to this genus, and have been ranked under it by Linnæus. Their toes are, however, differently placed; their food also is different, being insects alone, and not fish; and their haunts are different, being moist woods, and not shores or the banks of rivers.]

5. The galbula, or green jacamar, is about the size of a lark. The bill is black, of a square form, a little incurvated, and sharp at the point; the plumage in general, in the upper part of the body, is of a most brilliant green, glossed with copper and gold in different lights; the belly, throat, and vent, are rufous; the tail is composed of ten feathers, and shaped like a wedge; the legs are of a greenish yellow, very short and weak; the claws are black.

This

ALCEDO.

Edwards del.

Paris sculp.

The Ispida, or common Kingfisher, Lock & Men.

London, Published as the Act directs May 28. 1766 by W. Mills.

This species is found both in Guiana and Brasil, in the moist woods, which it prefers to the more dry spots, for the sake of insects, on which it feeds. It is seldom seen except single, as it is a very solitary bird, keeping for the most part in the thickest parts; its flight quick, but short; perches on branches of a middling height, where it sits all night, and frequently part of the day, without stirring. They are said to have a short and agreeable note. The natives of Guiana call this bird *venetore*, and the Creoles, *colibri des grands bois*. At Brasil their flesh is eaten.

6. The paradisæa, or paradise jacamar, is of the same size with the former, and has a similar bill; the throat, fore part of the neck, and under wing coverts, are white; the rest of the plumage is of a deep dull green, in some lights appearing almost black, in others with a slight gloss of violet and copper bronze; the tail is composed of twelve feathers of unequal lengths; the two middle ones longest; the legs are black; the toes are placed two before and two behind, and pretty much united. It inhabits Surinam; and, like the others, it feeds on insects; and sometimes, contrary to them, frequents open places. It flies farther at a time, perches on the tops of trees, and is frequently found with a companion, not being quite so solitary a bird as the other. It also differs in the note, having a kind of soft whistle often repeated, but not heard a great way off. Above thirty other species have been described by ornithologists.

ALCESTER, Warwickshire, (or Aulcester, originally Alncester,) is a neat market-town, and a place of great antiquity, twenty miles from Birmingham; sixteen from Warwick; eight from Stratford-on-Avon; ten from Evesham, Worcestershire; thirteen from Broomsgrove; thirteen from Droitwich; and twenty from Worcester; to all which places there are excellent turnpike-roads. It is eight miles from Henley in Arden, and one hundred and two from the metropolis, and is situated in a pleasant and fertile vale, near the conflux of the Alne and Arrow; from the first of which rivers and its having been a city, or fortified place, in the times of the Saxons, the name is probably derived. The Roman Way, called Ickenild-street, passed through or near this place; and many coins, Roman bricks, &c. continue to be found. There is a very considerable market for corn, &c. on Tuesdays; and three fairs, on Tuesday before Lady-day, the 18th of May, and the 17th of October, for horses, cattle, sheep, &c. The earl of Warwick is lord of the manor, and patron of the rectory; and, in the year 1765, generously surrendered the tolls of the market and fairs for the benefit of the town and county. It is governed by a steward, deputy steward, two bailiffs, and constables, who are elected annually at the court-leet, &c. of the lord of the manor.

In the parish were formerly two chantries, and an abbey erected on a piece of ground encompassed with the river Arrow, and a moat, which made it a kind of island. The church is a neat edifice situate near the centre of the town. Here are also three meeting-houses, viz. presbyterians, anabaptists, and quakers.

Walter Newport, Gent. of Holdenby, in the county of Northampton, (34 Eliz.) gave the sum of 400l. to buy lands, or an annuity of the value of 20l. a-year, to found and endow a school. In this town are also eight almshouses for aged men and women, with suitable allowances; and many other charities to the poor of this parish. The principal manufactory carried on here is needle-making, which affords employment to many families.

ALCHEMILLA, *f.* [from its having been celebrated by the *alchemists*.] In botany, a genus of the tetandria monogynia class, ranking in the natural order of senticosæ. The generic characters are—Calyx: perianthium one-leaved, tubulous, permanent; edge flat, divided into eight segments. Stamina: filaments erect, awl-shaped, very small, on the edge of the calyx; antheræ roundish. Pistillum: germ ovate; style filiform, length of the stamina, inserted at the base of the germ; stigma globular. Pericarpium: none, the neck of the calyx closes and never

opens. Seed: solitary, elliptic, compressed.—*Essential Character*. Calyx eight-cleft; seed, one.

Species. 1. *Alchemilla vulgaris*, or common ladies' mantle or bearsfoot: leaves lobed. The whole plant is astringent. In the province of Smolandia, in Gothland, they make a tincture of the leaves, and give it in spasmodic or convulsive diseases. Horses, sheep, and goats, eat it. Cows are not fond of it. It grows naturally in high pastures in several parts of England, but is not very common near London: the roots are composed of many thick fibres, which spread greatly when they are in a proper soil; the leaves rise immediately from the root sustained by long petioles; they are roundish, and divided into seven or eight lobes, scalloped round the edges, somewhat like the ladies' scalloped mantles, from whence it had its name. The flower-stems arise between the leaves about a foot high, which divide into many branches, and have at each joint one small leaf, shaped like those below; the flowers are composed of an herbaceous calyx, without any corolla, so that the only beauty of this plant is in the leaves, which are used in medicine, and are esteemed to be vulnerary, drying, and binding, and are of great force to stop inward bleeding. There is a variety, which is much smaller; the leaves are much whiter, and appear silky; the flower-stems do not branch out so much, nor are the flowers produced in so large clusters; their calyx is broader, and the segments more obtuse. Besides this, the species varies much in size, being abundantly larger in a moist soil, and in gardens, than on its native dry hills and mountains. Dr. Withering mentions another variety with a white calyx.

2. *Alchemilla Alpina*, or cinquefoil or Alpine ladies' mantle: leaves digitate, serrate. Grows naturally on the mountains in Yorkshire, Westmoreland, and Cumberland, generally upon moist boggy places. It is also a native of Sweden, Denmark, the Alps, and other cold parts of Europe; and is admitted into gardens for the sake of its elegance. The leaves of this sort are very white, and consist of from five to nine folioles; the flower-stems seldom rise more than six inches high, nor do the flowers make a better appearance than the other. It has a great affinity with the foregoing.

3. *Alchemilla aphanoides*: leaves many-parted; stem erect. This is a small plant, about the size of pursley piert, or *aphanes arvensis*, and much resembling it in the leaves; it is also annual like that, but has the eight-cleft calyx of this genus. Found in New Granada.

4. *Alchemilla pentaphyllea*, or five-leaved ladies' mantle: leaves quinate, multifid, smooth. Grows naturally on the high Alps, as Gothard, Furca, Speluga, Pilat, &c. and is only to be found in some few curious botanic gardens in this country.

Propagation and Culture. These are all, except the third, abiding plants, which have perennial roots, and annual stalks, perishing in autumn. They may be propagated by parting their roots; the best time for doing this is in autumn, that their roots may be established before the drying winds of the spring come on. They should have a moist soil, and a shady situation, otherwise they will not thrive in the southern parts of England. When they are propagated by seeds, they should be sown in the autumn, on a shady moist border, and, when the plants come up, they will require no other care but to be kept clean from weeds.

ALCHEMICAL, *adj.* Relating to alchemy; produced by alchemy.

ALCHEMICALLY, *adv.* In the manner of an alchemist; by means of alchemy.

ALCHEMIST, *f.* One who pursues or professes the science of alchemy:

To solemnize this day, the glorious sun
Stays in his course, and plays the *alchemist*,
Turning, with splendour of his precious eye,
The meagre cloddy earth to glittering gold. *Shakespeare*.

ALCHEMY, *f.* [of *al*, Arab. and *χημα*, Gr.] That branch of chemistry which had for its principal objects the transmutation of metals into gold; the panacea, or universal remedy; an alkaleft, or univerfal menftruum; an univerfal ferment; and many other things equally obfcure.

ALCHEMY, a kind of mixed metal ufed for fpoons, and kitchen utenfils.—White *alchemy* is made of pan-brafs one pound, and arfenicum three ounces; or *alchemy* is made of copper and auripigmentum. *Bacon*.

ALCHORNEA, *f.* [from Mr. Stainby Alchorne, apothecary, of London.] In botany, a genus of the dioecia monadelphia clafs, or, according to Swartz, of the monadelphia octandria. The generic characters are—I. Male. Calyx: perianthium three or five leaved; leaflets ovate, concave, equal, coloured, deciduous. Stamina: filaments eight, equal, fcarce longer than the calyx, fightly connate at the bafe; antheræ ovate, upright. Pistillum: a rudiment. II. Female. Calyx: perianthium one-leaved, four or five toothed; teeth equal, fmall. Pistillum: germ twin, fuperior; ftyles two, very long, filiform; fligmas fimple, acute. Pericarpium: capfule berried, two-feeded, two-celled, two-valved. Seeds: folitary, large, oblong.—*Effential Character*. Male. Calyx, three-five-leaved. Female. Calyx, five-toothed; ftyles, two-parted; capfule berried, dicoccous.

There is but one fpecies, which is called alchornea latifolia.

ALCIAT (Andrew), a great lawyer, who flourifhed in the fixteenth century, born at Milan. He mixed much of polite learning in the explication of the laws, and happily drove out the barbarity of language which till then had reigned in the lectures and writings of lawyers; for which Thuanus highly praifes him. He publifhed a great many law-books, and fome notes upon Tacitus. His Emblems have been much admired, and tranflated into French, Italian, and Spanifh; and feveral learned men have written commentaries on them.

ALCIBIADES, an Athenian general. It was the fate of this great man to live at a time when his country was the fcene of confufion. The Greeks, grown infolent from their conquells in Perfia, turned their army againft each other, and banded together under the conduct of the two moft opulent ftates, Athens and Lacedæmon. Alcibiades, in the midft of an expedition he had planned againft the enemy of his country, was recalled home to answer fome charge of a private nature; but, fearing the violence of his enemy, inftead of going to Athens, he offered his fervices at Sparta, where they were readily accepted. By his advice the Lacedæmonians made a league with Perfia, which gave a very favourable turn to their affairs. But his credit in the republic raifing jealousies againft him, he privately reconciled himfelf to his country, and took again the command of an Athenian army. Here victory, waiting as it were at his command, attended all his motions. The lofs of feven battles obliged the Spartans to fue for peace. He enjoyed his triumphs, however, only a fhort time at Athens. One unfuccefsful event made him again obnoxious to the malice of the citizens; and he found it expedient to retire from Athens. In his abfence the Spartans again took the lead, and at the fatal battle of Ægos entirely fubdued the Athenian power. Alcibiades, though in exile, endeavoured to reftore the power of his country; of which the Spartans having intelligence, procured him to be affaffinated. He was a man of admirable accomplifhments, but indifferently principled; of great parts; and of an amazing verfatility of genius.

ALCINO MOUNT, a fmall town of Tufcany, fituated on a mountain. In this neighbourhood is produced the moft exquisite wine in Italy, called Mufcatello di Mont Alcino; but the inhabitants are not allowed to fell a fingle pipe of it, till the great-duke has firft ordered what number he judges proper for his own ufe.

ALCINOUS, a king of the Phœnicians, in the ifland now called Corfu, was fon of Naufithous, and grandfon

of Neptune and Peribea. It is by his gardens this king has chiefly immortalized his memory. He received Ulyffes with much civility, when a ftorm had caft him on his coaft.

ALCMAER, a city of the United Provinces, fituated in North Holland, about four miles from the fea, fifteen from Haerlem, and eighteen from Amfterdam. It is a handfome city, and one of the cleaneft in Holland. The ftreets and houfes are neat and regular, and the public buildings very beautiful. It had formerly two parifh-churches, dedicated to St. Matthew and St. Lawrence. The latter had fo high a tower, that it ferved for a fea-mark to the veffels that were in the open fea; but, in 1464, it tumbled down, and damaged the other church fo much, that they were both demolished in 1470, and one church was built in their ftead, dedicated to the fame faints. The Spaniards, under the command of Frederic of Toledo, fon of the duke of Alba, came to befiege it, after they had taken Haerlem, in 1573; but were forced to raife the fiege, after three months lying before it, as well on account of the infection of the air as the ftout refiftance of the inhabitants and foldiers; even the women fignaling themfelves bravely in its defence. It is recorded in the register of this city, that, in the year 1637, 120 tulips, with the off-fets, fold at public auction for 90,000 florins; a fingle one of them, named the Viceroy, fold for 4203 guilders; and not only the name and price, but the weight, of thefe flowers, are particularly fet down in the city registers. The paffion of giving enormous prices for flowers and flower-roots, by which many were ruined, was come to fo great a height, that the ftates interfered, and put a ftop to it, by fevere penalties. The town has a very good trade in butter and cheefe, of which a vaft quantity is fold every year, and is efteemed the beft in Holland. Lat. 52. 28. N. lon. 4. 26. E.

ALCMAN, a lyric poet, who flourifhed in the twenty-feventh Olympiad. He was born at Sparta; and compofed feveral poems, of which only fome fragments are remaining, quoted by Athenæus and fome other ancient writers. He was very amorous; accounted the father of gallant poefy; and is faid to have been the firft that introduced the custom of finging love-fongs in company. He is reported to have been one of the greateft eaters of his age; upon which Mr. Bayle remarks, that fuch a quality would have been extremely inconvenient, if poetry had been at that time upon fuch a footing as it has been often fince, not able to procure the poet bread. He died of a difeafe fimilar to that of Philip II. king of Spain; for he was eaten up with lice.

ALCMANIAN, *f.* in ancient lyric poetry, a kind of verfe confifting of two dactyles and two trochees; as,—*Virgini|bus pue|rifque| canto*. The word is formed from Alcman, the name of an ancient Greek poet, in great efteem for his erotics or amorous compofitions.

ALCMENA, the daughter of Electryon king of Mycenæ, and wife of Amphitryon. Jupiter putting on the fhape of her hufband, while he was abroad in the wars, begot Hercules upon her. He made that night as long as three ordinary ones.

ALCOCK (John), doctör of laws, and bifhop of Ely in the reign of king Henry VII. was born at Beverly, in Yorkfhire, and educated at Cambridge. He was firft made dean of Weftminfter, and afterwards appointed mafter of the rolls. In 1471, he was confecrated bifhop of Rochefter; in 1476, he was tranflated to the fee of Worcester; and, in 1486, to that of Ely. He was a prelate of great learning and piety; and fo highly efteemed by king Henry, that he appointed him lord prefident of Wales, and afterwards lord chancellor of England. Alcock founded a fchool at Kingfton-upon-Hull, and built the fpacious hall belonging to the epifcopal palace at Ely. He was alfo the founder of Jefus-college, in Cambridge, for a mafter, fix fellows, and as many fcholars. This houfe was formerly a nunnery, dedicated to St. Radigund; and, as Godwin

1. The Indian spotted Kingfisher. 2. The Paradise Jacamar.

Godwin tells us, the building being greatly decayed, and the revenues reduced almost to nothing, the nuns had all forsaken it, except two; whereupon bishop Alcock procured a grant from the crown, and converted it into a college. But Camden and others tell us, that the nuns of that house were so notorious for their incontinence, that king Henry VII. and pope Julius II. consented to its dissolution: Bale accordingly calls this nunnery *spiritualium meretricium canobium*, "a community of spiritual harlots." Bishop Alcock wrote several pieces, amongst which are the following: 1. Mons Perfectionis. 2. In Psalmos Penitentiales. 3. Homiliae Vulgares. 4. Meditationes Patrum. He died October 1, 1500; and was buried in the chapel he had built at Kingston-upon-Hull.

ALCOHOL, *f.* in chemistry, spirit of wine highly rectified. It is also used for any highly-rectified spirit. Alcohol is extremely light and inflammable; it is a strong antiseptic, and therefore employed to preserve animal substances. The term alcohol is also used for any fine impalpable powder.

ALCOHOLIZATION, *f.* The process of rectifying any spirit. It is also used for pulverization.

To ALCOHOLIZE, *v. a.* To make an alcohol; that is, to rectify spirits till they are wholly dephlegmated. To comminute powder till it is wholly without roughness.

ALCOR, *f.* [Arab.] In astronomy, a small star adjoining to the large bright one in the middle of the tail of *ursa major*. It is a proverb among the Arabians, applied to one who pretends to see small things, but overlooks much greater: "Thou canst see *alcor*, and yet not see the full moon."

ALCORAN, or AL-KORAN, *f.* the scripture or bible of the Mahometans. The word is compounded of the Arabic particle *al*, and *coran* or *horan*, derived from the verb *caraa* or *haraa*, to read. The word therefore properly signifies, the reading; or rather, *that which ought to be read*. The Koran is divided into 114 larger portions of a very unequal length, which we call *chapters*; but the Arabians *sowar*. These chapters are not, in the manuscript copies, distinguished by their numerical order, but by particular titles, which are taken sometimes from a particular matter treated of, or person mentioned therein; and some chapters have two or more titles, occasioned by the difference of the copies. Every chapter is subdivided into smaller portions of very unequal length, with us called *verses*, but in Arabic *ayat*; the same with the Hebrew *otok*, signifying *signs* or *wonders*; such as are the secrets of God, his attributes, &c. Many of these have their particular titles also.

Besides these unequal divisions of chapter and verse, the Mahometans have also divided their Koran into sixty equal portions, which they call *Ahzab*, in the singular *Hizeb*, each sub-divided into four equal parts; which is an imitation of the Jews, who have an ancient division of their Mishna into sixty portions called *Massekoth*.

Next after the title, at the head of every chapter, except only the ninth, is prefixed the following solemn form, by the Mahometans called the *Bismallah*, "IN THE NAME OF THE MOST MERCIFUL GOD;" which form they constantly place at the beginning of all their books and writings in general, as a peculiar mark or distinguishing characteristic of their religion, it being counted a sort of impiety to omit it. Mahomet probably took this form, as he did many other things, from the Persian Magi, who used to begin their books in these words, *Benam Yezdan hakhsaishgher dadar*; that is, "In the name of the most merciful just God." There are twenty-nine chapters of the Koran which have this peculiarity, that they begin with certain letters of the alphabet, some with a single one, others with more. These letters the Mahometans believe to be the peculiar marks of the Koran, and to conceal several profound mysteries; but they have been explained by writers in many different ways.

The Koran is universally allowed to be written with the utmost elegance and purity of language, and is confessed-

ly the standard of the Arabic tongue. Indeed the more orthodox believe, and are taught by the book itself to consider it inimitable by any human pen; a permanent miracle; greater than that of raising the dead, and alone sufficient to convince the world of its divine original. To this miracle, in fact, did Mahomet himself chiefly appeal for the confirmation of his mission, publicly challenging the most learned men in Arabia to produce even a single chapter that might be compared with it.

The general design of the Koran was to unite the professors of the three different religions, then followed in the populous country of Arabia, in the knowledge and worship of one God, under the sanction of certain laws, and the outward signs of ceremonies partly of ancient and partly of novel institution, enforced by the consideration of rewards and punishments both temporal and eternal; and to bring them all to the obedience of Mahomet, as the prophet and ambassador of the deity.

The great doctrine then of the Koran is the unity of God; to restore which point Mahomet pretended was the chief end of his mission; it being laid down by him as a fundamental truth, That there never was, nor ever can be, more than one true orthodox religion. Whenever this religion became neglected, or corrupted in essentials, God, he asserted, had the goodness to re-inform and admonish mankind thereof, by several prophets, of whom Moses and Jesus were the most distinguished, till the appearance of Mahomet, who is their seal, and no other to be expected after him. The more effectually to enforce this idea, great part of the Koran is employed in relating examples of dreadful punishments formerly inflicted by God on those who rejected and abused his messengers; several of which stories, or some circumstances of them, are taken from the Old and New Testaments, but many more from the Apocryphal books and traditions of the Jews and Christians of those ages. Indeed, few or none of the relations or circumstances in the Koran were invented by Mahomet, as is generally supposed; it being easy to trace the greatest part of them much higher, as the rest might be, were more of those books extant, and were it worth while to make the enquiry.

The rest of the Alcoran is taken up in prescribing necessary laws and directions, frequent admonitions to moral and divine virtues, the worship and reverence of the Supreme Being, and resignation to his will. One of their most learned commentators distinguishes the contents of the Alcoran into *allegorical* and *literal*; under the former are comprehended all the obscure, parabolical, and enigmatical passages, with such as are repealed, or abrogated; the latter, such as are clear, and in full force.

The most excellent moral in the whole Alcoran, interpreters say, is that in the chapter *Al Ahraf*, viz. "Shew mercy, do good to all, and dispute not with the ignorant." Mahomet, according to the authors of the *Keschaf*, having begged of the angel Gabriel a more ample explication of this passage, received it in these terms: "Seek him who turns thee out, give to him who takes from thee, pardon him who injures thee; for God will have you plant in your soul the roots of his chief perfections." It is evident, this commentary is copied from the gospel. (See Exodus xxxiii. 4, 5.) But it matters not so much who had it first, as he who observes it best. The caliph Hafs, son of Hali, being at table, a slave unfortunately let fall a dish of meat reeking hot, which scalded him severely. The slave fell on his knees, rehearsing the words of the Alcoran, "Paradise is for those who restrain their anger." I am not angry with thee, answered the caliph.—"And for those who forgive offences against them," continues the slave. I forgive thee thine, replies the caliph.—"But above all, for those who return good for evil," adds the slave. I set thee at liberty, rejoined the caliph; and I give thee ten dinars.

The Mahometans believe, that the Koran is of divine original; nay, that it is eternal and uncreated, remaining, as some express it, in the very essence of God: that the

first transcript has been from everlasting by God's throne, written on a table of vast bigness, called the *preserved table*, in which are also recorded the divine decrees past and future; that a copy from this table, in one volume on paper, was by the ministry of the angel Gabriel sent down to the lowest heaven, in the month of Ramadan, on the night of *power*: from whence Gabriel revealed it to Mahomet by parcels, some at Mecca, and some at Medina, at different times, during the space of twenty-three years, as the exigency of affairs required; giving him, however, the consolation to shew the whole (which they tell us was bound in silk, and adorned with gold and precious stones of paradise) once a-year; but in the last year of his life he had the favour to see it twice. They say, that few chapters were delivered entire, the most part being revealed piecemeal, and written down from time to time by the prophet's amanuensis in such a part of such and such a chapter, till they were completed, according to the directions of the angel.

After the new-revealed passages had been from the prophet's mouth taken down in writing by his scribe, they were published to his followers; several of whom took copies for their private use, but the far greater number got them by heart. The originals, when returned, were put promiscuously into a chest, observing no order of time; for which reason it is uncertain when many passages were revealed. When Mahomet died, he left his revelations in the same disorder, and not digested into the form in which we now find them. This was the work of his successor Abu Beer; who ordered the whole to be collected, not only from the palm-leaves and skins on which they had been written, and which were kept between two boards or covers, but also from the mouths of such as had gotten them by heart. From this it is generally imagined that Abu Beer was really the compiler of the Koran; though, for aught appears to the contrary, Mahomet left the chapters complete as we now have them, excepting such passages as his successor might add or correct from those who had gotten them by heart.

However, in the 30th year of the Hegira, Othman being then caliph, and observing the great disagreement in the copies of the Koran in the several provinces of the empire, ordered a great number of copies to be transcribed from that of Abu Beer; which copies were afterwards dispersed in the several provinces of the empire, and the old ones burnt. Yet, though many irregularities were corrected by this means, some few various readings still exist.

With so much esteem and reverence do Mussulmans regard the book of the Alcoran, that they dare not so much as touch it without being first washed, or legally purified; to prevent which, an inscription is put on the cover or label, "Let none touch but they who are clean." It is read with great care and respect; being never held below the girdle. They swear by it; take omens from it on all weighty occasions; carry it with them to war; write sentences of it in their banners; adorn it with gold and precious stones; and knowingly suffer it not to be in the possession of any of a different religion. Some say that it is punishable even with death, in a Christian, to touch it; others, that the veneration of the Mussulmans leads them to condemn the translating it into any other language as a profanation: but these seem to be aggravations. The Mahometans have taken care to have their scripture translated into the Persian, the Javan, the Malayan, and other languages; though, out of respect to the original, these versions are generally, if not always, interlineated.

By the advocates of Mahometanism, the Koran, as already observed, has always been held forth as the greatest of miracles, and equally stupendous with the act of raising the dead. The miracles of Moses and Jesus, they say, were transient and temporary; but that of the Koran is permanent and perpetual; and therefore far surpasses all the miraculous events of preceding ages. We will not detract from the real merit of the Koran: we allow it to be generally elegant, and often sublime: but at the

same time we reject with disdain its arrogant pretence to any thing supernatural; all the real excellence of the work being easily referable to natural and visible causes.

"In the language of Arabia, a language extremely loved and diligently cultivated by the people to whom it was vernacular, Mahomet found advantages which were never enjoyed by any former or succeeding possessor. It requires not the eye of a philosopher to discover, in every soil and country a principle of national pride: and, if we look back for many ages on the history of the Arabians, we shall easily perceive that pride among them invariably to have consisted in the knowledge and improvement of their native language. The Arabic, which has been justly esteemed the most copious of the eastern tongues; which had existed from the remotest antiquity; which had been embellished by numberless poets, and refined by the constant exercise of the natives; was the most successful instrument which Mahomet employed in planting his new religion among them. Admirably adapted by its unrivalled harmony, and by its endless variety, to add painting to expression, and to pursue the imagination in its unbounded flight; it became in the hands of Mahomet an irresistible charm to blind the judgment, and to captivate the fancy of his followers.

"Of that description of men, who first composed the adherents of Mahomet, and to whom the Koran was addressed, few, probably, were able to pass a very accurate judgment on the propriety of the sentiments, or on the beauties of the diction: but all could judge of the military abilities of their leader; and in the midst of their admiration it is not difficult to conceive, that they would ascribe to his compositions every imaginary beauty of inspired language.

"The shepherd and the soldier, though awake to the charms of those wild but beautiful compositions, in which were celebrated their favourite occupations of love or war, were yet little able to criticise any other works than those which were addressed to their imagination or the heart. To abstract reasonings on the attributes and the dispensations of the Deity, to the comparative excellencies of rival religions, to the consistency of any one religious system in all its parts, and to the force of its various proofs, they were quite inattentive. In such a situation, the appearance of a work which possessed something like wisdom and consistence; which prescribed the rules, and illustrated the duties, of life; and which contained the principles of a new and comparatively sublime theology, independently of its real and permanent merit; was likely to excite their astonishment, and to become the standard of future composition.

"In the first periods of the literature of every country, something of this kind has happened. The father of Grecian poetry very obviously influenced the taste and imitation of his countrymen. The modern nations of Europe all possess some original author, who, rising from the darkness of former ages, has begun the career of composition, and tinged with the character of his own imagination the stream which has flowed through his posterity.

"But the prophet of Arabia had in this respect advantages peculiar to himself. His compositions were not to his followers the works of man, but the genuine language of Heaven, which had sent him. They were not confined therefore to that admiration which is so liberally bestowed on the earliest productions of genius, or to that fond attachment with which men every where regard the original compositions of their country: but with their admiration they blended their piety. To know and to feel the beauties of the Koran, was in some respect to share in the temper of heaven; and he who was most affected with admiration in the perusal of its beauties, seemed most fitly the object of that mercy which had given it to ignorant man. The Koran, therefore, became naturally and necessarily the standard of taste. With a language thus hallowed in their imaginations, they were too well satisfied, either to dispute its elegance or improve its structure. In succeeding

succeeding ages, the additional sanction of antiquity, or prescription, was given to these compositions which their fathers had admired: and, while the belief of its divine original continues, that admiration, which has thus become the test and the duty of the faithful, can neither be altered nor diminished.

"When therefore we consider these peculiar advantages of the Koran, we have no reason to be surprised at the admiration in which it is held. But if, descending to a more minute investigation of it, we consider its perpetual inconsistency and absurdity, we shall indeed have cause for astonishment at that weakness of humanity which could ever have received such compositions as the work of the Deity.

"The first praise of all the productions of genius is invention; that quality of the mind, which, by the extent and quickness of its views, is capable of the largest conceptions, and of forming new combinations of objects the most distant and unusual. But the Koran bears little impression of this transcendent character. Its materials are wholly borrowed from the Jewish and Christian scriptures, from the Talmudical legends and apocryphal gospels then current in the east, and from the traditions and fables which abounded in Arabia. The materials collected from these several sources are here heaped together, with perpetual and needless repetitions, without any settled principle or visible connection.

"When a great part of the life of Mahomet had been spent in preparatory meditation on the system he was about to establish, its chapters were dealt out slowly and separately during the long period of twenty-three years. Yet thus defective in its structure, and no less exceptionable in its doctrines, was the work which Mahomet delivered to his followers as the oracles of God.

"The most prominent feature of the Koran, that point of excellence in which the partiality of its admirers has ever delighted to view it, is the sublime notion it generally impresses of the nature and attributes of God. If its author had really derived these just conceptions from the inspiration of that Being whom they attempt to describe, they would not have been surmounted, as they now are on every side, with error and absurdity. But it might easily be proved, that whatever it justly defines of the divine attributes was borrowed from our holy scripture; which even from its first promulgation, but especially from the completion of the New Testament, has extended the views and enlightened the understandings of mankind; and thus furnished them with arms, which have too often been ineffectually turned against itself by its ungenerous enemies.

"In this instance particularly, the copy is far below the great original, both in the propriety of its images and the force of its descriptions. Our holy scriptures are the only compositions that can enable the dim sight of mortality to penetrate into the invisible word, and to behold a glimpse of the Divine perfections. Accordingly, when they would represent to us the happiness of Heaven, they describe it, not by any thing minute and particular, but by something general and great; something, that, without descending to any determinate object, may at once by its beauty and immensity excite our wishes and elevate our affections. Though in the prophetic and evangelical writings the joys that shall attend us in a future state are often mentioned with ardent admiration, they are expressed rather by allusion than similitude, rather by indefinite and figurative terms than by any thing fixed and determinate. 'Eye hath not seen, nor ear heard, neither hath entered into the heart of man, the things which God hath prepared for them that love him.' 1 Cor. ii. 9. What a reverence and astonishment does this passage excite in every hearer of taste and piety? What energy, and at the same time what simplicity, in the expression? How sublime, and at the same time how obscure, is the imagery?

"Different was the conduct of Mahomet in his descriptions of heaven and of paradise. Unassisted by the necessary influence of virtuous intentions and divine inspiration,

he was neither desirous, nor indeed able, to exalt the minds of men to sublime conceptions, or to rational expectations. By attempting to explain what is inconceivable, to describe what is ineffable, and to materialize what in itself is spiritual, he absurdly and impiously aimed to sensualize the purity of the Divine essence. Thus he fabricated a system of incoherence, a religion of depravity, totally repugnant indeed to the nature of that Being, who, as he pretended, was its object; but therefore more likely to accord with the appetites and conceptions of a corrupt and sensual age.

"That we may not appear to exalt our Scriptures thus far above the Koran by an unreasonable preference, we shall produce a part of the second chapter of the latter, which is deservedly admired by the Mahometans, who wear it engraved on their ornaments, and recite it in their prayers. 'God! there is no God but he; the living, the self-subsisting: neither slumber nor sleep seizeth him: to him belongeth whatsoever is in heaven, and on earth. Who is he that can intercede with him but through his good pleasure? He knoweth that which is past, and that which is to come. His throne is extended over heaven and earth, and the preservation of both is to him no burden. He is the high, the mighty.' *Sale's Kor.* ii. p. 30. 4to edit.

"To this description who can refuse the praise of magnificence? Part of that magnificence, however, is to be referred to that verse of the Psalmist whence it was borrowed: 'He that keepeth Israel, shall neither slumber nor sleep.' *Psal.* cxxi. 4. But, if we compare it with that other passage of the same inspired Psalmist, all its boasted grandeur is at once obscured, and lost in the blaze of a greater light. 'O my God, take me not away in the midst of my days; thy years are throughout all generations. Of old hast thou laid the foundations of the earth; and the heavens are the work of thy hands. They shall perish, but thou shalt endure; yea, all of them shall wax old, as doth a garment; as a vesture shalt thou change them, and they shall be changed; but thou art the same, and thy years shall not fail.' The Koran, therefore, upon a retrospective view of these several circumstances, far from supporting its claim to a supernatural work, sinks below the level of many compositions confessedly of human origin; and still lower does it fall in our estimation, when compared with that pure and perfect pattern which we justly admire in the scriptures of truth. It is therefore abundantly apparent, that no miracle either was externally performed for the support, or is internally involved in the composition, of the Mahometan revelation."

ALCORAN is also figuratively applied to certain other books full of impieties and impostures, particularly the Alcoran of the Cordeliers, which placed St. Francis on a level with Jesus Christ. Erasmus Albertus exposed the folly and absurdity of it, in a publication, entitled, *The Alcoran of the Franciscans*, with a preface by Martin Luther.

ALCORANISTS, among Mahometans, those who adhere strictly to the letter or text of the alcoran, from an opinion of its ultimate sufficiency and perfection. The Persians are generally Alcoranists, as admitting the Alcoran alone for their rule of faith. The Turks, Tartars, Arabs, &c. besides the Alcoran, admit a multitude of traditions. The Alcoranists, among Mahometans, amount to much the same with the textuaries among the Jews. The Alcoranists can find nothing excellent out of the Alcoran; are enemies of philosophers, metaphysicians, and scholastic writers. With them the Alcoran is every thing.

ALCOVE, *f.* [*alcoba*, Span.] A recess, or part of a chamber, separated by an estrapade, or partition, and other correspondent ornaments; in which is placed a bed of state, and sometimes seats to entertain company;

Deep in a rich *alcove* the prince was laid,
And slept beneath the pompous colonnade.

Pope.

ALCUDIA, a town in Majorca, of about 1000 houses, situated

situated between two large harbours. Lat. 39. 50. N. lon. 3. 0. E.

ALCUINUS (Flaccus), an ecclesiastic of the eighth century. He was sent on an embassy by Offa king of Mercia to the emperor Charlemagne; who contracted so great an esteem and friendship for him, that he earnestly solicited, and at length prevailed upon, him, to settle in his court, and become his preceptor in the sciences. Alcuinus accordingly instructed that great prince in rhetoric, logic, mathematics, and divinity; which rendered him one of his greatest favourites. "He was treated with so much kindness and familiarity (says a contemporary writer) by the emperor, that the other courtiers called him, by way of eminence, *the emperor's delight*." Charlemagne employed his learned favourite to write several books against the heretical opinions of Felix bishop of Urgel in Catalonia, and to defend the orthodox faith against that heresiarch, in the council of Francfort, A. D. 894; which he performed to the entire satisfaction of the emperor and council, and even to the conviction of Felix and his followers, who abandoned their errors. The emperor consulted chiefly with Alcuinus on all things relating to religion and learning; and, by his advice, did many great things for the advancement of both. An academy was established in the imperial palace, over which Alcuinus presided, and in which the princes and prime nobility were educated; and other academies were established in the chief towns of Italy and France, at his instigation, and under his inspection. "France (says one of our best writers of literary history) is indebted to Alcuinus for all the polite learning it boasted of in that and the following ages. The universities of Paris, Tours, Fulden, Soissons, and many others, owe to him their origin and increase; those of whom he was not the superior and founder, being at least enlightened by his doctrine and example, and enriched by the benefits he procured for them from Charlemagne." After Alcuinus had spent many years in the most intimate familiarity with the greatest prince of his age, he at length, with great difficulty, obtained leave to retire from court to his abbey of St. Martin's at Tours. He composed many treatises on a great variety of subjects, in a style much superior in purity and elegance to that of the generality of writers in the age in which he flourished. He died A. D. 804. His works were collected and published by Andrew du Chesne in one volume folio, Paris, 1617.

ALCYON, the trivial name of a species of alcedo. See **ALCEDO**.

ALCYONIUM, an obsolete name of a submarine plant. It is also used for a kind of coral, or astroites, frequently found fossil in England.

ALCYONIUM STAGNUM, a lake in the territory of Corinth, whose depth was unfathomable, and in vain attempted to be discovered by Nero.

ALCYONIUS (Peter), a learned Italian, who flourished in the sixteenth century. He was well versed in the Greek and Latin tongues, and wrote some pieces of eloquence which met with great approbation. The two orations he made after the taking of Rome, wherein he represented very strongly the injustice of Charles V. and the barbarity of his soldiers, were excellent pieces. There is also an oration ascribed to him, on the knights who died at the siege of Rhodes.

ALDBOROUGH, or **ALDEBURGH**, Suffolk, is a sea-port town, seventy-six computed and eighty-eight measured miles from London, both strongly and pleasantly situated in the valley of Slaughden, having the sea and an extensive view of the German ocean on the east, and the river Ald on the west. It is a commodious harbour for seamen and fishermen, upon which account it is fully inhabited by these sort of people. It is a town corporate, governed by two bailiffs, twelve capital burgeses, and twenty-four inferior officers. It sends two members to parliament: it has a market weekly on Saturday, and a fair annually on the first Tuesday in Lent. It had formerly three streets in a row, and nearly a mile in length; but

is now reduced to two streets by the encroachment of the sea: it is reckoned by the physicians to be one of the most healthy places along the coast, and as remarkable for longevity, being subject to cooling and refreshing breezes from the sea, on which account a great deal of company resort to the town in summer for the benefit of their health and sea-bathing, to which the pleasantness of the spot invites; and is growing into much repute. The shore is also much admired for its evenness and regular declivity for the bathing machines, which are upon a remarkably safe and commodious construction. The hills at the back of the town are likewise much esteemed for the pleasant walks, and for the fine and beautiful prospects of the surrounding country for many miles. There are no manufactories except the drying of red sprats, which are caught and dried in great abundance, and exported to Holland. It is equally famous for the soles and lobsters, which are caught in great quantities, and far surpass any other for fine flavour. Fish of all kinds are in great plenty, as well as every other commodity. Aldborough is within eight miles of the once famous and ancient city of Dunwich, and seven miles of Saxmundham, (being the next post-town, where coaches and stage-waggons pass through daily;) five miles from the borough of Orford; twelve miles from Wickham market; eighteen from Woodbridge; and twenty-six from Ipswich, (the county town.) E. long. 1. 32. N. lat. 52. 50.

ALDBOROUGH, a market-town in the west-riding of Yorkshire, seated on the river Ouse, fifteen miles north-west of York, and 200 miles north of London. It sends two members to parliament. W. long. 0. 20. N. lat. 54. 15. It was anciently a Roman city, called *Ipsurum Brigantium*; and several coins and monuments of the Saxons and Romans have been discovered there.

ALDEBARAN, in astronomy, a star of the first magnitude, called in English the *bull's eye*, as making the eye of the constellation Taurus. Its longitude is 6 deg. 32. min. 9 sec. of Gemini, and its latitude 5 deg. 29 min. 40 sec. south.

ADDERBURY, Wiltshire, two miles from Salisbury, on a healthy hill, near the Avon. A manufacture of cottons and fustians is carried on here. By a fire in 1777, 200 houses were destroyed.

ALDER-TREE, *f.* in botany. See **BETULA**.

ALDER, (Black,) *f.* in botany. See **RHAMNUS**.

ALDERHOLM, a pleasant island of Sweden, formed by the three arms of a river running through Gentle, a town of Nordland, in Sweden. Here is a wharf, a repository for planks and deals, two packing-houses, a large custom-house for taking toll of the ships, an arsenal for cannon, and a granary.

ALDERLEY, Gloucestershire, near Wotton-Under-edge. On some of the hills here are found fossils, apparently petrifications of marine shell.

ALDERLEY, Staffordshire, near Seisdon.

ALDERLIEVEST, *adj. superl.* [from *ald*, *alder*, old, elder, and *lieve*, dear, beloved.] Most beloved; which has held the longest possession of the heart:

The mutual conference that my mind hath had,
In courtly company, or at my beads,
With you, mine *alderlievest* sovereign,
Makes me the bolder.

Shakespeare.

ALDERMAN, *f.* [from *ald*, old, and *man*.] In the British policy, a magistrate subordinate to the mayor of a city or town-corporate. The number of these magistrates is not limited, but is more or less according to the magnitude of the place. In London they are twenty-six; each having one of the wards of the city committed to his care. This office is for life: so that, when one of them dies, or resigns, a wardmote is called, who return the person they have chosen to the court of aldermen; which court is obliged to admit him to supply the vacancy. All the aldermen are justices of the peace, by a charter of 13 Geo. II. The aldermen of London, &c. are exempted from serving

ALCYONIUM.

Different Species of Alcyonium?

J. Pass sculp.

London. Published as the Act directs. April 25. 1807. by J. Wilkes.

serving inferior offices; nor shall they be put upon assizes, or serve on juries, so long as they continue to be aldermen.

ALDERMAN, among our Saxon ancestors, was a degree of nobility, answering to earl or count at present.

ALDERMAN was also used, in the time of king Edgar, for a judge or justice. Thus we meet with the titles of *Aldermannus totius Angliæ*, *aldermannus regis*, *comitatus*, *civitatis*, *burgi*, *castelli*, *hundredi* five *wapentachii*, et *novemdecimorum*. According to Spelman, the *aldermannus totius Angliæ* seems to have been the same officer who was afterwards styled *capitalis iudiciarius Angliæ*, or chief-justice of England; the *aldermannus regis* seems to have been an occasional magistrate, answering to our justice of assize; and the *aldermannus comitatus*, a magistrate who held a middle rank between what was afterwards called the *earl* and the *sheriff*; he sat at the trial of causes with the bishop: the latter proceeding according to ecclesiastical law, and the former declaring and expounding the common law of the land.

ALDERMASTON, Berkshire, a pretty neat village, beautifully situated on an eminence that overlooks the river Kennet. It is three miles from Silchester, the Roman station, three from Baghurst, and eight from Reading.

ALDERNEY, an island in the British channel, subject to the crown of Great Britain. It is about eight miles in compass, and is separated from Cape la Hogue, in Normandy, by a narrow freight, called the *Race of Alderney*, which is a very dangerous passage in stormy weather when the two currents meet; otherwise it is safe, and has depth of water for the largest ships. Through this freight the French fleet made their escape after their defeat at La Hogue in 1692. It is a healthy island, has but one church, is fruitful both in corn and pasture, and is remarkable for a fine breed of cows. The inhabitants, for their greater safety, live together in a town of the same name. It has but one harbour, called *Crabby*, which is at a good distance from the town; and is only fit for small vessels. To the west lie the range of rocks called the *Caskets*, so dangerous to mariners. W. lon. 2. 17. N. lat. 49. 50.

ALDHELM (St.) bishop of Sherborne, in the time of the Saxon heptarchy. He is said to have been the son of Kenred, brother to Ina, king of the West-Saxons; but, in the opinion of William of Malmesbury, his father was no more than a distant relation to that king. Having received the first part of his education in the school at Malmesbury, he travelled into France and Italy for his improvement. At his return home, he studied some time under Adrian abbot of St. Augustine's in Canterbury, the most learned professor of the sciences who had ever been in England. In these different seminaries he acquired a very uncommon stock of knowledge; and became famous for his learning, not only in England, but in foreign countries. He was the first Englishman who wrote in the Latin language both in prose and verse, and composed a book for the instruction of his countrymen in the profody of that language. Besides this, he wrote several other treatises on various subjects; some of which are lost, and others published by Martin Delrio and Canisius. Venerable Bede, who flourished in the end of this and the beginning of the next century, gives the following character of Aldhelm: "He was a man of universal erudition, having an elegant style, and being wonderfully well acquainted with books, both on philosophical and religious subjects." King Alfred the Great declared, that Aldhelm was the best of all the Saxon poets; and that a favourite song, which was universally sung in his time, near 200 years after its author's death, was of his composition. When he was abbot of Malmesbury, having a fine voice, and great skill in music as well as poetry; and, observing the backwardness of his barbarous countrymen to listen to grave instructions, he composed a number of little poems, which he sung to them after mass in the sweetest manner; by which they were gradually instructed and civilized. After this excellent person had governed the monastery of Malmesbury, of which he was the founder, about thirty years, he

was made bishop of Sherborne, where he died A. D. 709. He wrote, 1. *De Octo Vitiis Principalibus*. This treatise is extant in *Bibliotheca Patrum* of Canisius. 2. *Ænigmaticum Versus Mille*. This, with several other of his poems, was published by Martin Delrio at Mentz, 8vo, 1601. 3. A book addressed to a certain king of Northumberland, named Alfrid, on various subjects. 4. *De Vita Monachorum*. 5. *De Laude Sanctorum*. 6. *De Arithmetica*. 7. *De Astrologia*. 8. A book against the mistake of the Britons concerning the celebration of Easter; printed by Sonius, 1576. 9. *De Laude Virginitatis*. Manuscript, in Bennet-college, Cambridge. Published among Bede's *Opuscula*. Besides many sonnets, epistles, and homilies, in the Saxon language.

ALDHUN, the first bishop of Durham, succeeded Elfisg in the bishopric of Lindisfarne, or Holy Island, in the year 990. He sat about six years in the see of Lindisfarne, during which time, that island being greatly exposed to the incursions of the Danish pirates, he resolved to remove from thence; and, after wandering about some time, he at last settled, with his followers, at Dunelm, now called Durham; where he gave rise both to the city and cathedral church. This prelate educated King Ethelred's two sons, Alfred and Edward; and, when their father was driven from his throne by Swane king of Denmark, he conducted them, and queen Emma, into Normandy, to duke Richard, the queen's brother, in 1017. The next year, the English having received a terrible overthrow in a battle with the Scots, the good bishop was so affected with the news, that he died a few days after, having enjoyed the prelacy twenty-nine years.

ALDPORT, an ancient name for Manchester. See MANCHESTER.

ALDRED, abbot of Tavistock, was promoted to the bishopric of Worcester in the year 1046. He was so much in favour with king Edward the Confessor, and had so much power over his mind, that he obliged him to be reconciled with the worst of his enemies, particularly with Swane son of the earl Goodwin, who had revolted against him, and came with an army to invade the kingdom. Aldred also restored the union and friendship between king Edward and Griffin king of Wales. He took afterwards a journey to Rome, and being returned into England, in the year 1054, he was sent ambassador to the emperor Henry II. he staid a whole year in Germany, and was very honourably entertained by Hermon archbishop of Cologne, from whom he learned many things relating to ecclesiastical discipline, which on his return he established in his own diocese. In the year 1058 he went to Jerusalem, which no archbishop nor bishop of England had ever done before. Two years after he returned to England; and Kinsius archbishop of York dying the 22d of December 1060, Aldred was elected in his stead, and thought fit to keep his bishopric of Worcester with the archbishopric of Canterbury. Aldred went soon after to Rome, in order to receive the pallium from the pope: he was attended by Toston Earl of Northumberland, Giso bishop of Wells, and Walter bishop of Hereford. The pope received Toston very honourably, and made him sit by him in the synod which he held against the Simonists. He granted to Giso and Walter their request, because they were tolerably well learned, and not accused of simony. But Aldred being by his answers found ignorant, and guilty of simony, the pope deprived him very severely of all honours and dignities; so that he was obliged to return without the pallium. On his way home he and his three fellow-travellers were attacked by some robbers, who took from them all that they had. This obliged them to return to Rome; and the pope either out of compassion, or by the threatenings of the earl of Northumberland, gave Aldred the pallium; but he was obliged to resign his bishopric of Worcester. However, as the archbishopric of York had been almost entirely ruined by the many invasions of foreigners, king Edward gave the new archbishop leave to keep twelve villages or manors which belonged to the bishopric of Worcester.

Edward

Edward the Confessor dying in 1066, Aldred crowned Harold his successor. He also crowned William the Conqueror, after he had made him take the following oath: "That he would protect the holy churches of God and their leaders; that he would establish and observe righteous laws; that he would entirely prohibit and suppress all rapines and unjust judgments." He was so much in favour with the Conqueror, that this prince looked upon him as a father; and, though imperious with regard to every body else, he yet submitted to obey this archbishop. John Brompton gives us the following instance of the king's submission, which at the same time shews the prelate's haughtiness:—It happened one day, as the archbishop was at York, that the deputy-governor or lord-lieutenant, going out of the city with a great number of people, met the archbishop's servants, who came to the town with several carts and horses loaded with provisions. The governor asked them to whom they belonged; and, they having answered they were Aldred's servants, the governor ordered that all these provisions should be carried to the king's store-house. The archbishop sent immediately some of his clergy to the governor, commanding him to deliver the provisions, and to make satisfaction to St. Peter, and to him the saint's vicar, for the injury he had done them; adding, that, if he refused to comply, he would excommunicate him. The governor, highly offended, used the messengers very ill, and returned an answer as haughty as the message was. Aldred thereupon went to London to make his complaint to the king; but in this very complaint he acted with his wonted insolence; for, meeting the king in the church of St. Peter at Westminster, he spoke to him in these words: "Hearken, O William: when thou wast but a foreigner, and God, to punish the sins of this nation, permitted thee to become master of it, after having shed a great deal of blood, I consecrated thee, and put the crown upon thy head with blessings; but now, because thou hast deserved it, I pronounce a curse over thee, instead of a blessing, since thou art become the persecutor of God's church, and of his ministers, and hast broken the promises and the oaths which thou madest to me before St. Peter's altar." The king, terrified at this discourse, fell upon his knees, and humbly begged the prelate to tell him by what crime he had deserved so severe a sentence. The noblemen, who were present, were enraged against the archbishop, and loudly cried out he deserved death, or at least banishment, for having offered such an injury to his sovereign, and they pressed him with threatenings to raise the king from the ground. But the prelate, unmoved at all this, answered calmly, "Good men, let him lie there, for he is not at Aldred's but at St. Peter's feet; he must feel St. Peter's power, since he dared to injure his viceroy." Having thus reproved the nobles by his episcopal authority, he vouchsafed to take the king by the hand, and to tell him the ground of his complaint. The king humbly excused himself, by saying he had been ignorant of the whole matter; and begged of the noblemen to intreat the prelate that he might take off the curse he had pronounced, and to change it into a blessing. Aldred was at last prevailed upon to favour the king thus far; but not without the promise of several presents and favours, and only after the king had granted him to take such revenge on the governor as he thought fit. Since that time (adds the historian) none of the noblemen ever dared to offer Aldred the least injury. It may be questioned which was most surprising here, the archbishop's haughtiness, who dared to treat his sovereign in so unbecoming a manner; or the king's stupidity, who suffered such insolence from a priest.—The Danes having made an invasion in the north of England in the year 1068, under the conduct of Harold and Canute, the sons of king Swane, Aldred was so much afflicted at it, that he died of grief the 11th of September in the same year, having besought God that he might not see the desolation of his church and country.

ALDRICH (Robert), bishop of Carlisle, was born at

Burnham, in Buckinghamshire, about the year 1493, and educated at Eaton-school; from whence, in 1507, he was elected scholar of King's-college, Cambridge, where he took his degree in arts, and was afterwards proctor of the university. In 1525, he was appointed master of Eaton-school, then became fellow of that college, and finally provost. In 1529, he went to Oxford, where, being first incorporated bachelor of divinity, in the following year he proceeded doctor in that faculty. In 1531, he was made archdeacon of Colchester; in 1534, canon of Windsor; and the same year, registrar of the order of the garter. He was consecrated bishop of Carlisle in the year 1537, and died at Horncastle in Lincolnshire in 1556.

ALDRICH (Dr. Henry), an eminent English divine and philosopher, born at London in 1647, was educated at Westminster-school under the famous Dr. Busby, and admitted of Christchurch-college, Oxford. He had a great share in the controversy with the papists in the reign of James II. and bishop Burnet ranks him among those who examined all the points of popery with a solidity of judgment, clearness of argument, depth of learning, and vivacity of writing, far beyond any who had before that time written in our language. He rendered himself so conspicuous, that, at the revolution, when Massey dean of Christchurch fled, his deanery was conferred on him. In this station he behaved in an exemplary manner, and that fabric owes much of its beauty to his ingenuity: it was Aldrich who designed the beautiful square called *Pech-water-Quadrangle*, which is esteemed an excellent piece of architecture. In imitation of his predecessor Dr. Fell, he published, yearly, a piece of some ancient Greek author, as a present to the students of his house. He published *A System of Logic*, with some other pieces; and the revising Clarendon's History of the Rebellion was intrusted to him and bishop Spratt; but it doth not appear that they made any additions, or considerable alterations, in it, as has been asserted by Mr. Oldmixon. Besides his preferments above-mentioned, Dr. Aldrich was also rector of Wem in Shropshire. He was chosen prolocutor of the convocation in 1702. This worthy person died at Christchurch, on the 14th of December, 1710, in the sixty-fourth year of his age. As to his character, he was a most universal scholar, and had a taste for all sorts of learning, especially architecture. His abilities also as a musician rank him, we are told, among the greatest masters of the science. He composed many services for the church, which are well known; as are also his anthems, nearly to the number of twenty. There are two catches of his; the one, "Hark the bonny Christchurch Bells," the other intitled, "A Smoking Catch," to be sung by four men smoking their pipes, which is not more difficult to sing than diverting to hear. His love of smoking was, it seems, so excessive as to be an entertaining topic of discourse in the university.

ALDROVANDUS (Ulysses), professor of philosophy and physic at Bologna, the place of his nativity. He was a most curious enquirer into natural history, and travelled into the most distant countries on purpose to inform himself of their natural productions. Minerals, metals, plants, and animals, were the objects of his curious researches; but he applied himself chiefly to birds, and was at great expence to have figures of them drawn from the life. Aubert le Mire says, that he gave a certain painter, famous in that art, a yearly salary of 200 crowns, for thirty years and upwards; and that he employed at his own expence Lorenzo Bennini and Cornelius Swintus, as well as the famous engraver Christopher Coriolanus. These expences ruined his fortune, and at length reduced him to the utmost necessity; and it is said that he died blind in an hospital at Bologna, at a great age, in 1605. Mr. Bayle observes, that antiquity does not furnish us with an instance of a design so extensive and so laborious as that of Aldrovandus, with regard to natural history; that Pliny has treated of more kinds of subjects, but only touches lightly on them, whereas Aldrovandus has collected all he could

could meet with. His compilation, or that compiled upon his plan, consists of thirteen volumes in folio, several of which were printed after his death. He himself published his Ornithology, or History of Birds, in three folio volumes, in 1599; and his seven books of Insects, which make another volume of the same size. The volume Of Serpents, three Of Quadrupeds, one Of Fishes, that Of exanguinous Animals, the History of Monsters, with the Supplement to that of Animals, the Treatise of Metals, and the Dendrology or History of Trees, were published at several times after his death, by the care of different persons.

ALDROVANDA, *f.* [named after Aldrovandus, a great traveller and collector.] In botany, a genus of the pentandria pentagynia class. The generic characters are—Calyx: perianthium five-parted, erect, equal, permanent. Corolla: petals five, oblong, acuminate, length of the calyx, permanent. Stamina: filaments length of the flowers; antheræ simple. Pistillum: germ globose, styles very short, stigmas obtuse. Pericarpium: a globose capsule with five blunt angles, five-valved, one-celled. Seeds: ten, longish, fixed to the inner wall of the pericarpium.—*Essential Character.* Calyx five-parted; petals five; capsule five-valved, one-celled, ten-seeded.

There is only one species, the *aldrovanda vesiculosa*, which is found in marshes both in Italy and India.

ALDUABIS, a river of Celtic Gaul, which rising from Mount Jura, separating the Sequani from the Helvetii, and running through Franche Comté, environs almost on every side the city of Besançon; and, running by Dole, falls into the Saône near Chalons. In Cæsar it is called *Alduadubis*; in Ptolemy *Dubis*; now *le Doux*.

ALE, *f.* [*ale*, Sax.] A fermented liquor obtained from an infusion of malt, and differing from beer chiefly in having a less proportion of hops, and by the first being drunk fresh or new, and the other kept until the gas sylvestre is destroyed, or incorporated with the liquor, so as to lose its elasticity, or at least a part of it. See **BREWING**. This liquor, the natural substitute of wine in such countries as could not produce the grape, was originally made in Egypt, the first planted kingdom, on the dispersion from the east, that was supposed unable to produce grapes. And, as the Noachian colonies pierced further into the west, they found, or thought they found, the same defect, and supplied it in the same manner. Thus the natives of Spain, the inhabitants of France, and the aborigines of Britain, all used an infusion of barley for their ordinary liquor; and it was called by the various names of *calia* and *ceria* in the first country, *cerevisia* in the second, and *curni* in the last; all literally importing only “the strong water.”

“All the several nations (says Pliny) who inhabit the west of Europe, have a liquor with which they intoxicate themselves, made of corn and water. The manner of making this liquor is somewhat different in Gaul, Spain, and other countries, and is called by many various names; but its nature and properties are every where the same. The people of Spain, in particular, brew this liquor so well, that it will keep good a long time. So exquisite is the cunning of mankind, in gratifying their vicious appetites, that they have thus invented a method to make water itself intoxicate.” The method in which the ancient Britons, and other Celtic nations, made their ale, is thus described by Isidorus and Orosius:—“The grain is steeped in water and made to germinate, by which its spirits are excited and set at liberty; it is then dried and grinded; after which it is infused in a certain quantity of water; which being fermented becomes a pleasant, warming, strengthening, and intoxicating, liquor.” This ale was most commonly made of barley; but sometimes of wheat, oats, and millet.

Anciently the Welch and Scots had also two kinds of ale, called *common ale* and *spiced ale*; and their value was thus ascertained by law:—“If a farmer hath no mead, he shall pay two casks of spiced ale, or four casks of common ale, for one cask of mead.” By this law, a cask of spiced

ale, nine palms in height and eighteen in diameter, was valued at a sum of money equal in efficacy to 7l. 10s. of our present money; and a cask of common ale, of the same dimensions, at a sum equal to 3l. 15s. This is a sufficient proof, that even common ale in this period was an article of luxury among the Welch, which could only be obtained by the great and opulent. Wine seems to have been quite unknown even to the kings of Wales, in this period, as it is not so much as once mentioned in their laws; though Giraldus Cambrensis, who flourished about a century after the conquest, acquaints us, that there was a vineyard in his time at Maenarper, near Pembroke, in South Wales.

Ale was a favourite liquor of the Anglo-Saxons and Danes, as it had been of their ancestors the ancient Germans. Before their conversion to Christianity, they believed that drinking large and frequent draughts of ale was one of the chief felicities which those heroes enjoyed who were admitted into the hall of Odin.

There are various sorts of ale known in Britain, particularly *pale* and *brown*. The former is brewed from malt slightly dried, and is esteemed more viscid than the latter, which is made from malt more highly dried or roasted. Pale ale brewed with hard waters, as those of springs and wells, is judged the most wholesome, in regard the mineral particles tend to prevent the cohesions of those drawn from the grain, and enable them to pass the proper secretions the better; softer waters, as those of rivers and rain, seem better suited to draw out the substance of high-dried malts, which retain many igneous particles, best absorbed in a smooth vehicle. In Staffordshire, they have a method of fining ale in a very short time. Plot conjectures it to be done by adding allum, or vinegar, in the working.

Ale is prepared various ways, and of various ingredients, as of wheat, rye, millet, oats, barley, the berries of the quick bean, &c. Some have found that the juice which bleeds from the birch or fycamore is of great use on this occasion, applied instead of water. It makes one bushel of malt go as far as four in the common way. Some have a method of preparing ale, so that it will keep, carried to the East or West Indies. The secret is, by mashing twice with fresh malt; boiling twice; and, after shipping it, putting to every five gallons two new-laid eggs whole, to remain therein. It is said, that, in a fortnight's time, the shells will be dissolved; and the eggs become like wind-eggs; and that afterwards the white would disappear, and the yolk remain untouched.

Ale is generally held to be more diuretic than beer, in regard it is smoother, more softening, and relaxing; so that where urine is to be promoted by facilitating the passage, ale is most likely to effect it.

Ale is flatulent, and so sometimes produces colics, and the cholera morbus; it is acefcent, but it does not produce calcareous diseases, as is asserted by many. It is observed that those who drink ale constantly are stronger than those who drink wine, and that those who do not drink any strong liquors cannot labour so well as those who do; but this does not appear to be the truth: men in health and accustomed to toil, but who never drink any strong liquors, undergo the most fatigue, and live longer than those who daily use them. Cordials are only designed for the infirm, and to fit the healthy for extraordinary exertions; but, as they may occasionally enable the vigorous to execute great undertakings, they also proportionably destroy the power of nature, and cause a premature old age. A constant use of wine, ale, &c. keeps up a constant fever, in most who use them freely, by which, destruction is surely the consequence, though somewhat slower than the general confessed poisons. We must observe that by the word *beer*, in common, is meant small or table beer, strong ale, or porter. The first of which, if kept to a proper age, is esteemed the best beverage to take with our food. Indeed they all ought to be kept till they have lost great part of their viscosity and sweetness; hence will they be more readily digestible, and not so apt to create disagreeable flatulence in the prime viæ, nor lay the

the foundation for visceral obstructions. However, they are all improper for delicate constitutions, whose digestive powers are in a state of debility, particularly if they are new, or recently brewed.

If malt-liquor, of any degree of strength, is become flat and tartish, as it is used, it should be drawn out of the cask into a jug, in which as many drachms of powdered chalk should be put as there are pints of liquor; thus a new ferment will be raised, a sprightly taste will be restored to the liquor, and its acidity will be destroyed. Tart liquors of this kind are apt to produce a dysury, stranguary, or a gonorrhœa, in which cases, give the person complaining a small quantity of brandy.

Ale being in some countries cheaper than wines, hath occasioned it to be medicated for the same purposes as wines so treated; and there are two ways of impregnating malt-liquors with medicinal substances:—first, by macerating the ingredients in the ale, after it is duly fermented; secondly, by adding them to the liquor while it is fermenting, that by the power of fermentation the medicinal virtues may more fully be extracted; nutmeg, for instance, one drachm of it powdered will flavour a large vat of fermenting ale, but, when the fermentation ceases, it flavours but a very small quantity.

The consumption of ale in these kingdoms is incredible. It was computed thirty years ago at the value of four millions yearly, including Great Britain and Ireland. The duties on ale and beer make a principal branch of the revenue. They were first imposed by the 12th of Car. II. and have been continued by several subsequent acts of parliament to first Geo. III. which lays an additional duty of 3d. per barrel. In the whole, the brewer of ale and beer for sale shall pay 8s. for every barrel of either, above 6s. a barrel; and for every barrel of 6s. or under, the sum of 1s. 4d.

Medicated ALE, that wherein medicinal herbs have been infused, or added during the fermentation. See **PHARMACY**.

Gill ALE, is that in which the dried leaves of gill or ground-ivy have been infused. It is esteemed absterfivè and vulnerary, and consequently good in disorders of the breast and obstructions of the viscera.

ALEA, *f.* in Roman antiquity, denotes in general all manner of games of chance; but, in a more restricted sense, was used for a particular game played with dice and tables, not unlike our backgammon.

ALEANDER (Jerome), cardinal and archbishop of Brindisi, was born in 1480, and distinguished himself at the beginning of the reformation, by the opposition he made to Luther; for, being sent into Germany as the pope's nuncio in 1519, he acted, as occasion served, both in the character of ambassador and doctor; and declaimed three hours together against Luther's doctrine before the diet of Worms, but could not prevent that celebrated reformer from being heard in that diet. He published several works, and died at Rome in 1542.

ALEANDER (Jerome), a learned man of the seventeenth century, born in the principality of Friuli, of the same family with the preceding. When he went to Rome, he was employed as secretary under cardinal Octavius Bandini, and discharged this office with great honour for almost twenty years. He afterwards, by the persuasion of Urban VIII. who had a great esteem for him, became secretary to cardinal Barberini, whom he accompanied to Rome when he went there in the character of legate *à latere*, and in whose service he died in 1631. He was one of the first members of the academy of Humourists, wrote a learned Treatise in Italian on the Device of the Society, and displayed his genius on many subjects.

ALE-CONNER, *f.* in law, is an officer who is appointed in the court-leet, sworn to look to the assize and goodness of ale and beer within the precincts of the leet. There are also four ale-conners, chosen by the liverymen of the city of London, in common-hall, on Midsummer-day,

whose office it is to inspect the measures used in public-houses.

ALE-COST, *f.* in botany. See **TANACETUM**.

ALECTO, one of the **FURIES**, daughter of Acheron and Night; or, as others would have it, of Pluto and Proserpine.

ALECTORIA, *f.* a stone said to be formed in the gall-bladders of old cocks, to which the ancients ascribed many fabulous virtues. This is otherwise called *alektorius lapis*, sometimes *alektorolithos*, in English the *cock-stone*. The more modern naturalists hold the alektorius lapis to be originally swallowed down, not generated in; the stomach or gizzard of cocks and capons. It is known that many of the fowl-kind make a practice of swallowing pebbles, as is supposed to be of service in the business of trituration and digestion.

ALECTOROLOPHUS, *f.* in botany. See **BARTSIA**, **PEDICULARIS**, and **RHINANTHUS**.

ALECTRA, *f.* in botany, a genus of the didynamia angiospermia class. The generic characters are—Calyx: perianthium one-leaved, two lipped; upper lip two-cleft, lower three-cleft; clefts ovate, obtuse, shorter than the tube. Corolla: one-petalled, tubular; tube by degrees widened a little; border expanding, five-parted; parts broad-lanceolate, obtuse. Stamina: filaments four, inserted into the tube, filiform, bearded, length of the tube; two of them are a little shorter; antheræ twin. Pistillum: germ ovate; style filiform, length of the filaments; stigma incurved, a little thicker than the style, and of the same length, striated on both sides. Pericarpium: capsule ovate, obtuse, twin, smooth, two-celled, two-valved. Seeds: solitary, ovate.—*Essential Character*. Corolla bell-shaped, filament bearded, capsule two-celled.

The only species of this genus is called *alecitra Capensis*, or Cape *alecitra*. The flowers are yellow, streaked with purple; and it is a native of the Cape of Good Hope, in grassy places near rivers, flowering in November and December.

ALECTRYOMANCY, or **ALECTOROMANCY**, *f.* [*αλεκτρυων* and *μαντις*, Gr.] Divination by a cock, of which there appears to have been different species. But that most spoken of by authors was in the following manner:—A circle being described on the ground, and divided into twenty-four equal portions, in each of these spaces was written one of the letters of the alphabet, and on each of the letters was laid a grain of wheat; after which, a cock being turned loose in the circle, particular notice was taken of the grains picked up by the cock, because the letters under them, being formed into a word, made the answer desired. It was thus, according to Zonaras, that Libanius and Jamblicus sought who should succeed the emperor Valens; and, the cock eating the grains answering to the spaces ΘΕΟΔ, several whose names began with those letters, as Theodotus, Theodistes, Theodulus, &c. were put to death; which did not hinder, but promote, Theodosius to the succession. But the story, however current, is but ill supported: it has been called in question by some, and refuted by others, from the silence of Marcellinus, Socrates, and other historians of that time.

A-LEE, *adv.* in the sea-language, a term only used when the wind, crossing or flanking the line of a ship's course, presses upon the masts and sails so as to make her incline to one side, which is called the lee-side; hence, when the helm is moved over to this side, it is said to be *a-lee*, or *hard a-lee*.

ALEGAMBE (Philip), a celebrated Jesuit, born at Brussels in 1592, distinguished himself by publishing a Bibliotheque of the writers of his order, and died at Rome in 1652.

ALEGAR, *f.* [from *ale* and *eager*, four.] Sour ale; a kind of acid made by ale, as vinegar by wine, which has lost its spirit.

ALEGER, *adj.* [*allegre*, Fr. *alacris*, Lat.] Gay; cheerful; sprightly: a word not now used.—Coffee, the root and

and leaf beetle, and tobacco, of which the Turks are great takers, do all condense the spirits, and make them strong and *alger*. *Bacon*.

ALEGRETTE, *f.* in botany. See **GLECOMA**.
ALE-HOUSE, *f.* A house where ale is publicly sold; a tipling-house. It is distinguished from a tavern, where they sell wine.—One would think it should be no easy matter to bring any man of sense in love with an *ale-house*; indeed of so much sense as seeing and smelling amounts to; there being such strong encounters of both, as would quickly send him packing, did not the love of good fellowship reconcile to these nuisances. *South*.

ALEHOOF, *f.* in botany. See **GLECOMA**.

ALE-HOUSE, *f.* A house where ale is publicly sold; a tipling-house. It is distinguished from a tavern, where they sell wine.—One would think it should be no easy matter to bring any man of sense in love with an *ale-house*; indeed of so much sense as seeing and smelling amounts to; there being such strong encounters of both, as would quickly send him packing, did not the love of good fellowship reconcile to these nuisances. *South*.

Thou shalt each *ale-house*, thee each gill-house, mourn,
 And answering gin-shops sower sighs return. *Pope*.

Ale-houses may be considered in the following respects:
 —1. Every inn is not an alehouse, nor is every alehouse an inn; but, if an inn uses common selling of ale, it is then also an alehouse; and, if an alehouse lodges and entertains travellers, it is also an inn.

2. By several statutes, licences to keep inns and alehouses shall be granted yearly at a general meeting of the justices of the division, on the first day of September, or within twenty days after, and at no other time; except in cities and towns corporate. And the persons licensed shall enter into recognizance to keep good order and rule. And, if any person shall sell ale without licence, he shall forfeit for the first offence 40s. for the second offence 4l. for the third and every other offence 6l. 5 Geo. III. c. 46. And by 27 Geo. III. c. 13. several excise-duties are imposed on ale and beer brewed in Great Britain, according to a schedule set forth in the act.

3. If one who keeps a common inn refuses either to receive a traveller as a guest into his house, or to find him victuals or lodging, upon his tendering him a reasonable price for the same, he is not only liable to render damages for the injury, in an action on the case at the suit of the party grieved, but also may be indicted and fined at the suit of the king. 1 *Haw. 225*.

4. An innkeeper may detain the person of the guest who eats, or the horse which eats, till payment. For it would be hard to oblige him to sue for every little debt; and a greater hardship, that he might not be able to find his guest. *Bac. Abr. Inns*.—But an horse committed to an innkeeper may be detained only for his own meat, and not for the meat of the guest, or of any other horse. Also if the innkeeper or alehouse-keeper shall refuse to give in the reckoning in particulars, or shall sell in measures unsealed, he shall not be permitted to detain for the reckoning, but shall be left to his action at law. 11 & 12 Wm. c. 15. In like manner, if the innkeeper gives credit to the party for that time, and lets him go without payment, then he hath waived the benefit of the custom, and must rely on his other agreement. 8 *Mod. 172*. An innkeeper that detains a horse for his meat cannot use him; because he detains him as in custody of the law; and, by consequence, the detention must be in the nature of a distress, which cannot be used by the distrainer. But, by custom in particular places, if the horse eats out his price, the innkeeper may take him as his own, on the reasonable appraisement of several of his neighbours; but the innkeeper has no power to sell the horse, by the general custom of the realm. *Bac. Abr. Inns*.

5. An innkeeper shall answer for those things which are stolen within his inn, though not specially delivered to him to keep; for it shall be intended to be through his negligence, or occasioned by the default of his servants. So if he puts a horse to pasture, without the direction of his

guest, and the horse is stolen, he must make satisfaction; but otherwise, if with his direction. 8 *Co. Caley's case*.

6. A guest in an inn, arising in the night, and carrying goods out of his chamber into another room, and from thence to the stable, intending to ride away with them, is guilty of felony, although there was no trespass in taking them, which is generally required in cases of felony.

ALEHOUSE-KEEPER, *f.* He that keeps ale publicly to sell.—You resemble perfectly the two *alehouse-keepers* in Holland, who were at the same time burgomasters of the town, and taxed one another's bills alternately. *Swift*.

ALEIUS CAMPUS, a plain in Cilicia, on this side the river Pyramus, near the mountain Chimera, famous for Bellerophon's wandering and perishing there, after being thrown off Pegasus; which is the reason of the appellation.

ALEKNIGHT, *f.* A pot companion; a tippler: a word now out of use.—The old *aleknights* of England were well depicted by Hanville, in the alehouse-colours of that time. *Camden*.

ALEMANIA, or **ALLEMANIA**, anciently a name of Germany, but not known before the time of the Antonines, and then used only for a part. After the Marcomanni and their allies had removed from the Rhine, a rabble, or collection of people from all parts of Gaul, as the term Alemanni denotes, prompted either by levity or poverty, occupied the Agri, called *Decumates* by Tacitus, because they held them on a tithe; now supposed to be the duchy of Wirtemberg. Such appear to be the small beginnings of Alemania, which was in aftertimes greatly enlarged; but still it was considered as a distinct part, for Caracalla, who conquered the Alemanni, assumed the surname both of Alemanicus and Germanicus.

ALEMBDAR, an officer in the court of the Grand Signior, who bears the green standard of Mahomet, when the sultan appears in public on any solemn occasion.

ALEMBERT (John le Rond d'), an eminent French mathematician and philosopher, and one of the brightest ornaments of the eighteenth century. He was perpetual secretary to the French Academy of Sciences, and a member of most of the philosophical academies and societies of Europe.

D'Alembert was born at Paris, the 16th of November, 1717. He derived his name of John le Rond from that of the church near which, after his birth, he was exposed as a foundling. But his father, informed of this circumstance, listening to the voice of nature and duty, took measures for the proper education of his child, and for his future subsistence in a state of ease and independence. His mother, it is said, was a lady of rank, the celebrated Mademoiselle Tencin, sister to cardinal Tencin, archbishop of Lyons.

He received his first education among the Jansenists, in the College of the Four Nations, where he gave early signs of genius and capacity. In the first year of his philosophical studies, he composed a Commentary on the Epistle of St. Paul to the Romans. The Jansenists considered this production as an omen, that portended to the party of Port-Royal a restoration to some part of their former splendour, and hoped to find one day in d'Alembert a second Pascal. To render this resemblance more complete, they engaged their pupil in the study of the mathematics; but they soon perceived that his growing attachment to this science was likely to disappoint the hopes they had formed with respect to his future destination; they therefore endeavoured to divert him from this line, but their endeavours were fruitless.

On his quitting the college, finding himself alone, and unconnected in the world, he sought an asylum in the house of his nurse. He hoped that his fortune, though not ample, would enlarge the subsistence, and better the condition, of her family, which was the only one he could consider as his own. It was here therefore that he fixed his residence, resolving to apply himself entirely to the study of geometry. And here he lived, during the space of forty years, with the greatest simplicity, discovering the

the augmentation of his means only by increasing displays of his beneficence, concealing his growing reputation and celebrity from these honest people, and making their plain and uncouth manners the subject of good-natured pleasantries and philosophical observation. His good nurse perceived his ardent activity; heard him mentioned as the writer of many books; but never took it into her head that he was a great man, and rather beheld him with a kind of compassion. "You will never (said she to him one day) be any thing but a philosopher—and what is a philosopher?—a fool, who toils and plagues himself all his life, that people may talk of him when he is dead."

As d'Alembert's fortune did not far exceed the demands of necessity, his friends advised him to think of some profession that might enable him to increase it. He accordingly turned his views to the law, and took his degrees in that faculty; but soon after, abandoning this line, he applied himself to the study of medicine. Geometry however was always drawing him back to his former pursuits, so that, after many ineffectual struggles to resist its attractions, he renounced all views of a lucrative profession, and gave himself up entirely to mathematics and poverty.

In the year 1741 he was admitted a member of the Academy of Sciences; for which distinguished literary promotion, at so early an age as twenty-four, he had prepared the way by correcting the errors of a celebrated work (the *Analyse Démontrée* of Reyneau), which was esteemed classical in France in the line of analytics. He afterwards set himself to examine with close attention and assiduity, what must be the motion and path of a body, which passes from one fluid into another denser fluid, in a direction oblique to the surface between the two fluids. Every one knows the phenomenon which happens in this case, and amuses children, under the denomination of *ducks and drakes*; but it was d'Alembert who first explained it in a satisfactory and philosophical manner.

Two years after his election to a place in the academy, he published his Treatise on Dynamics. The new principle developed in this treatise, consisted in establishing an equality, at each instant, between the changes that the motion of a body has undergone, and the forces or powers which have been employed to produce them; or, to express the same thing otherwise, in separating into *two parts* the action of the moving powers, and considering the *one* as producing alone the motion of the body in the second instant, and the *other* as employed to destroy that which it had in the first.

So early as the year 1744, d'Alembert had applied this principle to the theory of the equilibrium, and the motion of fluids; and all the problems before resolved in physics became in some measure its corollaries. The discovery of this new principle was followed by that of a new calculus, the first essays of which were published in a Discourse on the General Theory of the Winds, to which the prize-medal was adjudged by the Academy of Berlin in the year 1746, which proved a new and brilliant addition to the fame of d'Alembert. This new calculus of Partial Differences he applied, the year following, to the problem of vibrating chords, the resolution of which, as well as the theory of the oscillations of the air and the propagation of sound, had been but imperfectly given by the mathematicians who preceded him; and these were his masters or his rivals.

In the year 1749 he furnished a method of applying his principle to the motion of any body of a given figure. He also resolved the problem of the precession of the equinoxes; determining its quantity, and explaining the phenomenon of the nutation of the terrestrial axis discovered by Dr. Bradley.

In 1752, d'Alembert published a Treatise on the Resistance of Fluids, to which he gave the modest title of an *essay*; though it contains a multitude of original ideas and new observations. About the same time he published, in the Memoirs of the Academy of Berlin, Researches concerning the Integral Calculus, which is greatly indebted

to him for the rapid progress it has made in the present century.

While the studies of d'Alembert were confined to mere mathematics, he was little known or celebrated in his native country. His connections were limited to a small society of select friends. But his cheerful conversation, his smart and lively sallies, a happy knack at telling a story, a singular mixture of malice of speech with goodness of heart, and of delicacy of wit with simplicity of manners, rendering him a pleasing and interesting companion, his company began to be much sought after in the fashionable circles. His reputation at length made its way to the throne, and rendered him the object of royal attention and beneficence. The consequence was a pension from government, which he owed to the friendship of count d'Argenson.

But the tranquillity of d'Alembert was abated when his fame grew more extensive, and when it was known beyond the circle of his friends, that a fine and enlightened taste for literature and philosophy accompanied his mathematical genius. Our author's eulogist ascribes to envy, detraction, &c. all the opposition and censure that d'Alembert met with on account of the famous *Encyclopédie*, or Dictionary of Arts and Sciences, in conjunction with Diderot. None surely will refuse the well-deserved tribute of applause to the eminent displays of genius, judgment, and true literary taste, with which d'Alembert has enriched that great work. Among others, the preliminary discourse he has prefixed to it, concerning the rise, progress, connections, and affinities, of all the branches of human knowledge, is perhaps one of the most capital productions the philosophy of the age can boast of.

Some time after this, d'Alembert published his Philosophical, Historical, and Philological, Miscellanies. These were followed by the Memoirs of Christina queen of Sweden; in which d'Alembert shewed that he was acquainted with the natural rights of mankind, and was bold enough to assert them. His Essay on the Intercourse of Men of Letters, with Persons high in Rank and Office, wounded the former to the quick, as it exposed to the eyes of the public the ignominy of those servile chains, which they feared to shake off, or were proud to wear. A lady of the court hearing one day the author accused of having exaggerated the despotism of the great, and the submission they require, answered sily, "If he had consulted me, I would have told him still more of the matter."

D'Alembert gave elegant specimens of his literary abilities in his translations of some select pieces of Tacitus. But these occupations did not divert him from his mathematical studies; for about the same time he enriched the *Encyclopédie* with a multitude of excellent articles in that line, and composed his Researches on several Important Points of the System of the World, in which he carried to a higher degree of perfection the solution of the problem concerning the perturbations of the planets, that had several years before been presented to the academy. In 1759 he published his Elements of Philosophy: a work much extolled as remarkable for its precision and perspicuity.

The resentment that was kindled (and the disputes that followed it) by the article *Geneva*, inserted in the *Encyclopédie*, are well known. D'Alembert did not leave this field of controversy with flying colours. Voltaire was an auxiliary in the contest; but as he had no reputation to lose, in point of candour and decency; and as he weakened the blows of his enemies, by throwing both them and the spectators into fits of laughter; the issue of the war gave him little uneasiness. It fell more heavily on d'Alembert; and exposed him, even at home, to much contradiction and opposition.

It was on this occasion that the late king of Prussia offered him an honourable asylum at his court, and the office of president of his academy; and the king was not offended at d'Alembert's refusal of these distinctions, but cultivated an intimate friendship with him during the rest of

of his life. He had refused, some time before this, a proposal made by the empress of Russia to entrust him with the education of the Grand Duke;—a proposal accompanied with all the flattering offers that could tempt a man, ambitious of titles, or desirous of making an ample fortune: but the objects of his ambition were tranquillity and study.

In the year 1765, he published his Dissertation on the Destruction of the Jesuits. This piece drew upon him a swarm of adversaries, who only confirmed the merit and credit of his work by their manner of attacking it.

Beside the works already mentioned, he published nine volumes of memoirs and treatises, under the title of Opusculs; in which he has resolved a multitude of problems relating to astronomy, mathematics, and natural philosophy; of which his panegyrist, Condorcet, gives a particular account, more especially of those which exhibit new subjects, or new methods of investigation. He published also Elements of Music; and rendered, at length, the system of Rameau intelligible; but he did not think the mathematical theory of the sonorous body sufficient to account for the rules of that art.

In the year 1772 he was chosen secretary to the French Academy of Sciences. He formed, soon after this preferment, the design of writing the lives of all the deceased academicians, from 1700 to 1772; and in the space of three years he executed this design, by composing seventy eulogies.

D'Alembert died on the 29th of October, 1783, being nearly sixty-six years of age. In his moral character there were many amiable lines of candour, modesty, disinterestedness, and beneficence; which are described, with a diffusive detail, in his eulogium, by Condorcet, in the Hist. de l'Acad. Royale des Sciences, 1783.

As it may be curious and useful to have in one view an entire list of d'Alembert's writings, we shall here insert a catalogue of them, from Rozier's *Nouvelle Table des Articles contenus dans les Volumes de l'Académie Royale des Sciences de Paris*, &c. as follows:—*Traité de Dynamique*, in 4to, Paris, 1743; the second edition in 1758. *Traité de l'Équilibre et du Mouvement des Fluides*: Paris, 1744, and the second edition in 1770. *Reflexions sur la Cause Générale des Vents*; which gained the prize at Berlin in 1746, and was printed at Paris in 1747, in 4to. *Recherches sur la Précession des Équinoxes, et sur la Nutation de l'Axe de la Terre dans le Système Newtonien*: Paris, 1749, in 4to. *Essai d'une Nouvelle Théorie du Mouvement des Fluides*: Paris, 1752, in 4to. *Recherches sur différents Points Importans du Système du Monde*: Paris, 1754 and 1756, three vol. in 4to. *Elémens de Philosophie*: 1759. *Opusculs Mathématiques, ou Mémoires sur différents Sujets de Géométrie, de Mécaniques, d'Optiques, & d'Astronomie*: Paris, 9 vol. in 4to. 1761 to 1773. *Elémens de Musique, théorique & pratique, suivant les Principes de M. Rameau, éclairés, développés, & simplifiés*: 1 vol. in 8vo. à Lyon. *De la Destruction des Jésuites*: 1765.

In the Memoirs of the Academy of Paris are the following pieces by d'Alembert, viz.—*Précis de Dynamique*, 1743, Hist. 164. *Précis de l'Équilibre & du Mouvement des Fluides*, 1744, Hist. 55. *Méthode générale pour déterminer les Orbites & les Mouvements de toutes les Planètes, en ayant égard à leur action mutuelle*, 1745, p. 365. *Précis des Réflexions sur la Cause Générale des Vents*, 1750, Hist. 41. *Précis des Recherches sur la Précession des Équinoxes, et sur la Nutation de l'Axe de la Terre dans le Système Newtonien*, 1750, Hist. 134. *Essai d'une Nouvelle Théorie sur la Résistance des Fluides*, 1752, Hist. 116. *Précis des Essais d'une Nouvelle Théorie de la Résistance des Fluides*, 1753, Hist. 289. *Précis des Recherches sur les différents Points Importans du Système du Monde*, 1754, Hist. 125. *Recherches sur la Précession des Équinoxes, et sur la Nutation de l'Axe de la Terre, dans l'Hypothèse de la Dissimilitude des Méridiens*, 1754, p. 413, Hist. 116. *Reponse à un Article du Mémoire de M. l'Abbé de la Caille, sur la Théorie du Soleil*, 1757, p. 145,

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Hist. 118. *Addition à ce Mémoire*, 1757, p. 567, Hist. 118. *Précis des Opusculs Mathématiques*, 1761, Hist. 86. *Précis du troisième volume des Opusculs Mathématiques*, 1764, Hist. 92. *Nouvelles Recherches sur les Verres Optiques, pour servir de suite à la théorie qui en a été donnée dans le troisième volume des Opusculs Mathématiques*: Premier mémoire, 1764, p. 75, Hist. 175. *Nouvelles Recherches sur les Verres Optiques, pour servir de suite à la théorie qui en a été donnée dans le troisième volume des Opusculs Mathématiques*: Second mémoire, 1765, p. 53. *Observations sur les Lunettes Achromatiques*, 1765, p. 53, Hist. 119. *Suite des Recherches sur les Verres Optiques*: Troisième mémoire, 1767, p. 43, Hist. 153. *Recherches sur le Calcul Intégral*, 1767, p. 573. *Accident arrivé par l'Explosion d'une Meule d'Emouleur*, 1768, Hist. 31. *Précis des Opusculs de Mathématiques, quatrième & cinquième volumes: Leur Analyse*, 1768, Hist. 83. *Recherches sur les Mouvements de l'Axe d'une Planète quelconque dans l'Hypothèse de la Dissimilitude des Méridiens*, 1768, p. 1, Hist. 95. *Suite des Recherches sur les Mouvements, &c.* 1768, p. 332, Hist. 95. *Recherches sur le Calcul Intégral*, 1769, p. 73. *Mémoire sur les Principes de la Mech.* 1769, p. 278.

And in the Memoirs of the Academy of Berlin, are the following pieces by our author, viz.—*Recherches sur le Calcul Intégral, première partie*, 1746. *Solution de quelques Problèmes d'Astronomie*, 1747. *Recherches sur la Courbe que forme une Corde Tendue, mise en Vibration*, 1747. *Suite des Recherches sur le Calcul Intégral*, 1748. *Lettre à M. de Maupertuis*, 1749. *Addition aux Recherches sur la Courbe que forme une Corde Tendue mise en Vibration*, 1750. *Addition aux Recherches sur le Calcul Intégral*, 1750. *Lettre à M. le Professeur Formey*, 1755. *Extr. de diffé. Lettres à M. de la Grange*, 1763. *Sur les Tautochrones*, 1765. *Extr. de diffé. Lettres à M. de la Grange*, 1769.

Also in the Memoirs of Turin are—*Différentes Lettres à M. de la Grange*, en 1764 & 1765, tom. 3 of these memoirs. *Recherches sur différens Sujets de Math.* t. 4.

ALEMBOIC, *f.* [from the Arabic particle *al*, and *ambic*, from *apbana*, for *arabico*, to ascend. Seneca calls it in the Latin language *miliarium*, *alemboic*, “moor's head.” It is also named *capilla*, *capitulum*.] A copper cap tinned in the inside, made like a head, in which the pipe, before worms were contrived, which passes through a tub of cold water, is fixed to receive the vapour from the heated cucurbit or body, to convey it to the receiver. Before retorts were used so commonly, the matter distilled was put into a vessel called a body, with a head placed on it to receive the vapour, whence it was conveyed by a canal, called the rostrum or beak, to the receiver; this head is properly the alemboic, and is called *alemboicus rostratus*, i. e. the beaked alemboic, to distinguish it from *alemboicus caecus*, or blind alemboic, which is without a canal, as it is to receive dry substances that are sublimed into it. The still-head is properly an alemboic; the body of the alemboic was placed over a fire or in hot water.

ALEMBROTH, *f.* in the writings of the alchemists, a word used for a sort of fixed alkaline salt, which had the power of the famous alkalest, in dissolving bodies, opening the pores of moist or all known substances, and thence, as well as by destroying sulphurs, promoting the separation of metals from their ores. It is also used for a compound of corrosive mercury and sal ammoniac. See CHEMISTRY.

ALEMOUTH, Northumberland, is a small sea-port town, situate at the mouth of the river Alne, five miles east from Alnwick, and six miles north from Warkworth. It has no market or fair; notwithstanding large quantities of corn are annually shipped from hence. This was one of the forfeited estates of Henry earl of Northumberland, which Henry IV. settled on his brother the duke of Clarence, for the better support of his dignity as lord-lieutenant of Ireland. Human bones of an uncommon magnitude having been several times dug up on the shore of

the river, near this town, has given rise to a traditional story, that a race of giants formerly resided here, and that these were some of their imperfect remains. In queen Elizabeth's time the French took possession of this town, and fortified it; as it was the first port they could safely land their supplies at for the queen mother. It affords a safe harbour for fishing vessels, and abounds with excellent fish.

ALENCON, a large handsome town of France, in Lower Normandy, with the title of a duchy. It is surrounded with good walls, and flanked with towers. The castle was formerly a place of great consequence, and has held out long sieges. It has but one parish-church, which has a bold and noble front. Among the nunneries, that of St. Clair is most remarkable. It is seated on the river Sarte, in a vast open plain, which produces all sorts of corn and fruit. Near it there are quarries of stone fit for building, wherein are found a sort like Bristol stones. The linen made at Alençon is very good, and sells at Paris. It is twenty miles north of Mans, sixty-three south-by-west of Rouen, and eighty-eight south-west of Paris. Lon. $0. 10. \text{lat. } 48. 25. \text{N.}$

ALENGTH, *adv.* [from *a* for *at*, and *length*.] At full length; along; stretched along the ground.

ALENIO, (Julius), a Jesuit, born at Brescia in the republic of Venice. He travelled into the eastern countries, and arrived at Maca in 1610, where he taught mathematics. From thence, he went to the empire of China, where he continued to propagate the Christian religion for thirty-six years. He was the first who planted the faith in the province of Xansi, and he built several churches in the province of Fokien. He died in August 1649, leaving behind him the following works, in the Chinese language: —1. The Life of Jesus Christ, in eight volumes. 2. The Incarnation of Jesus Christ. 3. Of the Sacrifice of the Mass. 4. The Sacrament of Penitence. 5. The Original of the World. 6. Proof of the Existence of a Deity. 7. Dialogues. 8. The Dialogue of St. Bernard betwixt the Soul and Body, in Chinese Verse. 9. A Treatise on the Sciences of Europe. 10. Practical Geometry, in four books. 11. The Life of P. Matthew Ricci. 12. The Life of Dr. Michael Yam, a Chinese Convert. 13. The Theatre of the World, or Cosmography.

ALENTEJO, a province of Portugal, between the rivers of Tago and Guadiana: the soil is very fertile, and the inhabitants laborious and industrious. The principal town is Évora.

ALEPPO, or **HALAB**, the capital of the Pachalic, and of all Syria, and the ordinary residence of the pacha, is situated in the vast plain which extends from the Orontes to the Euphrates, and which towards the south terminates in the desert. It is built on eight hills or eminences, on the highest of which the castle is erected, and is supposed to be the ancient Beræa. This mount is of a conic form, and seems in a great measure to be raised with the earth thrown up out of a deep broad ditch which surrounds it. The suburbs to the north-north-east are next in height to this, and those to the west-south-west are much lower than the parts adjacent, and than any other part of the city. The houses are large and commodious, having terraces on their tops, and generally sky-lights in form of a dome to let the light into the rooms, which from their loftiness, the gilding on the window-shutters, cupboard-doors, &c. have at first entrance a very grand and agreeable effect. They are all so equal in height, that there are seldom any steps to ascend or descend in going from one house to another; while several large vaulted streets increase the facility of communication, by affording a passage to every part of the city free from the embarrassment of the open streets. They are carefully paved; have gutters and a foot-pavement on each side; and the middle of the street is laid with brick, the small end upwards, for the convenience of the horses. There is also a cleanliness observed here unknown to the other cities of Turkey, and which is not attended with the trouble of our scavengers, there being

ass-drivers who go about the city and take up the rubbish and dust, which each inhabitant is obliged to sweep together; and, though the heat of the climate renders this labour more easy, the same heat obliges them to greater cleanliness in order to preserve the salubrity of the air.

The mosques in Aleppo are numerous, and some few of them magnificent. Before each of them is an area, with a fountain in the middle, designed for ablutions before prayers; and behind some of the larger there are little gardens. There are many large khans, or caravanferas, consisting of a capacious square, on all sides of which are a number of rooms, built on a ground-floor, used occasionally for chambers, warehouses, or stables. Above stairs there is a colonade or gallery on every side, in which are the doors of a number of small rooms, wherein the merchants, as well strangers as natives, transact most of their business.

The bazars or market-places are long covered narrow streets, on each side of which are a great number of small shops, just sufficient to hold the tradesman and his goods, the buyer being obliged to stand without. Each separate branch of business has a particular bazar, which is locked up, as well as the streets, an hour and a half after sunset: but the locks are of wood, though the doors are cased with iron. The slaughter-houses are in the suburbs, open to the fields. The tanners have a khan to work in near the river. To the southward in the suburbs they burn lime; and a little beyond that there is a village where they make ropes and catgut. On the opposite side of the river, to the westward, there is a glass-house, where they make a coarse white glass, in the winter only; for the greatest part of this manufacture is brought from a village thirty-five miles westward.

The situation of Aleppo, besides the advantage of a rich and fruitful soil, possesses also that of a stream of fresh water, which never becomes dry. This rivulet, which is about as large as that of the Gobelins at Paris, or the New River near London, rises in the mountains of Aentab, and terminates six leagues below Aleppo, in a morass full of wild boars and pelicans. Near Aleppo, its banks, instead of the naked rocks which line them in the upper part of its course, are covered with a fertile earth, and laid out in gardens, or rather orchards, which, in a hot country, and especially in Turkey, cannot but be delightful. The city is in itself one of the most agreeable in Syria, and is perhaps the cleanest and best built of any in Turkey. On whatever side it is approached, its numerous minarets and domes present an agreeable prospect to the eye, fatigued with the continued sameness of the brown and parched plains. In the centre is an artificial mountain surrounded by a dry ditch, on which is a ruinous fortress. From hence we have a fine prospect of the whole city, and to the north discover the snowy tops of the mountains of Bailan; and on the west, those which separate the Orontes from the sea; while to the south and east, the eye can discern as far as the Euphrates. In the time of Omar, this castle stopped the progress of the Arabs for several months, and was at last taken by treachery, but at present would not be able to resist the feeblest assault. Its slight wall, low, and without a buttress, is in ruins; its little old towers are in no better condition; and it has not four cannon fit for service, not excepting a culverine nine feet long, taken from the Persians at the siege of Bassora. Three hundred and fifty janisaries, who should form the garrison, are busy in their shops, and the aga scarcely finds room in it to lodge his retinue. It is remarkable that this aga is named immediately by the Porte, which, ever suspicious, divides as much as possible the different offices. Within the walls of the castle is a well, which, by means of a subterraneous communication, derives its water from a spring a league and a quarter distant. In the environs of the city, we find a number of large square stones, on the top of which is a turban of stone, which are so many tombs. There are many rising grounds round it, which, in case of a siege, would greatly facilitate the approaches

of the assailants. Such, among others, is that on which the house of the Derviches stands, and which commands the canal and the rivulet: Aleppo, therefore, cannot be esteemed a place of importance in war, though it be the key of Syria to the north; but, considered as a commercial city, it has a different appearance. It is the emporium of Armenia and the Diarbekar; sends caravans to Bagdad and into Persia: and communicates with the Persian Gulph and India, by Bassora, with Egypt and Mecca by Damascus, and with Europe by Scanderoon (Alexandretta) and Latakia. Commerce is there principally carried on by barter. The chief commodities are raw or spun cottons, clumsy linens fabricated in the villages; silk stuffs manufactured in the city, copper, *bourees* (coarse cloths) like those of Rouen, goats hair brought from Natolia: the gall nuts of the Kourdesian, the merchandise of India, such as shawls and muslins, and pistachio nuts of the growth of the neighbourhood. The articles supplied by Europe are the Languedoc cloths, cochineal, indigo, sugar, and some other groceries. The coffee of America, though prohibited, is introduced, and serves to mix with that of Moka. The French have at Aleppo a consul and seven counting-houses; the English and the Venetians two, and the merchants of Leghorn and Holland one. The emperor appointed a consul there in 1784, in the person of a rich Jew merchant, who shaved his beard to assume the uniform and the sword. Russia has also sent one very lately. Aleppo is not exceeded in extent by any city in Turkey, except Constantinople and Cairo, and perhaps Smyrna. The number of inhabitants has been computed at 200,000; but in these calculations certainty is impossible. However, if we observe that this city is not larger than Nantes or Marseilles, and that the houses consist only of one story, we shall perhaps not think it probable they exceed 100,000. The people of this city, both Turks and Christians, are with reason esteemed the most civilized in all Turkey; and the European merchants no where enjoy so much liberty, or are treated with so much respect.

The air of Aleppo is very dry and piercing, but at the same time very salubrious for all who are not troubled with asthmatic complaints. The city, however, and the environs, are subject to a singular endemial disorder, which is called the ringworm or pimple of Aleppo: it is in fact a pimple which is at first inflammatory, and at length becomes an ulcer of the size of the nail. The usual duration of this ulcer is one year; it commonly fixes on the face, and leaves a scar which disfigures almost all the inhabitants. It is alleged that every stranger who resides there three months is attacked with it; experience has taught that the best mode of treatment is to make use of no remedy. No reason is assigned for this malady: but M. Volney suspects it proceeds from the quality of the water, as it is likewise frequent in the neighbouring villages, in some parts of the Diarbekar, and even in certain districts near Damascus, where the soil and the water have the same appearances. Of the Christian inhabitants the greater number are Greeks, next to them the Armenians, then the Syrians, and lastly the Maronites; each of whom have a church in the city called *Judida*; in which quarter, and the parts adjacent, most of them reside. The common language is the vulgar Arabic, but the Turks of condition use the Turkish. Most of the Armenians can speak the Armenian, some few Syrians understand Syriac, and many of the Jews Hebrew; but scarcely one of the Greeks understands a word of Greek. The people in general are of a middle stature, and tolerably well proportioned; but they seem neither vigorous nor active. Both sexes are handsome when young: but the beard soon disfigures the men: and the women, as they come early to maturity, also fade very soon; females are generally married from fourteen to eighteen years of age, and many under fourteen. The people of rank here are polite and affable, making allowances for that superiority which the Mahometan religion instructs its votaries to assume over all who hold a different faith. Their bread is generally of wheat

flour made into thin cakes, but very ill prepared, and is generally eaten as soon as it comes out of the oven. The principal people have small loaves of a finer flour, which are well fermented and baked. Besides these, there are a variety of biscuits, most of which are srewed on the top with some kind of seeds. The Europeans have very good bread, baked and prepared in the French manner. All the inhabitants of both sexes smoke tobacco to great excess; even the very servants have almost constantly a pipe in their mouths. Coaches or carriages are not used here; therefore persons of quality ride on horseback in the city, with a number of servants walking before them, according to their rank: ladies of the first distinction are even compelled to walk on foot in the city, or to any place at a moderate distance; in longer journeys they are carried by mules, in a kind of a coach close covered up. There are a number of public bagnios in this city, which are used by people of all ranks, except those of the highest distinction, who commonly have baths and every other convenience in their own houses. A curious account of the domestic manners of the people of Aleppo has lately been given to the public by Dr. Russel in his Natural History of Aleppo. This gentleman availed himself of the opportunity which his profession of a physician afforded, in gratifying his own and the public curiosity by a more detailed account of the Harem, or female apartments, that characteristic object of the eastern domestic economy. From this we shall make some extracts.

"When the ladies visit one another in a forenoon, they do not immediately unveil on coming into the Harem, lest some of the men should happen to be still at home, and might see them as they pass; but, as soon as they enter the apartment of the lady to whom the visit is intended, either one of the young ladies, or a slave, assists in taking off the veil, which, being carefully folded up, is laid aside. It is a sign that the visitant intends only a short stay, when, instead of resigning the veil, she only uncovers her head, permitting the veil to hang carelessly down on the shoulders. This generally produces a friendly contest between the parties; one insisting upon taking the veil away, the other refusing to surrender it. A like contest takes place at the close of the visit. The common salutation is performed by laying the right hand on the left breast, and gently inclining the head. They sometimes salute by kissing the cheek; and the young ladies kiss the hands of their senior relations. They entertain with coffee and tobacco, but the sherbet and perfume are only produced on particular occasions. The great men are attended in the Harem, by the female slaves, in the same manner as, in the outer apartments, by the pages. They remain standing in the humble attitude of attendance, their hands crossed before them on their cincture, and their eyes fixed on the ground. The other ladies, as well as the daughters of the family, occasionally bring the pipe and coffee, but do not remain standing; they either are desired to sit down, or they retire. This however is to be understood of the grantees; for, in ordinary life, both wives and daughters minister servilely to the men: the two sexes never sitting at table together. It is seldom that all the ladies of a Harem are, by the great man, seen assembled, unless they happen, in the summer, to be surprized sitting in the Divan, where they meet to enjoy the cool air. At his approach, they all rise up, but, if desired, resume their places, (some of the slaves excepted,) and return to their work. However loquacious they may have been before he entered, a respectful silence ensues the moment he appears: a restraint which they feel the less, from their being accustomed to it almost from infancy. The Turks, in presence of their women, appear to affect a more haughty reserved air than usual, and, in their manner of speaking to them, are less courteous, and more abrupt, than they are to one another, or even to men who are much their inferiors. As this was frequently observed in persons remarkable for an affable deportment to men, it may be considered rather as their usual manner, than ascribed to the accidental presence

sence of an European; and is further confirmed by the ordinary behaviour of the boys, who talk to the women in an imperious manner, which they could only have learned from example. The men perhaps judge it politic to assume this demeanour, in a situation where dominion may be supposed to be maintained with more difficulty than among their male dependants; and therefore venture only in hours of retirement to avow that gentleness, which, as if derogatory from their dignity, they think prudent, in their general conduct, to conceal from persons whose obedience they believe can alone be secured by an air of stern authority. Persons of distinction, who are in office, leave the Harem early in the morning, and two hours after noon excepted, pass most of their time in the outer apartments. But others, who have little business, and the luxurious young men of all denominations, lounge many hours in their Harem. Some allowance, in this respect, is made to youth, for some weeks after marriage; but an effeminate character, which is by no means respectable among the men, is far from being acceptable to the women. The presence of the men, at unusual hours in the day time, lays the whole Harem under restraint, and, however some particular favourite may be gratified by the particular attention of her lord, the rest of the women are apt to lament the liberty they are deprived of, by his remaining too much at home.

"The grandees, if slightly indisposed, continue to see company in the outer apartments; but when the disorder becomes serious they retreat into the Harem, to be nursed by their women; and in this situation, besides their medical attendants and very near relations, no person whatever can have access, except on very urgent business. They make choice of the females they wish to have more immediately about their person, and one in particular is appointed to give an account to the physician of what happens in the intervals of his visits, to receive his directions, and to see them duly obeyed. Medical people, whether Europeans or natives, have access to the Harem at all times when their attendance is requisite. The physician, after being announced, is obliged to wait at the door till the way be cleared; that is, till his patient, when a female, her company, and attendants, and others who might happen to be in the courts through which he must pass, have either veiled, or retired out of sight. He is then conducted to the chamber of the sick lady by a slave, who continues in a loud voice to give warning of his approach, a precaution which does not always prevent the unveiled ladies, who have not been apprized, from accidentally crossing the court, in which case it becomes the well-bred physician to turn his eyes another way. Upon entering the chamber, he finds his patient covered with a loose veil, and, it being a vulgar notion that the malady may be discovered from the pulse, he is no sooner seated, than the naked wrist is presented for his examination. She then describes her complaints, and, if it be necessary to look at the tongue, the veil is for that purpose removed, while the assistants keep the rest of the face, and especially the crown of the head, carefully covered. The women do not hesitate to expose the neck, the bosom, or the stomach, when the case requires those parts to be inspected, but never without extreme reluctance consent to uncover the head. Ladies whom I had known very young, and who from long acquaintance were careless in concealing their faces from me, never appeared without a handkerchief or some other slight covering thrown over the head. So far as I could judge, from general practice, it seemed to be considered, in point of decorum, of more consequence to veil the head than the face. When the visit is at length concluded, notice being given to clear the way, the physician sets out, preceded as before by the slave. But it rarely happens that he is not more than once stopped, to give advice to some of the domestics, who wait his return; for, however slightly they may be indisposed, the temptation of telling their complaints to a doctor is irresistible. These damsels seldom have any other veil than a hand-

kerchief thrown over the head, one corner of which is held in the mouth; but, in order to avoid even that trouble, they frequently place themselves behind a door, or a window-shutter, half open, in which situation, thrusting out one arm, they insist on having the pulse examined. It sometimes happens, in the great Harem, that another obstacle must be encountered before regaining the gate. This arises from some of the younger ladies, or slaves, who are at work in the court, refusing peremptorily either to veil or retire; which is done merely in sport, to vex the conductress, who is obliged of course to make a halt. In vain she makes use by turns of entreaty, threats, and reproach; till, finding all in vain, she gives fair warning, and has recourse to a never-failing stratagem: she marches on, and bids the doctor follow. A complete rout ensues; the damsels scamper different ways, catch hold of whatever offers first by way of veil, or attempt to conceal themselves behind one another. But it is only when none of the men are in the Harem, that this scene of romping can take place: when the physician is conducted by the aga himself, every thing passes in orderly silence, and, in the chamber of the sick, none besides the elderly or married relations offer to join in the conversation: but it is seldom that the aga himself takes the trouble, after the few first visits, except the doctor be a stranger to the family.

"The transient manner in which the Turkish women can only be seen by a stranger, renders it difficult, if not impossible, to speak decidedly of their beauty, in comparison with that of the women of other countries, who are seen with more familiarity. Their dress and veil, which are so disadvantageous to their shape, may perhaps (the latter particularly) be of advantage to their looks. I have had occasion to see great numbers, and thought them in general handsomer than the Christian and Jewish ladies; but I was sometimes inclined to doubt whether that opinion might not in some degree be ascribed to seeing them partially, or when revealed in such a manner as to give relief to their beauty; it is certain that many whose faces I had at first thought exquisitely fine, from under a loose veil, lost considerably when more exposed."

Aleppo is seventy miles east of Scanderoon, on the sea-coast, and 175 north-by-east of Damascus. Lat. 36. 12. N. lon. 37. 40. E.

ALEPPO (the Pachalic of), one of the five governments into which Syria is divided. It comprehends the country extending from the Euphrates to the Mediterranean, between two lines, one drawn from Scanderoon to Beer, along the mountains; the other from Beles to the sea, by Mara and the bridge of Shoger. This space principally consists of two plains; that of Antioch to the west, and that of Aleppo to the east: the north and the sea-coast are occupied by considerably high mountains, known to the ancients by the names of Amanus and of Rhofus. In general, the soil of this government is fat and loamy. The lofty and vigorous plants which shoot up every where after the winter rains prove its fertility, but its actual fruitfulness is but little. The greatest part of the lands lie waste; scarcely can we trace any marks of cultivation in the environs of the towns and villages. Its principal produce consists in wheat, barley, and cotton, which are found especially in the flat country. In the mountains, they rather choose to cultivate the vine, mulberry, olive, and fig, trees. The sides of the hills towards the sea-coast are appropriated to tobacco, and the territory of Aleppo to pistachios. The pasturage is not to be reckoned, because that is abandoned to the wandering hordes of the Turkmen and Curds.

In the greater part of the pachalics the pacha is, as his title imports, at once the viceroy and farmer-general of the country; but in that of Aleppo he does not possess the latter office. This the Porte has bestowed on a *mehasfil* or collector, who is immediately accountable for what he receives. His lease is only for a year. The present rent of his farm is 800 purfes (above 40,000*l.*) but to this must be added the price of the *babouches* (Turkish slippers,) or

a present of three or four thousand pounds, to purchase the favour of the vizir and men in office. For these two sums the farmer receives all the duties of the government; which are, first, The produce of import and export duties on merchandize coming from Europe, India, and Constantinople, and on that exported in exchange. Secondly, The taxes paid by the herds of cattle brought every year by the Turkmen and Curds from Armenia and the Diarbekar, to be sold in Syria. Thirdly, The fifth of the salt-works of Djeboul. And lastly, The miri, or land-tax. These united may produce about 60,000l.

The pacha, deprived of this lucrative branch of the administration, receives a fixed allowance of about 8300l. This revenue has always been inadequate to the expences; for, besides the troops he is obliged to maintain, and the reparation of the highways and fortresses, the expences of which he is obliged to defray, he is under the necessity of making large presents to the ministers, in order to keep his place; but the Porte adds to the account the contributions he may levy on the Curds and Turkmen, and his extortions from the villages and individuals; nor do the pachas come short of this calculation. Abdi Pacha, who governed thirteen or fourteen years ago, carried off, at the end of fifteen months, upwards of 160,000l. by laying under contribution every trade, even the very cleaners of tobacco-pipes; and very lately another of the same name has been obliged to fly for similar oppressions. The former was rewarded by the divan with the command of an army against the Russians; but, if the latter has not enriched himself, he will be strangled as an extortioner. Such is the ordinary progress of affairs in Turkey!

In consequence of such wretched government, the greater part of the pachalics in the empire are impoverished and laid waste. This is the case in particular with that of Aleppo. In the ancient *defstars*, or registers of imposts, upwards of 3200 villages were reckoned; but at present the collector can scarcely find 400. Such of our merchants as have resided there twenty years, have themselves seen the greater part of the environs of Aleppo become depopulated. The traveller meets with nothing but houses in ruins, cisterns rendered useless, and fields abandoned. Those who cultivated them are fled into the towns, where the population is absorbed, but where at least the individual conceals himself among the crowd from the rapacious hand of despotism.

ALERIA, ALALIA, or ALARIA, anciently a town of Corsica, situated near the middle of the east side of the island, on an eminence, near the mouth of the river Rotanus mentioned by Ptolemy; built by the Phœceans. Afterwards Sylla led a colony thither. It is now in ruins, and called *Aleria Distrutta*.

ALERT, *adj.* [*alerte*, Fr. perhaps from *alacris*, but probably from *à part*, according to art or rule.] In the military sense, on guard; watchful; vigilant; ready at a call. In the common sense, brisk; pert; petulant; smart; implying some degree of censure and contempt.—I saw an *alert* young fellow, that cocked his hat upon a friend of his, and accosted him, Well, Jack, the old prig is dead at last. *Addison*.

ALERTNESS, *f.* The quality of being alert; sprightliness; pertness.

ALES (Alexander), a celebrated divine of the confession of Augsburg, born at Edinburgh the 23d of April 1500. He soon made a considerable progress in school-divinity, and entered the lists very early against Luther. Soon after he had a share in the dispute which Patrick Hamilton maintained against the ecclesiastics, in favour of the new faith he had imbibed at Marpurg. He endeavoured to bring him back to the Catholic religion; but this he could not effect, and even began himself to doubt about his own religion, being much affected by the discourse of this gentleman, and still more by the constancy he shewed at the stake, where David Beton archbishop of St. Andrew's caused him to be burnt. Beginning thus to waver, he was himself persecuted with so much vio-

lence, that he was obliged to retire into Germany, where he became at length a perfect convert to the Protestant religion. He was chosen professor of divinity at Leipsic, and died in March 1565. He wrote a Commentary on St. John, on the Epistles to Timothy, on the Psalms, &c.

ALESA, ALESA, or HALESA, an ancient town of Sicily, on the Tuscan sea, built, according to Diodorus Siculus, by Archonides of Herbita, in the second year of the 94th Olympiad, or 403 years before Christ; situated on an eminence about a mile from the sea: now in ruins.

ALESHAM, or AYLHAM, a small neat town in Norfolk. It is fifteen miles N. of Norwich, and 121 N. E. by N. of London. Lat. 52. 53. N. lon. 0. 30. E. This place is all copyhold, holden chiefly under the duchy of Lancaster, the manor having, by Edward III. been granted to John of Gaunt, duke of Lancaster. There are two fairs, the 23d of March, and the last Tuesday in September. It has a market on Tuesdays and Saturdays. There is a Spa about a mile from the town, the waters of which are reckoned a sovereign remedy for almost all chronic disorders.—The river from hence to Coltishall, in its course to Yarmouth, has been made navigable; distance about ten miles, in which space there are five locks. A free-school was founded here by Robert Jennys, mayor of Norwich, in 1517, and endowed with 101. a year, paid by the treasurer of the great hospital at Norwich, of which the mayor, &c. of the city are governors, and the manor of Fakenham in Shropham is bound for it; and archbishop Parker founded two scholarships in Corpus Christi, commonly called Bennet, college, in Cambridge, and appropriated them to that and Wymondham school; one of the scholars must be born in Aylsham; but it is sufficient for the other to be educated at the free-school there, and he must be sent up to college by the nomination of the mayor and court of Norwich: the other to be admitted by the college without any such nomination.

ALESIA, called *Alexia* by Livy and others; an ancient town of the Mandubii, a people of Celtic Gaul; situated, according to Cæsar, on a very high hill, whose foot was washed on two sides by two rivers. The town was of such antiquity, that Diodorus Siculus relates it was built by Hercules. It is supposed to be the city of *Alife*, in the duchy of Burgundy, not far from Dijon.

ALE SILVER, *f.* a rent or tribute annually paid to the lord mayor of London, by those that sell ale within the liberty of the city.

ALESTAKE, *f.* a stake set up at fairs on merry meetings in the country, with a sign thereon, denoting that ale is sold there.

ALET, a town of France, in Lower Languedoc. It is remarkable for its baths, and for the grains of gold and silver found in the stream which runs from the Pyrean mountains, at the foot of which it stands. It is seated on the river Aude, fifteen miles S. of Carcassone, and thirty-seven N. W. of Narbonne. E. lon. 2. 5. N. lat. 42. 59.

ALEMASTER, *f.* [from *ale* and *master*.] An officer appointed in every court leet, and sworn to look to the assize and the goodness of bread and ale, or beer, within the precincts of that lordship.

ALETRIS, *f.* [*alew*, to grind.] In botany, a genus of the hexandria monogynia class, ranking in the natural order of lilia or liliacæ. The generic characters are—Calyx: none. Corolla: one-petalled, ovate-oblong, hexangular, funnel-shaped, semisefid, very much wrinkled; the divisions lanceolate, acuminate, spreading, erect, permanent. Stamina: filaments awl-shaped, length of the corolla, inserted into the base of the divisions: antheræ oblong, erect. Pistillum: germ ovate: style subulate, length of the stamens; stigma trifid. Pericarpium: an ovate, three-cornered, acuminate, three-celled, capsule. Seeds: very many. The stamens not being alternate, with, but opposite to, the segments of the corolla; and this being very much wrinkled, and in a manner farinaceous, these circumstances render this a genus perfectly distinct. *Essential Character.* Corolla, funnel-shaped. Stamina, inserted

inserted into the base of the segments; capsule three-celled.

Species. 1. *Aletris farinosa*, or American aletris: stemless, leaves lanceolate membranaceous, flowers alternate. This species has a tuberous root, from which arise several lanceolate leaves, and a naked stalk supporting a spike of flowers placed alternately, of a greenish white colour; these appear in June, but are rarely succeeded by seeds in England. It grows naturally in North America. The natives use it frequently in coughs, and in the pleurisy.

2. *Aletris Capensis*, or waved-leaved aletris: stemless, leaves lanceolate waved, spike ovate, flowers nodding. Justieu doubts whether this be of the same genus with the other species. Native of the Cape of Good Hope. It flowers with us from November to April; and was introduced in 1768 by Mr. William Malcolm.

3. *Aletris glauca*, or glaucous aletris: stemless, leaves lanceolate glaucous, flowers nodding with a spreading border. This differs from the foregoing in having glaucous leaves scarcely waved; whereas in that they are very much waved, and of a bright green on their upper surface. The flowers are smaller and narrower. This is also a native of the Cape of Good Hope, flowers in January, and was introduced in 1781 by Geo. Wynch, Esq.

4. *Aletris uvaria*, or great orange-flowered aletris: stemless, scape longer than the sword-shaped keeled leaves. *Aletris* or *aloe uvaria*, commonly called iris uvaria, has very long, narrow, triangular, leaves; shaped like those of the bull-rush; the flowers are produced in close thick spikes, upon stalks near three feet high. They are of an orange-colour, so that when the plants are strong, and produce large spikes, they make a fine appearance. It flowers in August and September. There is a variety of this with narrower leaves, and longer spikes of flowers. It is a native of the Cape of Good Hope, and was cultivated in the botanic garden at Chelsea in 1707.

5. *Aletris pumila*, or small orange-flowered aletris: stemless, scape shorter than the linear sharply-keeled leaves. This also is a native of the Cape, where it was discovered by Mr. Francis Masson. It was introduced in 1774, and flowers from September to November.

6. *Aletris hyacinthoides*: stemless, leaves lanceolate fleshy, flowers geminate. A variety of this species was cultivated in 1690 in the royal garden at Hampton Court, and is known by the title of *Guinea aloe*; it has thick fleshy roots like those of the flag, creeping far where they have room. The leaves arise singly from the root, and are near a foot and a half long, stiff, waved, and proceeding immediately from the root, as do also the flower-stems; which, when the roots are strong, are often a foot and a half high, adorned almost the whole length with flowers of a clear white, seldom continuing in beauty more than two or three days, and never producing seeds in England.

7. *Aletris fragrans*, or sweet-scented aletris: caulescent, leaves lanceolate loose. This species rises with an herbaceous stalk to the height of eight or ten feet, having many joints, and is adorned towards the top with a head of leaves, which are of a deep green colour, and reflex at their ends, embracing the stalks with their base. The flower-stems arise from the centre of the heads, which are generally two feet high, branching out on each side, and fully garnished with white flowers, in shape somewhat like those of the second sort; but these open only in the evening, when they emit a most fragrant odour, but close again in the morning, and are not of long duration.

8. *Aletris Cochinchinensis*: caulescent, leaves lanceolate-linear reflex, flowers paniced. Native of Cochinchina, and is cultivated in their gardens. The natives use the juice of the leaves to dye green, and eat the flowers.

Propagation and Culture. The first species is tolerably hardy, and may be preserved through the winter, if sheltered under a hot-bed frame; but, as the seeds do not ripen here, and the roots increase but slowly, the plants are at present rare in England. The roots of the second sort must be planted in pots, filled with light earth, that they

may be sheltered in a dry airy glass-case in winter, being too tender to thrive in the open air in England; therefore the pots should be removed into shelter in October, and during the winter season should be sparingly watered. In May they should be placed abroad in a sheltered situation, and in warm weather must be frequently refreshed with water; with this management the plants will flower; but, as they do not perfect their seeds here, nor increase fast by roots, the plants are scarce in England. The fourth sort is hardy enough to live abroad in mild winters, provided it be planted in a warm border, and a dry soil; but, as it is often destroyed in severe winters, some plants should be kept in pots to preserve the sort. This is propagated by seeds, which the plants generally produce in plenty; the seeds must be sown in pots soon after they are ripe, and in winter should be sheltered under a common hot-bed frame; in the spring, the plants will come up, when they should be inured to bear the open air by degrees; and, when they are large enough to be removed, some of them should be planted in pots, and the others in a warm border, where they will require to be sheltered the following winter, as they will not have acquired sufficient strength to resist the cold. The sixth sort with its varieties, and the sweet-scented aletris, are too tender to live through the winter in England, unless they are placed in a warm stove; nor will they produce their flowers, if the plants are not plunged into a tan-bed; for, although they may be preserved in a dry stove, yet they make but little progress there; in a tan-bed they will advance faster, the leaves will be much larger, and the whole plant much stronger. The Guinea aletris or aloe will sometimes flower in a dry stove, but the flower-stems will be weak, and do not produce half so many flowers as when in tan; but the fragrant aletris has not yet flowered here when kept in the dry stove. The sixth sorts propagate very fast by their creeping roots, which send up many heads; these may be cut off in June, and laid in the stove for a fortnight, that the part wounded may be healed over; they should then be planted in small pots, filled with light sandy earth, and plunged into a moderate hot-bed of tanners' bark, giving them but little water till they have put out good roots; then they must be treated like other tender succulent plants, never setting them abroad in summer. The seventh sort is easily propagated from the side-heads, which it puts out after flowering. These heads, when taken from the stems, should be laid in the stove for a week, for their wounds to heal, before they are planted in pots, when they may be treated in the same manner as the others.

ALEVAT, *f.* [from *ale* and *vat*.]—The tub in which the ale is fermented.

ALEURITES, *f.* [*αλευρίτης*, farinaceous, various parts of the tree having a meal scattered over them.] In botany, a genus of the monoecia monadelphica class, of the natural order of tricoceæ. The generic characters are—Male flowers. Calyx: perianthium three-cleft, very short; clefts ovate, obtuse. Corolla: petals five, oblong, spreading, obtuse, much longer than the calyx; nectary, five scales, somewhat cornered, very short, at the bases of the petals. Stamina: filaments numerous, connate into a conic columnar receptacle; antheræ roundish. Female flowers few, in the same corymb. Calyx, corolla, and nectary: as in the male, but larger. Pistillum: germ conic superior; style none; stigmata two, very short. Pericarpium: berry large, globose, two-seeded. Seeds: two, globose, coated with a double bark.

There is but one species, which is called *aleurites triloba*.

ALEUROMANCY, *f.* the same with what was otherwise called *alphitomantia*, and *crithomantia*; and means an ancient kind of divination, performed by means of meal or flour.

ALEW, *f.* Clamour; outcry. Used mostly in courting the hare.

ALEWASHED, *adj.* Steeped or soaked in ale: not now

J. Chapman sc.

ALEXANDER THE GREAT.

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now in use.—What a beard of the general's cut, and a horrid suit of the camp, will do among foaming battles and *alewashed* wits, is wonderful to be thought on. *Shakespeare*.

ALEWIFE, f. A woman that keeps an alehouse.

ALEXANDER the GREAT, king of Macedon, was born at Pella, the first year of the 106th Olympiad, the 398th from the building of Rome, and the 356th before the birth of Christ. His father Philip was descended from Hercules, and his mother Olympias from Achilles.

When Alexander was fifteen years of age, he was delivered to the tuition of Aristotle. He discovered very early a mighty spirit, and symptoms of that vast and immoderate ambition, which was afterwards to make him the scourge of mankind, and the pest of the world. One day, when it was told him that Philip had gained a battle, instead of rejoicing he looked much chagrined; and said, that, "if his father went on at this rate, there would be nothing left for him to do." Upon Philip's shewing some little wonder, that Alexander did not engage in the Olympic games, "Give me (said the youth) kings for my antagonists, and I will present myself at once." The taming and managing of the famous Bucephalus is always mentioned among the exploits of his early age. This remarkable horse was brought from Thessaly, and purchased at a very great price; but upon trial he was found so wild and vicious, that neither Philip nor any of his courtiers could mount or manage him. In short, he was upon the point of being sent back as an intractable and useless beast, when Alexander, expressing his grief, that so noble a creature should be rejected and set at nought, merely because nobody had the dexterity to manage him, was at length permitted to try what he could do. Alexander had perceived, that the frolicsome spirit and wildness of Bucephalus proceeded solely from the fright which the animal had taken at his own shadow; whereupon, turning his head directly to the sun, and gently approaching him with address and skill, he threw himself at length upon him; and, though Philip at first was extremely distressed and alarmed for his son, yet when he saw him safe, and perfectly master of his steed, he received him with tears of joy, saying, "O my son, thou must seek elsewhere a kingdom, for Macedonia cannot contain thee." One more instance of this very high spirit shall suffice. When Philip had repudiated Olympias for infidelity to his bed, the young prince felt the most lively resentment on the occasion; yet, being invited by his father to the nuptials with his new wife, he did not refuse to go. In the midst of the entertainment, Attalus, a favourite of Philip, had the imprudence to say, that the Macedonians must implore the gods to grant the king a lawful successor. "What, you scoundrel! do you then take me for a bastard?" says Alexander; and threw a cup that instant at his head. Philip, intoxicated with wine, and believing his son to be author of the quarrel, rushed violently towards him with his sword; but, slipping with his foot, fell prostrate upon the floor. Upon which, said Alexander insultingly, "See, Macedonians, what a general you have for the conquest of Asia, who cannot take a single step without falling;" for Philip had just before been named for this expedition in a common assembly of the Greeks, and was preparing for it, when he was murdered at a feast by Pausanias.

Alexander, now twenty years of age, succeeded his father as king of Macedon: he was also chosen, in room of his father, generalissimo, in the projected expedition against the Persians; but the Greeks, agreeably to their usual fickleness, deserted from him, taking the advantage of his absence in Thrace and Illyricum, where he began his military enterprises. He hastened immediately to Greece, when the Athenians and other states returned to him at once; but, the Thebans standing out, he directed his arms against them, slew a prodigious number, and destroyed their city; sparing nothing but the descendants of the house of Pindar, out of respect to the memory of that poet. This happened in the second year of the 3d Olym-

piad. It was about this time that he went to consult the oracle at Delphi; when, the priests pretending that it was not on some account lawful for her to enter the temple then, he, being impatient, hauled her along, and occasioned her to cry out, "Ah, my son! there is no resisting you:" upon which Alexander, seizing the words as ominous, replied, "I desire nothing farther: this oracle suffices." It was also probably at this time that the remarkable interview passed between our hero and Diogenes the cynic. Alexander had the curiosity to visit this philosopher in his tub, and complimented him with asking, "if he could do any thing to serve him?" "Nothing (said the brute) but to stand from betwixt me and the sun." The attendants were expecting what resentment would be shewn to this savage behaviour; when Alexander surprised them by saying, "Positively, if I was not Alexander, I would be Diogenes."

Having settled the affairs of Greece, and left Antipater as his viceroy in Macedonia, he passed the Hellespont, in the third year of his reign, with an army of no more than 30,000 foot, and 4,500 horse; and, with these forces, he overturned the Persian empire. His first battle was at the Granicus, a river of Phrygia, in which the Persians were routed. His second was at Issus, a city of Cilicia, where he was also victorious in an eminent degree: for the camp of Darius, with his mother, wife, and children, fell into his hands; and the humane and generous treatment which he shewed them, is justly reckoned the noblest and most amiable passage of his life.

While he was in this country, he caught a violent fever by bathing when hot in the cold waters of the river Cydnus; and this fever was made more violent from his impatience at being detained by it. The army was under the utmost consternation, and no physician durst undertake the cure. At length one Philip of Acarnan desired time to prepare a potion, which he was sure would cure him; and, while this potion was preparing, Alexander received a letter from his most intimate confidant Parmenio, informing him, that this Acarnan was a traitor, and employed by Darius to poison him at the price of a thousand talents and his sister in marriage. What a situation for a sick prince! The same greatness of soul, however, which accompanied him upon all occasions, did not forsake him here. He did not seem to his physician under any apprehensions; but, after receiving the cup into his hands, delivered the letter to the Acarnan, and with eyes fixed upon him drank it off. The medicine at first acted so powerfully, as to deprive him of his senses, and then without doubt all concluded him poisoned; however, he soon got better, and was restored to his army perfectly safe and well.

Passing through Cilicia, he marched forwards to Phœnicia, which all surrendered to him, except Tyre; and it cost him a siege of seven months to reduce that city. The vexation of Alexander, at being unseasonably detained by the obstinacy of the Tyrians, occasioned a mighty destruction and carnage; and the cruelty he exercised here is inexcusable.

When he came before the city of Gaza, he found it provided with a strong garrison, commanded by Betis, one of Darius's eunuchs. This governor, who was a brave man, and very faithful to his sovereign, defended it with great vigour against Alexander. As this was the only inlet or pass into Egypt, it was absolutely necessary for him to conquer it, and therefore he was obliged to besiege it. But although every art of war was employed, notwithstanding his soldiers fought with the utmost intrepidity, he was forced to lie two months before it. Exasperated at its holding out so long, and his receiving two wounds, he was resolved to treat the governor, the inhabitants, and soldiers, with a barbarity absolutely inexcusable; for he cut ten thousand men to pieces, and sold all the rest with their wives and children for slaves. When Betis, who had been taken prisoner in the last assault, was brought before him, Alexander, instead of using him kindly, as his valour and fidelity justly merited, this young monarch,

monarch, who otherwise esteemed bravery even in an enemy, fired on that occasion with an insolent joy, spoke thus to him: "Betis, thou shalt not die the death thou desirest; prepare therefore to suffer all the torments which revenge can invent." Betis, looking upon the king with not only a firm but a haughty air, did not make the least reply to his menaces; upon which the king, more enraged than before at his disdainful silence, "Observe (said he), I beseech you, that dumb arrogance! Has he bended his knee? Has he spoken but so much as one submissive word? But I will conquer this obstinate silence, and will force groans from him, if I can draw nothing else." At last Alexander's anger rose to fury, his conduct now beginning to change with his fortune: upon which he ordered a hole to be made through his heels, when a rope being put through them, and this being tied to a chariot, he ordered his soldiers to drag Betis round the city till he died. He boasted his having imitated upon this occasion Achilles, from whom he was descended, who, as Homer relates, caused the dead body of Hector to be dragged in the same manner round the walls of Troy; as if a man ought to pride himself for having imitated so ill an example. Both were very barbarous; but Alexander was much more so in causing Betis to be dragged alive, and for no other reason than because he had served his sovereign with bravery and fidelity, by defending a city with which he had intrusted him; a fidelity that ought to have been admired, and even rewarded, by an enemy, rather than punished in so cruel a manner.

After besieging and taking Gaza, he went to Jerusalem, where he was received by the high priest; and, making many presents to the Jews, sacrificed in their temple. He told Jadduas, for that was the priest's name, that he had seen in Macedonia a god, in appearance exactly resembling him, who had exhorted him to this expedition against the Persians, and given him the firmest assurance of success. Afterwards, entering Egypt, he went to the oracle of Jupiter Ammon, and upon his return built the city of Alexandria. It was now that he took it into his head to assume divinity, and to pretend himself the son of Jupiter Ammon. To soothe and cherish this ridiculous pretension, there were not wanting flatterers, those common pests of courts, who are more dangerous to princes than the arms of their enemies. With this view he appointed a festival, and made an incredibly pompous banquet; to which he invited the greatest lords of his court, both Macedonians and Greeks, and most of the highest quality among the Persians. With these he sat down at table for some time; after which he withdrew. Upon this Cleon, one of his flatterers, began to speak; and expatiated very much on the praises of the king, as had before been agreed upon. He made a long detail of the high obligations they had to him; all which, he observed, they might acknowledge and repay at a very easy expence, merely with two grains of incense, which they should offer him as to a god, without the least scruple, since they believed him such. To this purpose he cited the example of the Persians; and added, that, in case the rest should not care to pay this justice to Alexander's merit, he himself was resolved to shew them the way, and to worship him in case he should return into the hall. But that all of them must do their duty; especially those who professed wisdom, and ought to serve the rest as an example of the veneration due to so great a monarch. It appeared plainly that this speech was directed to Callisthenes. He was related to Aristotle, who had presented him to Alexander, his pupil, that he might attend upon that monarch in the war of Persia. He was considered, upon account of his wisdom and gravity, as the fittest person to give him such wholesome counsels as were most likely to preserve him from those excesses into which his youth and fiery temper might hurry him. This philosopher seeing that every one on this occasion continued in deep silence, and that the eyes of the whole assembly were fixed upon him, addressed himself to Cleon in the following words:—"Had the king been present

when thou madest thy speech, none among us would have attempted to answer thee; for he himself would have interrupted thee; and not have suffered thee to prompt him to assume the customs of barbarians, in casting an odium on his person and glory, by so servile an adulation. But, since he is absent, I will answer thee in his name. I consider Alexander as worthy of all the honours that can be paid a mortal; but there is a difference between the worship of the gods and that of men. The former includes temples, altars, prayers, and sacrifices; the latter is confined to commendations only, and awful respect.—We salute the latter, and look upon it as glorious to pay them submission, obedience, and fidelity; but we adore the former. We institute festivals to their honour, and sing hymns and spiritual songs to their glory. We must not therefore confound things, either by bringing down the gods to the condition of mortals, or by raising a mortal to the state of a god. Alexander would be justly offended should we pay to another person the homage due to his sacred person only; ought we not to dread the indignation of the gods as much, should we bestow upon mortals the honour due to them alone? I am sensible that our monarch is vastly superior to the rest; he is the greatest of kings, and the most glorious of all conquerors; but then he is a man, not a god.—The Greeks did not worship Hercules till after his death; and then not till the oracle had expressly commanded it. The Persians are cited as an example for our imitation; but how long is it that the vanquished have given law to the victor? Can we forget that Alexander crossed the Hellespont, not to subject Greece to Asia, but Asia to Greece?" The deep silence which all the company observed whilst Callisthenes spoke was an indication, in some measure, of their thoughts. The king, who stood behind the tapestry all the time, heard whatever had passed. He therefore ordered Cleon to be told, that, without insisting any farther, he would only require the Persians to fall prostrate, according to their usual custom; a little after which he came in, pretending he had been busied in some affair of importance. Immediately the Persians fell prostrate to adore him. Polyperchon, who stood near him, observing that one of them bowed so low, that his chin touched the ground, bade him in a rallying tone of voice to strike harder. The king, offended at this joke, threw Polyperchon into prison. As for Callisthenes, the king determined to get rid of him, and therefore laid to his charge a crime of which he was no way guilty. Accordingly, he was thrown into a dungeon, loaded with irons, and the most grievous torments were inflicted on him, in order to extort a confession of his guilt. But he insisted upon his innocence to the last, and expired in the midst of his tortures.

Nothing has reflected a greater dishonour on Alexander's memory than this unjust and cruel death of Callisthenes; and by this dreadful example he deprived all virtuous men of the opportunity of exhorting him to those things which were for his true interest. From that instant no one spoke with freedom in the council; even those who had the greatest love for the public good, and a personal affection for Alexander, thought themselves not obliged to undeceive him. After this, nothing was listened to but flattery, which gained such an ascendancy over that prince, as entirely depraved him, and justly punished him, for having sacrificed, to the wild ambition of having adoration paid him, the most virtuous man about his person. "The murder of this philosopher (says Seneca) was a crime of so heinous a nature, as entirely obliterates the glory of all his other actions."

His object now was to overtake and attack Darius in another battle; and this battle was fought at Arbela, when victory, granting every thing to Alexander, put an end to the Persian empire. Darius had offered his daughter in marriage, and part of his dominions, to Alexander, and Parmenio advised him to accept the terms: "I would (says he) if I was Alexander;" "And so would I (replied the conqueror) if I was Parmenio." The same Parmenio, counselling

counselling the prince to take the advantage of the night in attacking Darius, "No (said Alexander), I would not steal a victory." Darius owed his escape from Arbela to the swiftness of his horse; and, while he was collecting forces to renew the war, was insidiously slain by Bessus, governor of the Bactrians. Alexander wept at the fate of Darius; and, afterwards procuring Bessus to be given up to him, punished the inhuman murderer according to his deserts. From Arbela Alexander pursued his conquests eastward; and every thing fell into his hands, even to the Indies. Here he was opposed by king Porus, whom however he subdued and took. Porus was a man of spirit, and his spirit was not destroyed even by his defeat; for, when Alexander asked him, "how he would be treated," he answered very intrepidly, "like a king;" which it is said, so pleased the conqueror, that he ordered the greatest attention to be paid him, and afterwards restored him to his kingdom. Having ranged over all the east, and made a great part of the Indies provinces of his empire, he returned to Babylon, where he died in the thirty-third year of his age.

The character of this hero is equally composed of very great virtues and very great vices. He had no mediocrity in anything but his stature; in his other properties, whether good or bad, he was all extremes. His ambition rose even to madness. His father was not at all mistaken in supposing the bounds of Macedon too small for his son: for how could Macedon bound the ambition of a man, who reckoned the whole world too small a dominion? He wept at hearing the philosopher Anaxarchus say, that there was an infinite number of worlds: his tears were owing to his despair of conquering them all, since he had not yet been able to conquer one. Livy, in a short digression, has attempted to enquire into the events which might have happened, if Alexander, after the conquest of Asia, had brought his arms into Italy? Doubtless things might have taken a very different turn with him; and all the grand projects, which succeeded so well against an effeminate Persian monarch, might easily have miscarried if he had engaged with the rough hardy Roman armies. And yet the vast aims of this mighty conqueror, if seen under another point of view, may appear to have been confined in a very narrow compass; since, as we are told, the utmost wish of that great heart, for which the whole earth was not big enough, was, after all, to be praised by the Athenians; for it is related, that the difficulties he encountered in order to pass the Hydaspes forced him to cry out, "O Athenians, could you believe to what dangers I expose myself for the sake of being celebrated by you!" But Bayle affirms, that this was quite consistent with the vast unbounded extent of his ambition, as he wanted to make all future time his own, and be an object of admiration to the latest posterity; yet did not expect this from the conquest of worlds, but from books. He was perfectly in the right, says Bayle; "for, if Greece had not furnished him with good writers, he would long ago have been as much forgotten as the kings who reigned in Macedon before Amphitryon."

Alexander has been much praised upon the score of continency. Indeed, the fire of his early youth appeared so cold towards women, that his mother suspected him to be impotent; and, to satisfy herself in this point, did, with the consent of Philip, procure a very handsome courtesan to lie with him; whose caresses, however, were all to no purpose. His behaviour afterwards to the Persian captives shews him to have had a great command over himself in this particular. The wife of Darius was a finished beauty; her daughters likewise were all beauties; yet this young prince, who had them in his power, not only bestowed on them all the honours due to their high rank, but managed their reputation with the utmost delicacy. They were kept as in a cloister, concealed from the world, and secured from the reach of every dishonourable (not only attack, but) imputation. Darius, in his expiring moments, hearing the kind treatment they had met with,

could not help lifting up his dying hands towards heaven, and wishing success to so wise and generous a conqueror, who could govern his passions at so critical a time. Plutarch informs us more particularly, that the princesses lived so retired in the camp, according to their own desire, that they were not seen by any person, except their own attendants; nor did any other person dare to approach their apartments. After the first visit, which was a respectful and ceremonious one, Alexander, to avoid exposing himself to the dangers of human frailty, made a solemn resolution never to visit Darius's queen any more. He, himself, informs us of this memorable circumstance, in a letter written by him to Parmenio, in which he commanded him to put to death certain Macedonians, who had forced the wives of some foreign soldiers. In this letter was the following paragraph: "For, as to myself, it will be found, that I neither saw, nor would see, the wife of Darius; and did not suffer any one to speak of her beauty before me."

The Amazon queen Thalestris could not obtain from him a compliance with her gallant request till after a delay of thirteen days. In the mean time, what are we to conclude from his causing his favourite mistress Pancaete to be drawn naked by Apelles, though it is true he gave her to the painter, who fell in love with her? What of that immoderate love of boys, which Athenæus relates of him? What of that prodigious number of wives and concubines which he kept?

It was a custom with Alexander the Great to oblige the captive women whom he carried along with him to sing songs after the manner of their country. He happened among these women to perceive one who appeared in deeper affliction than the rest; and who by a modest, and at the same time a noble, confusion, discovered a greater reluctance than the others to appear in public. She was a perfect beauty; which was very much heightened by her bashfulness, whilst she threw her eyes on the ground, and did all she could to conceal her face. The king soon imagined, by her air and mien, that she was not of vulgar birth; and, enquiring into it, the lady answered, that she was grand-daughter to Oëtius, who not long before had swayed the Persian sceptre, and daughter of his son; that she had married Hytaspes, who was related to Darius, and general of a great army. Alexander being touched with compassion, when he heard the unhappy fate of a princess of the blood royal, and the sad condition to which she was reduced, not only gave her her liberty, but returned all her possessions; and caused her husband to be sought for, in order that she might be restored to him.

This prince shewed sometimes so tender and humane a disposition, as to be sensible of the afflictions of persons in the lowest rank. A poor Macedonian soldier was one day driving before him a mule, laden with gold for the king's use; the beast being so tired that he was not able either to go or sustain the load, the mule-driver took it up and carried it, but with great difficulty, a considerable way. Alexander seeing him just sinking under the burthen, and going to throw it on the ground, in order to ease himself from it, cried out, "Friend, do not be weary yet; try and carry it quite through to thy tent, for it is all thy own."

Olympias, Alexander's own mother, was of such an unhappy disposition, that he would never let her have any concern in the affairs of the government. She used frequently to make very severe complaints on that account; but he always submitted to her ill-humour with great mildness and patience. Antipater, one of his friends, having one day written a long letter against her, the king, after reading it, replied, "Antipater does not know that one single tear shed by a mother will obliterate ten thousand such letters as this." A behaviour like this, and such an answer, shew, at one and the same time; that Alexander was both an affectionate son and an able politician.

As Alexander drew near the city of Persepolis, he perceived a large body of men, who exhibited a memorable

example of the greatest misery. These were about four thousand Greeks, very far advanced in years; who, having been made prisoners of war, had suffered all the torments which the Persian tyranny could inflict. The hands of some had been cut off, the feet of others, and others again had lost their noses and ears; after which, the Persians, having impressed by fire barbarous characters on their faces, had the inhumanity to keep them as so many laughing-stocks, with which they sported perpetually. They appeared like so many shadows rather than men; speech being almost the only thing by which they were known to be such. Alexander could not refrain from tears at this sight; and, as they unanimously besought him to commiserate their condition, he bade them with the utmost tenderness not to despond; and assured them, that they should again see their wives and native country. This proposal, which one might suppose should naturally have filled them with joy, seemed to heighten their misery; and, with tears in their eyes, "How will it be possible (said some of them) for us to appear publicly before all Greece, in the dreadful condition to which we are reduced: a condition still more shameful than dissatisfactory? The best way to bear misery is to conceal it; and no country is so sweet to the wretched as solitude, and an oblivion of their past misfortunes." They therefore besought the king to permit them to continue in a country where they had spent so many years, and to end their days among those who were already accustomed to their misfortunes. Alexander granted their request; and presented each of them three thousand drachmas, five men's suits of clothes, the same number of women's, two couple of oxen to plough their lands, and corn to sow them. He commanded the governor of the province not to suffer them to be molested in any manner; and ordered that they should be free from taxes and tributes of every kind. Such behaviour as this was truly royal.

During his stay in Persopolis, he entertained his friends at a banquet, at which his guests drank, as usual, to excess. Among the women who were admitted to it masked, was Thais, the courtesan, a native of Attica, and at that time mistress to Ptolomy, who afterwards was king of Egypt. About the end of the feast, during which she had studiously endeavoured to please the king in the most artful and delicate manner, she said, with a gay tone of voice, "That it would be a matter of inexpressible joy to her, were she permitted (masked as she was, and in order to end the entertainment hobly) to burn the magnificent palace of Xerxes, who had burned Athens; and to set it on fire with her own hand, in order that it might be said in all parts of the world, that the women who followed Alexander, in his expedition to Asia, had taken much better vengeance on the Persians, for the many calamities they had brought on the Grecians, than all the generals who had fought for them, both by sea and land." All the guests applauded the discourse; when immediately the king rose from table, (his head being crowned with flowers,) and, taking a torch in his hand, he advanced forward to execute this mighty exploit. The whole company follow him, breaking out into loud exclamations; and afterwards, singing and dancing, they surround the palace. All the rest of the Macedonians, at this noise, ran in crowds with lighted tapers, and set fire to every part of it. However, Alexander was sorry, not long after, for what he had done; and thereupon gave orders for extinguishing the flames, but it was too late.

His excesses with regard to wine were notorious, and beyond all imagination; and he committed, when drunk, a thousand extravagancies.

Clitus was one of Alexander's best friends, an old officer, who had fought under his father Philip, and signalized himself on many occasions. At the battle of the Granicus, as Alexander was fighting bare-headed, and Rosaces had his arm raised in order to strike him behind, he covered the king with his shield, and cut off the barbarian's hand. Hellenice, his sister, had nursed Alexan-

der; and he loved her with as much tenderness as if she had been his own mother. As the king, from these several considerations, had a very great respect for Clitus, he intrusted him with the government of one of the most important provinces of his empire; and ordered him to set out the next day. In the evening, Clitus was invited to an entertainment, in which the king, after drinking to excess, began to celebrate his own exploits; and was so extremely lavish of self-commendation, that he even shocked those very persons who knew what he spoke was in general true. Clitus, who by this time, as well as the rest of the company, was equally intoxicated, began to relate the actions of Philip, and his wars in Greece, preferring them to whatever was done by Alexander. Though the king was prodigiously vexed, he nevertheless stifled his resentment; and it is probable that he would have quite suppressed his passion, had Clitus stopped there; but the latter growing more and more talkative, as if determined to exasperate and insult the king, he was commanded to leave the table. "He is in the right (says Clitus, as he rose up) not to bear free-born men at his table, who can only tell him truth. He will do well to pass his life among barbarians and slaves, who will pay adoration to his Persian girdle, and his white robe." The king, no longer able to suppress his rage, snatched a javelin from one of the guards, and would have killed Clitus on the spot, had not the courtiers withheld his arm, and Clitus been forced, with great difficulty, out of the hall. However, he returned into it that moment by another door, singing, with an air of insolence, verses reflecting highly on the prince, who, seeing the general near him, struck him with his javelin dead at his feet, crying out, at the same time, "Go now to Philip, to Parmenio, and to Attalus."

As soon as the king was capable of reflecting seriously on what he had done, his crime displayed itself to him in the blackest and most dreadful light; for, though Clitus had committed a great and inexcusable fault, yet it must be confessed, that the circumstances of the banquet extenuate in some degree, or throw, in some measure, a veil over, Clitus's conduct. When a king makes a subject his companion in a debauch, he seems, on such an occasion, to forget his dignity, and to permit his subjects to forget it also; he gives a sanction, as it were, to the liberties, familiarities, and sudden flights, which wine commonly inspires. A fault, committed under these circumstances, is always a fault; but then it ought never to be expiated with the blood of the offender. This Alexander had generosity enough to acknowledge; and at the same time perceived that he had done the vile office of an executioner, in punishing, by an horrid murder, the uttering some indiscreet words, which ought to be imputed to the fumes of wine. Upon this, he threw himself upon his friend's body, forced out the javelin, and would have dispatched himself with it, had he not been prevented by his guards. He passed that night and the next day in tears, stretched on the ground, and venting only groans and deep sighs.

Alexander, having invited several of his friends and general officers to supper, proposed a crown as a reward for him who should drink most. He who conquered on this occasion was Promachus, who swallowed fourteen measures of wine, that is, eighteen or twenty pints. After receiving the prize, which was a crown worth a talent, i. e. about a thousand crowns, he survived his victory but three days. Of the rest of his guests, forty died of their intemperate drinking.—When this same prince was at Babylon, after having spent a whole night in carousing, a second was proposed to him. He met accordingly, and there were twenty guests at table. He drank to the health of every person in company, and then pledged them severally. After this, calling for Hercules's cup, which held an incredible quantity, it was filled, when he poured it all down, drinking to a Macedonian of the company, Proteas by name; and afterwards pledged him

him again in the same furious and extravagant bumper. He had no sooner swallowed it, than he fell upon the floor. "Here then (cries Seneca, describing the fatal effects of drunkenness) this hero, unconquered by all the toils of prodigious marches, exposed to the dangers of sieges and combats, to the most violent extremes of heat and cold; here he lies subdued by his intemperance, and struck to the earth by the fatal cup of Hercules." In this condition he was seized with a fever, which, in a few days, terminated in death. He was thirty-two years and eight months old, of which he had reigned twelve. "No one (says Plutarch and Arrian) suspected then that Alexander had been poisoned; the true poison which brought him to this end was wine, which has killed many thousands besides Alexander."

In short, to sum up the character of this prince, we cannot be of opinion, that his good qualities did in any wise compensate for his bad ones. Heroes make a noise; their actions glare, and strike the senses forcibly; while the infinite destruction and misery they occasion lies more in the shade, and out of sight. One good legislator is worth all the heroes that ever did or will exist. See MACEDON.

ALEXANDER AB ALEXANDRO, a Neapolitan lawyer, of great learning, who flourished toward the end of the 15th and beginning of the 16th century. He followed the profession of the law first at Naples, afterwards at Rome; but he devoted all the time he could spare to the study of polite literature; and at length he entirely left the bar, that he might lead a more easy and agreeable life with the Muses. The particulars of his life are to be gathered from his work intitled *Genialium Dierum*. We are there informed, that he lodged at Rome, in a house that was haunted; and he relates many surprising particulars about the ghost. He says, also, that, when he was very young, he went to the lectures of Philadelphus, who explained at Rome the Tusculan questions of Cicero; he was there also when Nicholas Perot and Domitius Calderinus read their lectures upon Martial. The particular time when he died is not known; but he was buried in the monastery of the Olivets. Tiraquea wrote a learned Commentary upon his work, which was printed at Lyons in 1587, and re-printed at Leyden in 1673, with the notes of Dennis Godfrey, Christopher Colerus, and Nicholas Mercerus.

ALEXANDER (Neckham), an eminent English writer in the 12th and 13th centuries, born at St. Alban's, in Hertfordshire. In 1215 he was made abbot of Exeter, and died in 1227. He wrote several works, which were never published; but they are to be found in manuscript in the public libraries of England and other countries.

ALEXANDER (Noel), an indefatigable writer of the 17th century, born at Rouen in Normandy, in 1639. After finishing his studies at Rouen, he entered into the order of Dominican friars, and was professed there in 1655. Soon after he went to Paris, to go through a course of philosophy and divinity in the great convent, where he distinguished himself so, that he was appointed to teach philosophy there, which he did for twelve years. M. Colbert shewed him many marks of his esteem; and, being determined to omit nothing to perfect the education of his son, afterwards archbishop of Rouen, he formed an assembly of the most learned persons, whose conferences upon ecclesiastical history might be of advantage to him. Father Alexander was invited to this assembly, where he exerted himself with so much genius and ability, that he gained the particular friendship of young Colbert, who shewed him the utmost regard as long as he lived. These conferences gave rise to Alexander's design of writing an ecclesiastical history. This he executed with great assiduity, collecting and digesting the materials himself, and writing even the tables with his own hand. He completed his work in 1686. Towards the latter part of his life, he was afflicted with the loss of his sight; a most inexpressible misfortune to one whose whole pleasure was in study, yet he bore it with great patience and

resignation. He died merely of a decay of nature, in 1724, in the 86th year of his age.

ALEXANDER SEVERUS, emperor of Rome, succeeded Heliogabalus, about A. D. 222, when but sixteen years of age. His mother's name was Mammæa, and by her advice he in a great measure regulated his conduct. He applied himself to the reformation of abuses, the state having been greatly disordered by the vicious conduct of his predecessor; he was a most strict lover of justice, an encourager of learning and learned men, and favourable to the Christians. He made a successful expedition against the Persians; but, endeavouring to reform his troops, which had grown very licentious under the late bad government, they murdered him at the instigation of Maximinus in the 29th year of his age, together with his mother, A. D. 235.

ALEXANDER VI. (Pope), had four bastards when he was cardinal, for one of which he had so great affection, that he stuck at nothing to raise him. Designing to poison some cardinals, he was poisoned himself, A. D. 1503. See BORGIA.

ALEXANDER VII. (Pope). See CHIGI.

ALEXANDER, bishop of Lincoln in the reigns of Henry I. and Stephen, was a Norman by birth, and nephew of the famous Roger, bishop of Salisbury, who first made him archdeacon of Salisbury, and afterwards, by his interest with the king, raised him to the mitre. Alexander was consecrated at Canterbury, July 22, 1123. The year after his consecration, his cathedral church at Lincoln having been accidentally burnt down, he re-built it, and secured it against the like accident for the future by a stone roof. This prelate increased the number of prebends in his church, and augmented its revenues with several manors and estates. In imitation of the barons and some of the bishops, particularly his uncle the bishop of Salisbury, he built three castles; one at Banbury, another at Sleaford, and a third at Newark. He likewise founded two monasteries; one at Haverholm, for regular canons and nuns together, the other at Tame for white friars. He went twice to Rome in the years 1142 and 1144. The first time, he came back in quality of the pope's legate, for the calling a synod, in which he published several wholesome and necessary canons. In August 1147, he took a third journey to the pope, who was then in France; where he fell sick through the excessive heat of the weather, and, returning with great difficulty to England, he died in the 24th year of his prelacy.

ALEXANDER (William), earl of Stirling, an eminent Scots statesman and poet in the reigns of James VI. and Charles I. who, after travelling with the duke of Argyle as his tutor or companion, wrote a poetical complaint of his unsuccessful love of some beauty, under the title of Aurora. He then removed to the court of James VI. where he applied to the more solid parts of poetry, forming himself upon the plan of the Greek and Roman tragedians. In 1607, he published some dramatic performances, intitled The Monarchic Tragedies, dedicated to king James; who was so well pleased with them, as to call him his philosophical poet. After this, he is said to have written a Supplement to complete the third part of Sir Philip Sidney's Arcadia; and, in 1613, he produced a poem called Doomday, or the Great Day of Judgment. He was made gentleman-usher to prince Charles, and master of the requests; was knighted; and obtained a grant of Nova Scotia, where he projected the settlement of a colony, but afterwards sold it to the French. In 1626, he was made secretary of state for Scotland; was created first viscount, and then earl, of Stirling; and died in 1640.

ALEXANDER I. (St.) whom St. Ireneus reckons the fifth bishop of Rome, succeeded St. Evaristus in the year 109, and died in the year 119. There is no account of his life; and the epistles which are attributed to him are supposititious.

ALEXANDER

ALEXANDER II. king of Scotland, succeeded his father William in 1213, at sixteen years of age. He made an expedition into England, to oppose the tyranny of king John; who returned the visit, and was offered battle by Alexander, but refused it. He took the city of Carlisle from Henry III. which was afterwards exchanged for Berwick. Alexander died in 1249, in the fifty-first year of his age, and the thirty-fifth of his reign; and left for his successor his son Alexander III. who was crowned king of Scotland in 1249. The Cummings, lords of Scotland, took arms against him; and, taking him prisoner, confined him at Striveling; but he was afterwards released by his subjects. He married the daughter of Henry III. king of England; and was killed by a fall from his horse, on the 10th of April 1290, after having reigned forty-two, or according to others thirty-seven, years.

ALEXANDERS, *f.* in botany. See SMYRNIUM.

ALEXANDRETTA, by the Turks called Scanderoon, a town in Syria, at the extremity of the Mediterranean sea. It is the port of Aleppo, from which it is distant twenty-eight or thirty leagues. It is now, properly speaking, nothing else but a village, without walls, in which the tombs are more numerous than the houses, and which entirely owes its existence to the road which it commands. This is the only road, in all Syria, where vessels anchor on a solid bottom, without their cables being liable to chafe; but in other respects it has many inconveniences. It is infested, during winter, by a peculiar wind, called by the French sailors *le Ragulier*, which, rushing from the snowy summits of the mountains, frequently forces ships to drag their anchors several leagues. And, when the snow begins to cover the mountains which surround the gulph, tempestuous winds arise which prevent vessels from entering for three or four months together. The road also to Aleppo by the plain is infested by the Kurd robbers, who conceal themselves in the neighbouring rocks, and frequently attack and plunder the strongest caravans. But the worst circumstance is the extreme unwholesomeness of the air, occasioned here by stagnant waters and mephitic exhalations. It may be affirmed that this every year carries off one-third of the crews of the vessels which remain here during the summer; nay, ships frequently lose all their men in two months. The season for this epidemic disorder is principally from May to the end of September. It is an intermitting fever of the most malignant kind; and is accompanied with obstructions of the liver, which terminate in a dropsy. To this baneful epidemic, Alexandretta, from its situation, seems to be irretrievably condemned; for the plain on which the town is built is so low and flat, that the rivulets, finding no declivity, can never reach the sea. When they are swelled by the winter rains, the sea, swelled likewise by tempests, hinders their discharging themselves into it; hence their waters, forced to spread themselves, form lakes in the plain. On the approach of the summer, the waters, becoming corrupted by the heat, exhale vapours equally corrupt, and which cannot disperse, being confined by the mountains that encircle the gulph. The entrance of the bay besides lies to the west, which in those countries is the most unhealthy exposure when it corresponds with the sea.

A few years ago, M. Volney informs us, the merchants of Aleppo, disgusted with the numerous inconveniences of Alexandretta, wished to abandon that port and carry the trade to Latika. They proposed to the pacha of Tripoli to repair the harbour at their own expence, provided he would grant them an exemption from all duties for ten years. To induce him to comply with their request, the agent they employed talked much of the advantage which would, *in time*, result to the whole country:—"But what signifies it to me (replied the pacha) what may happen *in time*? I was yesterday at Marach; to-morrow, perhaps, I shall be at Djedda. Why should I deprive myself of present advantages, which are certain, for future benefits I cannot hope to partake?" The European factors were

obliged therefore to remain at Scanderoon. The only curiosity which they have to amuse strangers with consists in six or seven marble monuments, sent from England, on which you read: Here lies such a one, carried off in the flower of his age, by the fatal effects of a contagious air. The sight of these is the more distressing, as the languid air, yellow complexion, livid eyes, and dropsical bellies, of those who shew them, make it but too probable they cannot long escape the same fate.

ALEXANDRIA, now Scanderia, by Athenæus called *Xerxon*; a city of Lower Egypt, and for a long time its capital. This city was built by Alexander the Great, soon after the overthrow of Tyre, about 333 years before Christ. It is situated on the Mediterranean, twelve miles west of that mouth of the Nile anciently called *Canopicum*; and lies in E. lon. 30. 19. N. lat. 31. 10. Alexander is said to have been induced to build this city, on account of its being conveniently situated for a fine port; and so sudden was his resolution, that after he had directed where every public structure was to be placed, fixed the number of temples, and the deities to whom they should be dedicated, &c. there were no instruments at hand proper for marking out the walls, according to the custom of those times. Upon this, a workman advised the king to collect what meal was among the soldiers, and to sift it in lines upon the ground, whereby the circuit of the walls would be sufficiently marked out. This advice was followed; and the new method of marking out the walls was, by Aristander, the king's soothsayer, interpreted as a preface of the city's abounding with all the necessaries of life. Nor was he deceived in his prediction; for Alexandria soon became the staple, not only for merchandise; but also for all the arts and sciences of the Greeks.

Alexandria was a league and a half long by one-third in breadth, which made the circumference of its walls about four leagues. Lake Mareotis bathed its walls on the south, and the Mediterranean on the north. It was intersected lengthwise by straight parallel streets. This direction left a free passage to the northerly wind, which alone conveys coolness and salubrity into Egypt. A street of 2000 feet wide began at the gate of the sea, and terminated at the gate of Canopus. It was decorated by magnificent houses, by temples, and by public buildings. In this extensive range, the eye was never tired with admiring the marble, the porphyry, and the obelisks, which were destined at some future day to embellish Rome and Constantinople. This street, the handsomest in the universe, was intersected by another of the same breadth, which formed a square at their junction of half a league in circumference. From the middle of this great place, the two gates were to be seen at once, and vessels arriving under full sail from the north and from the south.

A mole of a mile in length stretched from the continent to the isle of Pharos, and divided the great harbour into two. That which is to the northward preserved its name. A dyke, drawn from the island to the rock whereon was built the Pharos, secured it from the westerly winds. The other was called *Eunostus*, or the Safe Return. The former is called at present the new, the latter the old, harbour: a bridge, that joins the mole to the city, served for a communication between them. It was raised on lofty pillars sunk into the sea, and left a free passage for ships. The palace, which advanced beyond the promontory of *Lochias*, extended as far as the dyke, and occupied more than a quarter of the city. Each of the Ptolemies added to its magnificence. It contained within its inclosure, the museum, an asylum for learned men, groves and buildings worthy of royal majesty, and a temple where the body of Alexander was deposited in a golden coffin. The infamous Selencus Cibyotæ violated this monument, carried off the golden coffin, and put a glass one in its place. In the great harbour was the little island of Anti-Rhodes, where stood a theatre, and a royal place of residence. Within the harbour of Eunostus was a smaller one, called *Kibotos*, dug by the hand of man, which communicated with Lake

Mareotis

Mareotis by a canal. Between this canal and the palace was the admirable temple of Serapis, and that of Neptune near the great place where the market was held. Alexandria extended likewise along the southern banks of the lake. Its eastern part presented to view the gymnasium, with its porticoes of more than 600 feet long, supported by several rows of marble pillars. Without the gate of Canopus was a spacious circus for the chariot races. Beyond that, the suburb of Nicopolis ran along the seashore, and seemed a second Alexandria. A superb amphitheatre was built there with a race-ground, for the celebration of the quinquennialia. Such is the description left us of Alexandria by the ancients, and above all by Strabo.

The architect employed by Alexander in this undertaking was the celebrated Dinocrates, who had acquired so much reputation by rebuilding the temple of Diana at Ephesus. The city was first rendered populous by Ptolemy Soter, one of Alexander's captains, who, after the death of the Macedonian monarch, being appointed governor of Egypt, soon assumed the title of king, and took up his residence at Alexandria, about 304 years before Christ.

In the thirtieth year of Ptolemy Soter's reign, he took his son Ptolemy Philadelphus partner with him in the empire; and by this prince the city of Alexandria was much embellished. In the first year of his reign the famous watch-tower of Pharos was finished. It had been begun several years before, by Ptolemy Soter; and, when finished, was looked upon as one of the wonders of the world. The same year, the island of Pharos itself, originally seven furlongs distant from the continent, was joined to it by a causeway. This was the work of Dexiphanes, who completed it at the same time that his son put the last hand to the tower. The tower was a large square structure of white marble; on the top of which fires were kept constantly burning, for the direction of sailors. The building cost 800 talents; which, if Attic, amounted to 165,000*l.* if Alexandrian, to twice that sum. The contrivance of the architect to usurp the glory of this great work to himself is well known.

This year also was remarkable for the bringing of the image of Serapis from Pontus to Alexandria. It was set up in one of the suburbs of the city called *Rhacotis*, where a temple was afterwards erected to his honour, suitable to the greatness of that stately metropolis, and called, from the god worshipped there, *Serapeum*. This structure, according to Ammianus Marcellinus, surpassed in beauty and magnificence all others in the world, except the capitol at Rome.—Within the verge of this temple was the famous Alexandrian library. It was founded by Ptolemy Soter, for the use of an academy he instituted in this city; and, by continual additions by his successors, became at last the finest library in the world, containing no fewer than 700,000 volumes. The method followed in collecting books for this library, was, to seize all those which were brought into Egypt by Greeks or other foreigners. The books were transcribed in the museum by persons appointed for that purpose; the copies were then delivered to the proprietors, and the originals laid up in the library. Ptolemy Euergetes, having borrowed from the Athenians the works of Sophocles, Euripides, and Æschylus, returned them only the copies, which he caused to be transcribed in as beautiful a manner as possible; presenting the Athenians at the same time with fifteen talents (upwards of 3000*l.* sterling) for the exchange.

As the museum was at first in that quarter of the city called *Bruchion*, near the royal palace, the library was placed there likewise; but, when it came to contain 400,000 volumes, another library, within the *Serapeum*, was erected by way of supplement to it, and on that account called the *daughter* of the former. In this second library 300,000 volumes, in process of time, were deposited; and the two together contained the 700,000 volumes already mentioned. In the war carried on by Julius Cæsar against the inhabitants of this city, the library in the *Bruchion*, with the 400,000 volumes it contained, was reduced to ashes.

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The library in the *Serapeum*, however, still remained; and here Cleopatra deposited 200,000 volumes of the Pergamean library, which Marc Antony presented her with. These, and others added from time to time, rendered the new library at Alexandria more numerous and considerable than the former; and, though it was often plundered during the revolutions and troubles of the Roman empire, yet it was again and again repaired, and filled with the same number of books. For 293 years Alexandria was held in subjection by the Ptolemies. Here follows a list of these princes, with the dates of their respective reigns.

Ptolemy the son of Lagus, surnamed Soter, reigned thirty-nine years, and died in the year of the world 3720. Ptolemy Philadelphus reigned thirty-nine years, and died in 3758. Ptolemy Euergetes reigned twenty-five years, and died in 3783. Ptolemy Philopator reigned seventeen years, and died in 3800. Ptolemy Epiphanes reigned twenty-four years, and died in 3824. Ptolemy Philometor reigned thirty-seven years, and died in 3861. Ptolemy Euergetes, or Physcon, reigned fifty-three years, part with his brother Philometor, and part alone. He died in 3888. Ptolemy Lathyrus reigned thirty-six years and six months. He died in 3923. Cleopatra, the daughter of Lathyrus and wife of Alexander I. reigned six months. Alexander I. the nephew of Lathyrus, was established in 3924, and died in 3943. Alexander II. the son of Alexander I. was dispossessed by the Alexandrians in 3939. Ptolemy Nothus, or Auletes, the son of Lathyrus, reigned thirteen years, and died in 3953. Ptolemy, surnamed *Dionysius* or *Bacchus*, reigned three years eight months, and died in 3957. Cleopatra reigned from 3957, and killed herself in 3974.

The city, as we have already observed, soon became extremely populous, and was embellished both by its own princes and the Romans; but, like most other noted cities of antiquity, hath been the seat of terrible massacres. About 141 years before Christ, it was almost totally depopulated by Ptolemy Physcon. That barbarous monster, without the least provocation, gave free liberty to his guards to plunder his metropolis and murder the inhabitants at their pleasure. The cruelties practised on this occasion cannot be expressed; and the few who escaped were so terrified that they fled into other countries. Upon this, Physcon, that he might not reign over empty houses, invited thither strangers from the neighbouring countries; by whom the city was repopulated, and soon recovered its former splendour. On this occasion many learned men having been obliged to fly, proved the means of reviving learning in Greece, Asia Minor, the islands of the Archipelago, and other places, where it was almost totally lost.

The new inhabitants were not treated with much more kindness by Physcon than the old ones had been; for, on their complaining of his tyrannical behaviour, he resolved on a general massacre of the young men. Accordingly, when they were one day assembled in the gymnasium, or place of their public exercises, he ordered it to be set on fire; so that they all perished, either in the flames, or by the swords of his mercenaries, whom the tyrant had placed at all the avenues.

Though Julius Cæsar was obliged to carry on a war for some time against this city, it seems not to have suffered much damage, except the burning of the library already mentioned. Before Cæsar left Alexandria, in acknowledgment of the assistance he had received from the Jews, he confirmed all their privileges there, and even engraved his decree on a pillar of brass. This, however, did not prevent the massacre of 50,000 of them in this city about the year of Christ 67.

The city of Alexandria seems to have fallen into decay soon after this, and to have forfeited many of its ancient privileges, though for what offence is not known; but when Adrian visited Egypt, about the year 141, it was almost totally ruined. He repaired both the public and private buildings, not only restoring the inhabitants to their

their ancient privileges, but heaping new favours upon them; for which they returned him their solemn thanks, and conferred upon him what honours they could while he was present; but, as soon as he was gone, they published the most bitter and virulent lampoons against him.

The fickle and satirical humour of the Alexandrians was highly disliked by Adrian, though he inflicted no punishment upon them for it; but, when they lampooned Caracalla, he did not let them escape so easily. That tyrant, in the year 215, when he visited their city, having become the subject of their foolish satires, ordered a general massacre by his numerous troops, who were dispersed all over the city. The inhuman orders being given, all were murdered, without distinction of age or sex; so that in one night's time the whole city floated in blood, and every house was filled with carcases. The monster who occasioned this had retired during the night to the temple of Serapis, to implore the protection of that deity; and, not yet fatiated with slaughter, commanded the massacre to be continued all the next day; so that very few of the inhabitants remained. As if even this had not been sufficient, he stripped the city of all its ancient privileges; suppressed the academy; ordered all strangers who lived there to depart; and, that the few who remained might not have the satisfaction of seeing one another, he cut off all communication of one street with another, by walls built for that purpose, and guarded by troops left there.

Notwithstanding this terrible disaster, Alexandria soon recovered its former splendour, as Caracalla was murdered a short time after. It was long esteemed the first city in the world, next to Rome; and we may judge of its magnificence, and the multitude of people contained in it, from the account of Diodorus Siculus, who relates, that in his time (forty-four years before Christ) Alexandria had on its rolls 300,000 freemen. Towards the middle of the sixth century, Amrou *Ebn el Aas*, Omar's general, took it by storm, after a siege of fourteen months, and with the loss of 23,000 men. Heraclius, then emperor of Constantinople, did not send a single ship to its assistance. This prince affords an example very rare in history; he had displayed some vigour in the first year of his reign, and then suffered himself to be lulled into idleness and effeminacy. Awakened suddenly from his lethargy by the noise of the conquests of Cosroes, that scourge of the east, he put himself at the head of his armies, distinguished himself as a great captain from his very first campaign, laid waste Persia for seven years, and returned to his capital covered with laurels: he then became a theologian on the throne, lost all his energy, and amused himself the rest of his life with disputing upon monotheism, whilst the Arabs were robbing him of the finest provinces of his empire. Deaf to the cries of the unfortunate inhabitants of Alexandria, as he had been to those of the people of Jerusalem, who defended themselves for two years, he left them a sacrifice to the fortunate ascendant of the indefatigable Amrou. All their intrepid youth perished with their arms in their hands. The victor, astonished at his conquest, wrote to the caliph, "I have taken the city of the west. It is of an immense extent. I cannot describe to you how many wonders it contains. There are 4000 palaces, 4000 baths, 12,000 dealers in fresh oil, 12,000 gardeners, 40,000 Jews who pay tribute, 400 comedians," &c. At this time, according to the Arabian historians, Alexandria consisted of three cities, viz. Menna, or the port, which included Pharos, and the neighbouring parts; Alexandria, properly so called, where the modern Scanderia now stands; and Nekita, probably the Necropolis of Josephus and Strabo.

At that time John, surnamed the grammarian, a famous Peripatetic philosopher, being in the city, and in high favour with Amrou Ebn al Aas the Saracen general, begged of him the royal library. Amrou replied, that it was not in his power to grant such a request; but that he would write to the khalif on that head; since, without knowing his pleasure, he dared not to dispose of a single book. He

accordingly wrote to Omar, who was then khalif, acquainting him with the request of his friend: to which the ignorant tyrant replied, That if these books contained the same doctrine with the koran, they could be of no use, since the koran contained all necessary truths; but, if they contained any thing contrary to that book, they ought not to be suffered; and therefore, whatever their contents were, he ordered them to be destroyed. Pursuant to this order, they were distributed among the public baths; where, for the space of six months, they served to supply the fires of those places, of which there was an incredible number in Alexandria.

After the city was taken, Amrou thought proper to pursue the Greeks who had fled farther up the country; and therefore marched out of Alexandria, leaving but a very slender garrison in the place. The Greeks, who had before fled on-board their ships, being apprised of this, returned on a sudden, surprised the town, and put all the Arabs they found therein to the sword: but Amrou, receiving advice of what had happened, suddenly returned, and drove them out of it with great slaughter; after which the Greeks were so intimidated, that he had nothing farther to fear from them.—A few years after, however, Amrou being deprived of his government by the khalif Othman, the Egyptians were so much displeased with his diffision that they inclined to a revolt; and Constantine the Greek emperor, having received intelligence of their disaffection, began to meditate the reduction of Alexandria. For this purpose, he sent one Manucl, an eunuch, and his general, with a powerful army, to retake the place; which, by the assistance of the Greeks in the city, who kept a secret correspondence with the imperial forces while at sea, and joined them as soon as they had made a descent, he effected without any considerable effusion of blood. The khalif, now perceiving his mistake, immediately restored Amrou to his former dignity. This step was very agreeable to the natives; who having had experience of the military skill and bravery of this renowned general, and apprehending that they should be called to an account by the Greeks for their former perfidious conduct, had petitioned Othman to send him again into Egypt.—Upon Amrou's arrival, therefore, at Alexandria, the Copts or natives, with the traitor Al-Mokawkas (who had formerly betrayed to Amrou the fortress of Mefri) at their head, not only joined him, but supplied him with all kinds of provisions, exciting him to attack the Greeks without delay. This he did; and, after a most obstinate dispute which lasted several days, drove them into the town, where, for some time, they defended themselves with great bravery, and repelled the utmost efforts of the besiegers. This so exasperated Amrou, that he swore, "If God enabled him to conquer the Greeks, he would throw down the walls of the city, and make it as easy of access as a *hawdy-house*, which lies open to every body." Nor did he fail to execute this menace; for, having taken the town by storm, he quite dismantled it, entirely demolishing the walls and fortifications. The lives of the citizens, however, were spared, at least as far as lay in the general's power; but many of them were put to the sword by the soldiers on their first entrance. In one quarter particularly, Amrou found them butchering the Alexandrians with unrelenting barbarity; to which, however, by his seasonable interposition, he put a stop, and on that spot erected a mosque, which he called the *mosque of mercy*.

From this time Alexandria never recovered its former splendour. It continued under the dominion of the khalifs till the year 924, when it was taken by the Magrebi-ans, two years after its great church had been destroyed by fire. This church was called by the Arabs *Al Kaisaria*, or *Casarea*; and had formerly been a pagan temple, erected in honour of Saturn by the famous queen Cleopatra.

The city was soon after abandoned by the Magrebi-ans; but in 928 they again made themselves masters of it; their fleet being afterwards defeated by that belonging to the khalif

khalif, *Abul Kafem* the Magrebian general retired from Alexandria, leaving there only a garrison of 300 men, of which *Thmaäl*, the khalif's admiral, being apprised, he in a few days appeared before the town, and carried off the remainder of the inhabitants to an island in the Nile called *Abuhair*. This was done to prevent *Abul Kafem* from meeting with any entertainment at Alexandria, in case he should think proper to return. According to Eutychius, above 200,000 of the miserable inhabitants perished this year.

What contributed to raise Alexandria to such a prodigious height of splendour as it enjoyed for a long time, was its being the centre of commerce between the eastern and western parts of the world. It was with the view of becoming master of this lucrative trade, that Alexander built this city, after having extirpated the Tyrians who formerly engrossed all the East-India traffic. Of the immense riches which that trade afforded, we may form an idea, from considering that the Romans accounted it a point of policy to oppress the Egyptians, especially the Alexandrians; and, after the defeat of Zenobia, there was a single merchant of Alexandria who undertook to raise and pay an army out of the profits of his trade. The Greek emperors drew prodigious tributes from Egypt, and yet the khalifs found their subjects in so good circumstances as to screw up their revenues to three hundred millions of crowns.

Though the revolutions which happened in the government of Egypt, after it fell into the hands of the Mahometans, frequently affected this city to a very great degree; yet still the excellence of its port, and the innumerable conveniences resulting from the East-India trade, to whomsoever were masters of Egypt, preserved Alexandria from total destruction, even when in the hands of the most barbarous nations. Thus, in the thirteenth century, when the barbarism introduced by the Goths, &c. began to wear off from the European nations, and they acquired a taste for the elegancies of life, the old mart of Alexandria began to revive; and the port, though far from recovering its former magnificence, grew once more famous by becoming the centre of commerce: but having fallen under the dominion of the Turks, and the passage round the Cape of Good Hope being discovered by the Portuguese in 1499, a fatal blow was given to the Alexandrian commerce, and the city has since fallen into decay.

At present, the city of Alexandria is reckoned to have about 15,000 inhabitants; a strange colluvies of different nations, as well as from various parts of the Turkish empire. They are in general given to thieving and cheating; and (like their predecessors) seditious above all others, were they not kept in awe by the severity of their government. The British and French carry on a considerable commerce with them, and have each a consul residing here. Some Venetian ships also sail thither yearly, but mostly under French colours. The subjects of those kingdoms which keep no consul here, are subjected to a tax by the Grand Signior: but the Jews have found out a method of indemnifying themselves for this disadvantage; namely, by selling their commodities cheaper than other foreigners can afford. They are also favoured by the farmers of the revenue; who know, that, if they do not pay some private regard to them, the Jews have it in their power to cause fewer merchandizes to come into their port during the two years that their farm lasts.

The present city is a kind of peninsula situated between the two ports. That to the westward was called by the ancients the *Portus Eunotus*, now the *Old Port*, and is by far the best; Turkish vessels only are allowed to anchor there: the other, called the *New Port*, is for the Christians; at the extremity of one of the arms of which stood the famous Pharos. The New Port, the only harbour for the Europeans, is clogged up with sand, inasmuch that in stormy weather ships are liable to bilge; and, the bottom being also rocky, the cables soon chafe and part; so that one vessel driving against a second, and that against a third,

they are perhaps all lost. Of this there was a fatal instance about twenty-five years ago, when forty-two vessels were dashed to pieces on the mole in a gale of wind from the north-west, and numbers have been since lost there at different times. If it be asked in Europe, Why do they not repair the New Port? the answer is, That in Turkey they destroy every thing, and repair nothing. The old harbour will be destroyed likewise, as the ballast of vessels has been continually thrown into it for the last 200 years. The spirit of the Turkish government is to ruin the labours of past ages, and destroy the hopes of future times, because the barbarity of ignorant despotism never considers to-morrow.

In time of war, Alexandria is of no importance; no fortification is to be seen; even the Farillon, with its lofty towers, cannot be defended. It has not four cannon fit for service, nor a gunner who knows how to point them. The 500 janisaries, who should form the garrison, reduced to half that number, know nothing but how to smoke a pipe. But Alexandria is a place of which the conquest would be of no value. A foreign power could not maintain itself there, as the country is without water. This must be brought from the Nile by the kalidj, or canal of twelve leagues, which conveys it thither every year at the time of the inundation. It fills the vaults or reservoirs dug under the ancient city, and this provision must serve till the next year. It is evident, therefore, that, were a foreign power to take possession, the canal would be shut, and all supplies of water cut off. It is this canal alone which connects Alexandria with Egypt; for from its situation without the Delta, and the nature of the soil, it really belongs to the deserts of Africa. Its environs are sandy, flat, and sterile, without trees and without houses; where we meet with nothing but the plant which yields the kali, and a row of palm-trees which follows the course of the kalidj or canal.

The city is governed like others in the same kingdom. (See *EGYPT*.) It hath a small garrison of soldiers, part of which are janisaries and assassins; who are very haughty and insolent, not only to strangers, but to the mercantile and industrious part of the people, though ever so considerable and useful. The government is so remiss in favour of these wretches, that Mr. Norden informs us, one of them did not hesitate to kill a farmer of the customs, for refusing to take less of him than the duty imposed, and went off unpunished; it being a common salvo among them, that what is done cannot be undone.

The present condition of Alexandria is very despicable, being now so far ruined, that the rubbish in many places overtops the houses. The famous tower of Pharos has long since been demolished, and a castle, called Farillon, built in its place. The causeway which joined the island to the continent is broken down, and its place supplied by a stone bridge of several arches. Some parts of the old walls of the city are yet standing, and present us with a masterpiece of ancient masonry. They are flanked with large towers, about 200 paces distant from each other, with small ones in the middle. Below are magnificent casemates, which may serve for galleries to walk in. In the lower part of the towers is a large square hall, whose roof is supported by thick columns of Thebaic stone. Above this are several rooms, over which there are platforms more than twenty paces square. The ancient reservoirs, vaulted with so much art, which extend under the whole town, are almost entire at the end of 2000 years.

Of Caesar's palace there remain only a few porphyry pillars, and the front, which is almost entire, and looks very beautiful. The palace of Cleopatra was built upon the walls facing the port, having a gallery on the outside, supported by several fine columns. Not far from this palace are two obelisks vulgarly called *Cleopatra's Needles*. They are of Thebaic stone, and covered with hieroglyphics. One is overturned, broken, and lying under the sand; the other is on its pedestal. These two obelisks, each of them of a single stone, are about sixty feet high, by seven feet square

square at the base. Towards the gate of Rosetta, are five columns of marble on the place formerly occupied by the porticoes of the Gymnasium. The rest of the colonnade, the design of which was discoverable 100 years ago by Maillet, has since been destroyed by the barbarism of the Turks.

But what most engages the attention of travellers is the pillar of Pompey, as it is commonly called, situated at a quarter of a league from the southern gate. It is composed of red granite. The capital is Corinthian, with palm-leaves, and not indented. It is nine feet high. The shaft and the upper member of the base are of one piece of ninety feet long, and nine in diameter. The base is a square of about fifteen feet on each side. This block of marble, sixty feet in circumference, rests on two layers of stone bound together with lead; which, however, has not prevented the Arabs from forcing out several of them, to search for an imaginary treasure. The whole column is 114 feet high. It is perfectly well polished, and only a little shivered on the eastern side. Nothing can equal the majesty of this monument; seen from a distance, it overtops the town, and serves as a signal for vessels. Approaching it nearer, it produces an astonishment mixed with awe. One can never be tired with admiring the beauty of the capital, the length of the shaft, nor the extraordinary simplicity of the pedestal. This last has been somewhat damaged by the instruments of travellers, who are curious to possess a relic of this antiquity; and one of the volutes of the column was immaturely brought down about twelve years ago, by a prank of some English captains, which is thus related by Mr. Irwin.

These jolly sons of Neptune had been pushing about the can on-board one of the ships in the harbour, until a strange freak entered into one of their brains. The eccentricity of the thought occasioned it immediately to be adopted; and its apparent impossibility was but a spur for the putting of it into execution. The boat was ordered; and with proper implements for the attempt these enterprising heroes pushed ashore, to drink a bowl of punch on the top of Pompey's pillar! At the spot they arrived; and many contrivances were proposed to accomplish the desired point. But their labour was vain; and they began to despair of success, when the genius who struck out the frolic happily suggested the means of performing it. A man was dispatched to the city for a paper kite. The inhabitants were by this time apprized of what was going forward, and flocked in crowds to be witnesses of the address and boldness of the English. The governor of Alexandria was told that these seamen were about to pull down Pompey's pillar. But whether he gave them credit for their respect to the Roman warrior, or to the Turkish government, he left them to themselves; and politely answered, that the English were too great patriots to injure the remains of Pompey. He knew little, however, of the disposition of the people who were engaged in this undertaking. Had the Turkish empire rose in opposition, it would hardly have deterred them. The kite was brought, and flown so directly over the pillar, that, when it fell on the other side, the string lodged upon the capital. The chief obstacle was now overcome. A two-inch rope was tied to one end of the string, and drawn over the pillar, by the end to which the kite was affixed. By this rope one of the seamen ascended to the top; and in less than an hour, a kind of shroud was constructed, by which the whole company went up, and drank their punch amid the shouts of the astonished multitude. To the eye below, the capital of the pillar does not appear capable of holding more than one man upon it; but our seamen found it could contain no less than eight persons very conveniently. It is astonishing that no accident befel these madcaps, in a situation so elevated, that would have turned a landman giddy in his sober senses. The only detriment which the pillar received, was the loss of the volute before mentioned; which came down with a thundering sound, and was carried to England by one of the captains, as a present to a lady who commissioned him for a piece of the pillar. The

discovery which they made amply compensated for this mischief; as, without their evidence, the world would not have known at this hour, that there was originally a statue on this pillar, one foot and ancle of which are still remaining. The statue must have been of a gigantic size, to have appeared of a man's proportion at so great an height.

There are circumstances in this story which might give it an air of fiction, were it not demonstrated beyond all doubt. Besides the testimonies of many eye-witnesses, the adventurers themselves have left us a token of the fact, by the initials of their names, which are very legible in black paint just beneath the capital.

Learned men and travellers have made many fruitless attempts to discover in honour of what prince it was erected. The best informed have concluded, that it could not be in honour of Pompey, since neither Strabo nor Diodorus Siculus have spoken of it. The Arabian Abulfeda, in his description of Egypt, calls it the *pillar of Severus*. And history informs us, that this emperor "visited the city of Alexandria: That he granted a senate to its inhabitants, who until that time, under the subjection of a single Roman magistrate, had lived without any national council, as under the reign of the Ptolemies, when the will of the prince was their only law: That he did not confine his benefactions there; he changed several laws in their favour." This column, therefore, Mr. Savary concludes to have been erected by the inhabitants as a mark of their gratitude to Severus. And in a Greek inscription, now half effaced, but visible on the west side when the sun shines upon it, and which probably was legible in the time of Abulfeda, he supposes the name of Severus to have been preserved. He further observes, that this was not the only monument erected to him by the gratitude of the Alexandrians: for there is still seen in the ruins of Antinoë, built by Adrian, a magnificent pillar, the inscription on which is still remaining, dedicated to Alexander Severus.

On the south-west side of the city, at a mile distant, are situated the catacombs, the ancient burial place of Alexandria: and although they cannot be compared to those of the ancient Memphis, which the Arabs will not permit to be visited, in order to make the better market of their mummies, it is probable that, the method of embalming being the same, the form of these catacombs can only differ in their proportions.—The Baron de Tott, in describing these, observes, "that Nature not having furnished this part of Egypt with a ridge of rocks, like that which runs parallel with the Nile above Delta, the ancient inhabitants of Alexandria could only have an imitation by digging into a bed of solid rock; and thus they formed Necropolis, or 'City of the Dead.' The excavation is from thirty to forty feet wide, 200 long, and twenty-five deep, and is terminated by gentle declivities at each end. The two sides, cut perpendicularly, contain several openings, about ten or twelve feet in width and height, hollowed horizontally; and which form, by their different branches, subterranean streets. One of these, which curiosity has disencumbered from the ruins and sands that render the entrance of others difficult or impossible, contains no mummies, but only the places they occupied. The order in which they were ranged is still to be seen. Niches, twenty inches square, sunk six feet horizontally, narrowed at the bottom, and separated from each other by partitions in the rocks, seven or eight inches thick, divide into checkers the two walls of this subterranean vault. It is natural to suppose, from this disposition, that each mummy was introduced with the feet foremost into the cell intended for its reception; and that new streets were opened, in proportion as these dead inhabitants of Necropolis increased." This observation, he adds, which throws a light on the catacombs of Memphis, may perhaps likewise explain the vast size and multitude, as well as the different elevations, of the pyramids in the Higher and Lower Egypt.

About seventy paces from Pompey's pillar is the khalis, or the canal of the Nile, which was dug by the ancient Egyptians, to convey the water of the Nile to Alexandria.

dria, and fill the cisterns under the city. On the side of the khalis are gardens full of orange and lemon trees, and the fields are full of caper and palm trees. On the top of a hill is a tower, on which a centinel is always placed, to give notice, by means of a flag, of the ships that are coming into the port. From this hill may be seen the sea, the whole extent of the city, and the parts round it.

In going along the sea-coast, there is a large basin cut out of the rock that lines the shore. On the sides of this basin, two beautiful saloons are hewn out by the chissel, with benches that run across them. A canal made zigzag, for the purpose of stopping the sand by its different windings, conveys into them the water of the sea, as pure and transparent as crystal. Seated on the stone bench, the water rises a little above the waist; while the feet softly repose on a fine sand. The waves of the sea are heard roaring against the rock, and foaming in the canal. The swell enters, raises you up, and leaves you; and thus, alternately entering and retiring, brings a continual fresh supply of water, and a coolness which is truly delicious under a burning sky. This place is vulgarly called the Bath of Cleopatra. Some ruins announce that it was formerly ornamented. Alexandria is about fifty leagues north of Cairo. Lat. 31. 12. N. lon. 31. 15. E.

ALEXANDRIA, a mountain of Myfia, on the sea-coast, forming a part of mount Ida, where Paris gave judgment on the three goddesses.

ALEXANDRIA, a strong and considerable city of Italy, belonging to the duchy of Milan, with a good castle, built in 1178 in honour of pope Alexander III. This pope made it a bishopric, with several privileges and exemptions. Prince Eugene of Savoy took this city in 1706, after three days siege. The French took it in 1745; but the king of Sardinia, to whom it belongs by the treaty of Utrecht, re-took it in 1746. The fortifications of the town are trifling, but the citadel is considerable. It is fifteen miles south-east of Cassal, thirty-five north-by-west of Genoa, and forty south-by-west of Milan. Lat. 44. 53. N. lon. 8. 40. E. The country about this town is called the Alexandrin.

ALEXANDRIA, a city of Arachosia, called also Alexandropolis, on the river Arachotus.—Another Alexandria in Gedrosia, built by Leonatus, by order of Alexander.—A third Alexandria in Aria, situated at the lake Arias; but, according to Pliny, built by Alexander on the river Arius.—A fourth in the Bactriana.—A fifth Alexandria, an inland town of Carmania.—A sixth Alexandria, or Alexandropolis, in the Sogdiana.—A seventh in India, at the confluence of the Arcefines and Indus.—An eighth, called also Alexandretta, near the Sinus Illicus, on the confines of Syria and Cilicia, now Scanderoon, the port-town to Aleppo.—A ninth Alexandria of Margiana, which, being demolished by the barbarians, was re-built by Antiochus the son of Seleucus, and called Antiochia of Syria; watered by the river Margus, which is divided into several channels, for the purposes of watering the country, which was called Zotale. The city was seventy stadia in circuit, according to Pliny; who adds, that, after the defeat of Crassus, the captives were conveyed to this place by Orodes, the king of the Parthians.—A tenth, of the Oxiana, built on the Oxus by Alexander, on the confines of Bactria.—An eleventh, built by Alexander at the foot of mount Paropamisus, which was called Caucasus.—A twelfth Alexandria in Troas, called also Troas and Antigonion.—A thirteenth on the Iaxartes, the boundary of Alexander's victories towards Scythia, and the last that he built on that side.

ALEXANDRIAN, *adj.* in a particular sense, is applied to all those who professed or taught the sciences in the school of Alexandria. In this sense, Clemens is denominated Alexandrinus, though born at Athens. The same may be said of Apion, who was born at Oasis; and Arostarchus, by birth a Samothracian. The chief Alexandrian philosophers were, Ammonius, Plotinus, Origen, Porphyry, Jamblicus, Sopater, Maximus, and Dexippus.

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ALEXANDRIAN is more particularly understood of a college of priests, consecrated to the service of Alexander Severus after his deification. Lampridius relates, that, notwithstanding Severus was killed by Maximin, the senate prosecuted his apotheosis; and, for regularity of worship, founded an order of priests, or *sodales*, under the denomination of *Alexandrin*.

ALEXANDRIAN LAUREL, *f.* in botany. See *Ruscus*.

ALEXANDRIAN MANUSCRIPT, a famous copy of the Scriptures, consisting of four volumes in a large quarto size; which contains the whole Bible in Greek, including the Old and New Testament, with the Apocrypha, and some smaller pieces, but not quite complete. This manuscript is now preserved in the British Museum. It was sent as a present to king Charles I. from Cyrillus Lucaris, patriarch of Constantinople, by Sir Thomas Rowe, ambassador from England to the Grand Signior, about the year 1628. Cyrillus brought it with him from Alexandria, where probably it was written.

ALEXANDRINE, *f.* A kind of verse borrowed from the French, first used in a poem called Alexander. They consist, among the French, of twelve and thirteen syllables, in alternate couplets; and, among us, of twelve.—Our numbers should, for the most part, be lyrical. For variety, or rather where the majesty of thought requires it, they may be stretched to the English heroic of five feet, and to the French alexandrine of six. *Dryden*.

Then, at the last and only couplet fraught
With some unmeaning thing they call a thought,
A needless alexandrine ends the song,
That, like a wounded snake, drags its slow length along.

Pope.

ALEXICACUS, *adj.* something that preserves the body from harm or mischief. The word amounts to much the same as *alexiterial*.

ALEXICACUS, in antiquity, was an attribute of Neptune, whom the tunny-fishers used to invoke under this appellation, that their nets might be preserved from the *ξίφας*, or sword fish, which used to tear them; and that he might prevent the assistance which it was pretended the dolphins used to give the tunnies on this occasion.

ALEXIPHARMIC, *adj.* [from *αλεξω*, to repel or drive away, and *φαρμακον*, poison; called also *antipharmaca*, and *caco alexiteria*.] Medicines, supposed fit to preserve the body against the power of poisons, or to correct or expel those taken into the machine. The words *alexiteria* and *antidota* have the same import, as also has the term *theriaca*; hence sudorifics and diaphoretics may be considered of this class; and perhaps the whole power of the alexipharmics can only be of any service by acting in one of these modes. The term has been also applied for *amulets*.

ALEXIS, a Piedmontese. There is a book of "Secrets," which for a long time has gone under his name. It was printed at Basil in 1536, and translated from Italian into Latin by Wecher; it has also been translated into French, and printed several times with additions. There is a preface to the piece, wherein Alexis informs us, that he was born of a noble family; that he had from his most early years applied himself to study; that he had learned the Greek, the Latin, the Hebrew, the Chaldean, the Arabian, and several other languages; that, having an extreme curiosity to be acquainted with the secrets of nature, he had collected as much as he could during his travels for fifty-seven years; that he piqued himself upon not communicating his secrets to any person; but that, when he was eighty-two years of age, having seen a poor man who had died of a sickness which might have been cured had he communicated his secret to the surgeon who took care of him, he was touched with such a remorse of conscience, that he lived almost like a hermit; and it was in this solitude that he ranged his secrets in order for publication.

ALEXITERICAL, or ALEXITERIC, *adj.* [from *αλεξω*, Gr.] That which drives away poison; that which resists fevers.

ALEYN (Charles), an English poet in the reign of Charles I. In 1631, he published two poems on the famous victories of Cressy and Poitiers. He succeeded his father as clerk of the ordnance, and was commissary-general of the artillery to the king at the battle of Edgehill. The next piece he wrote was a poem in honour of Henry VII. and the victory that gained him the crown of England. In 1639, the year before he died, he translated the history of Eurialus and Lucretia from the Latin epistles of *Æneas Sylvius*.

ALFANDIGA, the name of the custom-house at the city of Lisbon.

ALFAQUES, *f.* among the Moors, the name generally used for their clergy, or those who teach the Mahometan religion; in opposition to the Morabites, who answer to monks among Christians.

ALFATERNA, the last town of Campania, beyond Vesuvius; the same with **NOCERA**, which see.

ALFDOUCH, *f.* a name given by the Moors to a sort of vermicelli, which they make of flour and water, and are very fond of it in their entertainments.

ALFET, *f.* in our old customs, denotes a cauldron full of boiling water, wherein an accused person, by way of trial or purgation, plunged his arm up to the elbow.

ALFORD, a town in Lincolnshire, with a market on Tuesdays for provisions and corn; and two fairs, on Whit-Tuesday and November 8, for cattle and sheep. It is seated on a small brook that runs through the town, and is a compact place. A salt-spring was discovered here in 1670, from the pigeons which flew thither in great numbers to drink the water; those birds being known to be fond of salt. It contains a purging-salt, together with a portion of sea-salt. It is strongly purgative. It is recommended as cooling, cleansing, and attenuating. As a good remedy in the scurvy, jaundice, and other glandular obstructions. It also promotes urine and sweat, and therefore is good in gravelly and other disorders of the kidneys and bladder; and in complaints arising from obstructed perspiration. Alford is six miles from the sea, twenty-five north of Boston, and 142 from London. Lat. 53.30. N. lon. 0.15. E.

ALFRAGAN, **ALFERGANI**, or **FARGANI**, a celebrated Arabic astronomer, who flourished about the year 800. He was so called from the place of his nativity, Fergan, in Sogdiana, now called Maracanda, or Samarcand, anciently a part of Bactria. He is also called Ahmed (or Muhammed) ben-Cothair, or Katir. He wrote the Elements of Astronomy, in thirty chapters or sections. In this work the author chiefly follows Ptolemy, using the same hypotheses, and the same terms, and frequently citing him. There are three Latin translations of Alfragan's work; the best of which was made by Golius, professor of mathematics and Oriental languages at Leyden: this work, which came out in 1669, after the death of Golius, is accompanied with the Arabic text, and many learned notes.

ALFRED, or **ÆLFRED**, the Great, king of England, was the fifth and youngest son of Æthelwolf king of the West Saxons, and was born at Wantage in Berkshire, in 849. He distinguished himself, during the reign of his brother Ethelred, in several engagements against the Danes; and upon his death succeeded to the crown, in the year 871, and the twenty-second of his age. At his ascending the throne he found himself involved in a dangerous war with the Danes, and placed in such circumstances as called for the greatest valour, resolution, and all the other virtues with which he was adorned. The Danes had already penetrated into the heart of his kingdom; and, before he had been a month upon the throne, he was obliged to take the field against those formidable enemies. After many battles gained on both sides, he was at length reduced to the greatest difficulties, and was entirely abandoned by his subjects.

In this universal defection, Alfred vainly attempted to

remind them of the duty they owed their country and their king; but, finding his remonstrances ineffectual, he was obliged to submit to the wretched necessity of the times. Accordingly he assumed a disguise most likely to conceal him, and, after having properly disposed of his family, and settled a method of communication with some trusty friends, he engaged himself in the service of his own cow-herd. The wife of the herdsmen was ignorant of the rank of her royal guest, and seeing him one day busied by the fire-side, in trimming his bow and arrows, she desired him to take care of some cakes that were baking at the fire, while she was employed in other domestic affairs; but Alfred, whose thoughts were otherwise engaged, forgot the cakes, and the woman, on her return, finding them burnt, chid the king very severely, telling him, that he was always willing enough to eat her hot cakes, though he was so negligent in turning them.

Alfred soon after this retired to the isle of Æthelingey in Somersetshire, where he built a fort for the security of himself, his family, and the few faithful servants who repaired thither to him. When he had been about a year in this retreat, having been informed that some of his subjects had routed a great army of the Danes, killed their chiefs, and taken their magical standard, he issued his letters, giving notice where he was, and inviting his nobility to come and consult with him. Before they came to a final determination, Alfred, putting on the habit of a harper, went into the enemy's camp, where, without suspicion, he was every where admitted, and had the honour to play before their princes. Having thereby acquired an exact knowledge of their situation, he returned in great secrecy to his nobility, whom he ordered to their respective homes, there to draw together each man as great a force as he could; and upon a day appointed there was to be a general rendezvous at the great wood, called Selwood, in Wiltshire. This affair was transacted so secretly and expeditiously, that, in a little time, the king, at the head of an army, approached the Danes, before they had the least intelligence of his design. Alfred, taking advantage of the surprise and terror they were in, fell upon them, and totally defeated them, at Æthendune, now Eddington. Those who escaped fled to a neighbouring castle, where they were soon besieged, and obliged to surrender at discretion. Alfred granted them better terms than they could expect. He agreed to give up the whole kingdom of the East-Angles to such as would embrace the Christian religion, on condition they would oblige the rest of their countrymen to quit the island, and, as much as it was in their power, prevent the landing of any more foreigners. For the performance thereof he took hostages; and when, in pursuance of the treaty, Guthrum the Danish captain came, with thirty of his chief officers, to be baptized, Alfred answered for him at the font, and gave him the name of Æthelstane; and certain laws were drawn up betwixt the king and Guthrum for the regulation and government of the Danes settled in England. In 884, a fresh number of Danes landed in Kent, and laid siege to Rochester; but, the king coming to the relief of that city, they were obliged to abandon their design. Alfred had now great success; which was chiefly owing to his fleet, an advantage of his own creating. Having secured the sea-coasts, he fortified the rest of the kingdom with castles and walled towns; and he besieged and recovered from the Danes the city of London, which he resolved to repair, and to keep as a frontier.

The Danes had possessed themselves of London in the time of his father; and had held it till now as a convenient place for them to land at, and fortify themselves in; neither was it taken from them but by a close siege. However, when it came into the king's hands, it was in a miserable condition, scarcely habitable, and all its fortifications ruined. The king, moved by the importance of the place, and the desire of strengthening his frontier against the Danes, restored it to its ancient splendour.

And

And observing, that, through the confusion of the times, many, both Saxons and Danes, lived in a loose disorderly manner, without owning any government, he offered them now a comfortable establishment, if they would submit and become his subjects. This proposition was better received than he expected; for multitudes, growing weary of a vagabond kind of life, joyfully accepted such an offer.

After some years respite, Alfred was again called into the field; for a body of Danes, being worsted in the west of France, came with a fleet of 250 sail on the coast of Kent; and, having landed, fixed themselves at Apple-tree: shortly after, another fleet of eighty vessels coming up the Thames, the men landed, and built a fort at Middelton. Before Alfred marched against the enemy, he obliged the Danes, settled in Northumberland and Essex, to give him hostages for their good behaviour. He then moved towards the invaders, and pitched his camp between their armies, to prevent their junction. A great body, however, moved off to Essex; and, crossing the river, came to Farnham in Surrey, where they were defeated by the king's forces. Meanwhile the Danes settled in Northumberland, in breach of treaty, and notwithstanding the hostages given, equipped two fleets; and, after plundering the northern and southern coasts, sailed to Exeter, and besieged it. The king, as soon as he received intelligence, marched against them; but, before he reached Exeter, they had got possession of it. He kept them, however, blocked up on all sides; and reduced them at last to such extremities, that they were obliged to eat their horses, and were even ready to devour each other. Being at length rendered desperate, they made a general sally on the besiegers; but were defeated, though with great loss on the king's side. The remainder of this body of Danes fled into Essex, to the fort they had built there, and to their ships. Before Alfred had time to recruit himself, another Danish leader, whose name was Laf, came with a great army out of Northumberland, and destroyed all before him, marching on to the city of Werheal in the west, which is supposed to be Chester, where they remained the rest of that year. The year following they invaded North Wales; and, after having plundered and destroyed every thing, they divided, one body returning to Northumberland, another into the territories of the East-Angles; from whence they proceeded to Essex, and took possession of a small island called Merefig. Here they did not long remain; for, having parted, some sailed up the river Thames, and others up the Lea-road; where, drawing up their ships, they built a fort not far from London, which proved a great check upon the citizens, who went in a body and attacked it, but were repulsed with great loss: at harvest-time the king himself was obliged to encamp with a body of troops in the neighbourhood of the city, in order to cover the reapers from the excursions of the Danes. As he was one day riding by the side of the river Lea, after some observations, he began to think that the Danish ships might be laid quite dry: this he attempted, and succeeded; so that the Danes deserted their fort and ships, and marched away to the banks of the Severn. This contrivance of the king's is thought to have produced the meadow between Hertford and Bow; for at Hertford was the Danish fort, and from thence they made frequent excursions on the inhabitants of London. Authors are not agreed as to the method the king pursued in laying dry the Danish ships: Dugdale supposes that he did it by straitening the channel; but Henry of Huntingdon alleges, that he cut several canals, which exhausted its water. Such of the Danish ships as could be got off, the Londoners carried into their own road; the rest they burnt and destroyed.

Alfred enjoyed a profound peace during the three last years of his reign, which he chiefly employed in establishing and regulating his government, for the security of himself and his successors, as well as the ease and benefit of his subjects in general. After a troublesome reign of twenty-eight years, he died on the 28th of October, A. D.

900; and was buried at Winchester, in Hyde-abbey, under a monument of porphyry.

All our historians agree in distinguishing him as one of the most valiant, wisest, and best, of kings, that ever reigned in England; and it is also generally allowed, that he not only digested several particular laws still in being, but that he laid the first foundation of our present happy constitution. There is great reason to believe that we are indebted to this prince for trials by juries; and the Domesday-book, which is preserved in the exchequer, is thought to be no more than another edition of Alfred's Book of Winchester, which contained a survey of the kingdom. It is said also, that he was the first who divided the kingdom into shires: what is ascribed to him is not a bare division of the country, but the settling a new form of judicature; for, after having divided his dominions into shires, he subdivided each shire into three parts, called *trythings*. There are some remains of this ancient division in the ridings of Yorkshire, the laths of Kent, and the three parts of Lincolnshire. Each trything was divided into hundreds or wapentakes; and these again into tythings or dwellings of ten householders: each of these householders stood engaged to the king, as a pledge for the good behaviour of his family, and all the ten were mutually pledges for each other; so that, if any one of the tythings was suspected of an offence, if the head-boroughs or chiefs of the tything would not be security for him, he was imprisoned; and, if he made his escape, the tything and hundred were fined to the king. Each shire was under the government of an earl, under whom was the reeve, his deputy; since, from his office, called *shire-reeve* or *sheriff*. And so effectual were these regulations, that it is said he caused bracelets of gold to be hung up in the highways, as a challenge to robbers, and they remained untouched.

The merit of this prince, both in private and public life, may with advantage be set in opposition to that of any monarch or citizen which the annals of any age or any nation can present to us. He seems, indeed, to be the complete model of that perfect character, which, under the denomination of a sage or wise man, the philosophers have been fond of delineating, rather as a fiction of their imagination, than in hopes of ever seeing it reduced to practice: so happily were all his virtues tempered together, so justly were they blended, and so powerfully did each prevent the other from exceeding its proper bounds. He knew how to conciliate the most enterprising spirit with the coolest moderation; the most obstinate perseverance with the easiest flexibility; the most severe justice with the greatest lenity; the greatest vigour in command with the greatest affability of deportment; the highest capacity and inclination for science, with the most shining talents for action. His civil and his military virtues are almost equally the objects of our admiration, excepting only, that the former, being more rare among princes, as well as more useful, seem chiefly to challenge our applause. Nature also, as if desirous that so bright a production of her skill should be set in the fairest light, had bestowed on him all bodily accomplishments, vigour of limbs, dignity of shape and air, and a pleasant, engaging, and open, countenance. Fortune alone, by throwing him into that barbarous age, deprived him of historians worthy to transmit his fame to posterity; and we wish to see him delineated in more lively colours, and with more particular strokes, that we may at least perceive some of those small specks and blemishes, from which, as a man, it is impossible he could be entirely exempted.

In private life, Alfred was the most amiable man in his dominions; of so equal a temper, that he never suffered either sadness or unbecoming gaiety to enter his mind; but appeared always of a calm yet cheerful disposition, familiar to his friends, just even to his enemies, kind and tender to all. He was a remarkable economist of his time; and Asserius has given us an account of the method he took for dividing and keeping an account of it: he caused six wax-candles to be made, each of twelve

inches length, and of as many ounces weight; on the candles the inches were regularly marked, and, having found that one of them burnt just four hours, he committed them to the care of the keepers of his chapel, who from time to time gave him notice how the hours went: but, as in windy weather the candles were wasted by the impression of the air on the flame, to remedy this inconvenience, he invented lanthorns, there being then no glass in his dominions.

A jewel, richly wrought, was dug up in the island of Æthelinge, which was some time the king's retreat when he fled from the Danes. This curious relic is still preserved in the Ashmolean collection of curiosities; and, besides its excellent workmanship, hath a Saxon inscription to this purpose: *ÆLFREDUS ME JUSSIT FABRICARI*—"Alfred directed this to be made." In his kingdom the industrious foreigner found a generous welcome; inventors, artists, mechanics, were all courted to repair to it, and none departed unrewarded.

This prince, we are told, was twelve years of age before a master could be procured in the western kingdom to teach him the alphabet; such was the state of learning when Alfred began to reign. He had felt the misery of ignorance, and determined even to rival his cotemporary Charlemagne in the encouragement of literature. He is supposed to have appointed persons to read lectures at Oxford, and is thence considered as the founder of that university. By other proper establishments, and by a general encouragement to men of abilities, he did every thing in his power to diffuse knowledge throughout his dominions. Nor was this end promoted more by his countenance and encouragement than by his own example and his writings. For, notwithstanding the lateness of his initiation, he had acquired extraordinary erudition; and, had he not been illustrious as a king, he would have been famous as an author. His works are, 1. *Breviarium quoddam collectum ex Legibus Trojanorum*, &c. lib. I. A Breviary collected out of the Laws of the Trojans, Greeks, Britons, Saxons, and Danes, in one book. Leland saw this book in the Saxon tongue, at Christchurch in Hampshire. 2. *Visi-Saxonum Leges*, lib. I. The laws of the West-Saxons, in one book. Pitts tells us, that it is in Bennet-college library, at Cambridge. 3. *Instituta quedam*, lib. I. Certain Institutes, in one book. This is mentioned by Pitts, and seems to be the second capitulation with Guthrum. 4. *Contra Judices iniquos*, lib. I. An Invektive against unjust Judges, in one book. 5. *Acta Magistratum suorum*, lib. I. Acts of his Magistrates, in one book. This is supposed to be the book of judgments mentioned by Horne; and was, in all probability, a kind of reports, intended for the use of succeeding ages. 6. *Regum Fortunæ variæ*, lib. I. The various Fortunes of Kings, in one book. 7. *Dicta Sapientum*, lib. I. The Sayings of Wise Men, in one book. 8. *Parabolæ et Sales*, lib. I. Parables and Pleasant Sayings, in one book. 9. *Collectiones Chronicorum*: Collection of Chronicles. 10. *Epistolæ ad Wulfsigium Episcopum*, lib. I. Epistles to Bishop Wulfsig, in one book. 11. *Manuale Meditationum*: A Manual of Meditations.

Besides these original works, he translated many authors from the Latin, &c. into the Saxon language, viz. 1. Bede's History of England. 2. Paulinus Orosius's History of the Pagans. 3. St. Gregory's Pastoral, &c. The first of these, with his prefaces to the others, together with his laws, were printed at Cambridge, 1644. His laws are likewise inserted in Spelman's Councils. 4. *Boethius de Consolatione*, lib. V. Boethius's Consolations of Philosophy, in five books. Dr. Plot tells us, king Alfred translated it at Woodstock, as he found in a MS. in the Cotton Library. 5. *Æsop's Fables*, which he is said to have translated from the Greek both into Latin and Saxon. 6. *Psalterium Davidicum*, lib. I. David's Psalter, in one book. This was the last work the king attempted, death surprising

him before he had finished it; it was, however, completed by another hand, and published at London in 1640, in quarto, by Sir John Spelman. Several others are mentioned by Malmſbury; and the old History of Ely asserts, that he translated the Old and New Testaments.

The life of this great king was first written by Afferius Menevenſis; and first published by archbishop Parker, in the old Saxon character, at the end of his edition of Haddingham's history, printed in 1674, fol.

The annexed Portrait of Alfred the Great, is taken from the only original painting of that monarch, preserved in the Bodleian Library, in the University of Oxford.

ALFRETON, Derbyshire, is situated in a very plentiful coal-country, and is supposed to take its name from king Alfred, who resided here; there being still some remains of the palace. It is a considerable market for corn, particularly oats: market-day chartered for Monday, but held on Friday. There are three fairs; one at Easter, one at Whitfuntide, and the other on the last day of July. Alfreton, according to history, is famous for nappy ale. It is situated from Nottingham sixteen miles, Derby sixteen, Chesterfield ten, Mansfield nine, Workworth ten, Bakewell seventeen, Matlock-bath eight, and London 141. Adjacent towns are, Southwimfield, Ashover, Shirland, Tibshelf, and Hardwick. It has two free-schools, one at Swanwick, another at Hallfield-gate; also a manufactory of stockings, and brown earthenware: its annual return amounts to 50,000l. Here is one church, and one dissenting meeting-house; and there is a canal about two miles off, which goes from Cronford into the Erewash canal. About two or three miles from this place begin those moors which extend a great way into the country, and are very dangerous to travellers, by reason of the rocks and bogs.

ALGA, *f.* in botany, the trivial name of the lichen, fucus, and several other plants of the cryptogamia class.

ALGÆ, *f.* in botany. See CRYPTOGRAMIA.

ALGAGIOLA, a small sea-port town in the island of Corfica, fortified with walls and bastions. It was almost destroyed by the malcontents in 1731, but has since been repaired. Lat. 42. 20. N. lon. 9. 45. E.

ALGAROT, *f.* in chemistry, an Arabic term for an emetic powder, prepared from regulus of antimony, dissolved in acids, and separated by repeated lotions in warm water.

ALGAROTI, commonly called Count Algaroti, a celebrated Italian of the present century, well skilled in architecture and the Newtonian philosophy, &c. Algaroti was born at Padua, but in what year has not been mentioned. Led by curiosity, as well as a desire of improvement, he travelled early into foreign countries; and was very young when he arrived in France in 1736. It was here that he composed his Newtonian Philosophy for the Ladies, as Fontenelle had done his Cartesian Astronomy, in the work intitled The Plurality of Worlds. He was much noticed by the king of Prussia, who conferred on him many marks of his esteem. He died at Pisa the 23d of May, 1764, and gave orders for his own mausoleum, with this inscription upon it; *Hic jacet Algarotus, sed non omnis*. He was esteemed to be well skilled in painting, sculpture, and architecture. His works, which are numerous, and upon a variety of subjects, abound with vivacity, elegance, and wit; a collection of them has lately been made and printed at Leghorn.

ALGARVA, a province in the kingdom of Portugal, sixty-seven miles in length and twenty in breadth; bounded on the west and south by the sea, on the east by the river Guadiana, and on the north by Alentejo. It is very fertile in figs, almonds, dates, olives, and excellent wines; besides, the fishery brings in large sums. The capital town is Pharo. It contains four cities, twelve towns, sixty-seven parishes, and 61,000 inhabitants.

J. Chapman sculp.

ALFRED the GREAT.

London: Published as the Act directs March 5 1796. by J. Wilkes.

A L G E B R A,

A GENERAL method of resolving mathematical problems by means of equations. Or, it is a method of performing the calculations of all sorts of quantities by means of general signs or characters. At first, numbers and things were expressed by their names at full length; but afterwards these were abridged, and the initials of the words used instead of them; and, as the art advanced farther, the letters of the alphabet came to be employed as general representations of all sorts of quantities; and other marks were gradually introduced, to express all sorts of operations and combinations; so as to entitle it to different appellations—*universal arithmetic*, and *literal arithmetic*, and the *arithmetic of signs*. And since its operations in the resolution of problems are performed by taking them always backwards in the contrary order, it hence becomes a species of the analytic art, and is called the *modern analysis*, in contradistinction to the *ancient analysis*, which chiefly respected geometry and its applications.

The etymology of the name, *algebra*, is given in various ways. It is an Arabic word, and by the Arabians is coupled with the word *macabelah*, signifying opposition and comparison, to express what we properly call algebra. Some derive it from Gebar, a celebrated philosopher, chemist, and mathematician, whom the Arabs call *Giaber*; but others, with more probability, derive it from *geber*, by prefixing the article *al*, which properly signifies the reduction of fractions to a whole number.

As to the origin of the analytic art, of which algebra is a species, it is doubtless as old as any science in the world, being the natural method by which the mind investigates truths, causes, and theories, from their observed effects and properties. Accordingly, traces of it are observable in the works of the earliest philosophers and mathematicians, the subject of whose researches most of any required the aid of such an art. The oldest treatise, however, which has come down to us, is that of Diophantus of Alexandria, who flourished about the year 350 after Christ, and who wrote, in the Greek language, thirteen books of Algebra or Arithmetic, though only six of them have hitherto been printed; and an imperfect book on Multangular Numbers, in a Latin translation, by Xilander, in the year 1575, and afterwards in 1621 and 1670 in Greek and Latin by Gaspar Bachet. These books however do not contain a treatise on the elementary parts of algebra, but only collections of difficult questions relating to square and cube numbers, and other curious properties of numbers, with their solutions.

But, although Diophantus was the first author on algebra that we now know of, it was not from him, but from the Moors or Arabians, that we received the knowledge of algebra in Europe, as well as that of most other sciences. And it is matter of dispute who were the first inventors of it; some ascribing the invention to the Greeks, while others say that the Arabians had it from the Persians, and these from the Indians, as well as the arithmetical method of computing by ten characters, or digits; but the Arabians themselves say it was invented amongst them by *Mahomet ben Musa*, or son of Moses, who it seems flourished about the 8th or 9th century. It is more probable, however, that Mahomet was not the inventor, but only a person well skilled in the art; and it is farther probable, that the Arabians drew their first knowledge of it from Diophantus or other Greek writers, as they did that of geometry and other sciences, which they improved and translated into their own language; and from them it was that we received these sciences, before the Greek authors were known to us, after the Moors settled in Spain, and after the Europeans began to hold communications with them, and that our countrymen began to travel amongst them to learn the sciences. And according to the testi-

mony of Abulpharagius, the Arithmetic of Diophantus was translated into Arabic by Mahomet ben-yahya Baziani. But whoever were the inventors and first cultivators of algebra, it is certain that the Europeans first received the knowledge, as well as the name, from the Arabians or Moors, in consequence of the close intercourse which subsisted between them for several centuries. And it appears that the art was pretty generally known, and much cultivated, at least in Italy, if not in other parts of Europe also, long before the invention of printing, as many writers upon the art are still extant in the libraries of manuscripts; and the first authors, presently after the invention of printing, speak of many former writers on this subject, from whom they learned the art.

It was chiefly among the Italians that this art was first cultivated in Europe. And the first author whose works we have in print, was Lucas Pacioli, or Lucas de Burgo, a Cordelier, or Minorite Friar. He wrote several treatises of Arithmetic, Algebra, and Geometry, which were printed in the years 1470, 1476, 1481, 1487, and in 1494. His principal work, intitled *Summa de Arithmetica, Geometria, Proportioni, et Proportionalita*, is a very masterly and complete treatise on those sciences, as they then stood. In this work he mentions various former writers, as Euclid, St. Augustine, Sacrobosco or Halifax, Boetius, Prodocimo, Giordano, Biagio da Parma, and Leonardus Pisanus, from whom he learned those sciences.

After Pacioli appeared Stifelius and Scheubelius, German authors; and after them came Scipio Ferreus, Cardan, Tartalea, and several others, whose works reached as far as the solution of some cubic equations. Ramus and Bombelli followed these, and went a little farther. At last came Nunnius, Stevinus, Schoner, Salignac, Clavius, &c. who all of them took different courses, but none of them went beyond quadratics.

In 1599, Vieta introduced what he called his "*Specious Arithmetic*," which consists in denoting the quantities, both known and unknown, by symbols or letters. He also introduced an ingenious method of extracting the roots of equations by approximations; since greatly improved and facilitated by Raphson, Halley, Maclaurin, Simpson, and others.

Vieta was followed by Oughtred, who, in his *Clavis Mathematica*, printed in 1631, improved Vieta's method, and invented several compendious characters, to shew the sums, differences, rectangles, squares, cubes, &c.

Harriot, another Englishman, cotemporary with Oughtred, left several treatises at his death; and, among the rest, an Analysis, or Algebra, which was printed in 1631, where Vieta's method is brought into a still more commodious form, and is much esteemed to this day.

In 1637, Des Cartes published his geometry, wherein he made use of the literal calculus and the algebraic rules of Harriot; and as Oughtred in his *Clavis*, and Marin Ghetaldus in his books of mathematical composition and resolution published in 1630, applied Vieta's arithmetic to elementary geometry, and gave the construction of simple and quadratic equations; so Des Cartes applied Harriot's method to the higher geometry, explaining the nature of curves by equations, and adding the constructions of cubic, biquadratic, and other higher, equations.

Des Cartes's rule for constructing cubic and biquadratic equations was farther improved by Thomas Baker, in his *Clavis Geometrica Catholica*, published in 1684; and the foundation of such constructions, with the application of algebra to the quadratures of curves, questions of *maximis et minimis*, the centrobaryc method of Guldhus, &c. was given by R. Slusius, in 1668; as also by Fermat in his *Opera Mathematica*, Roberval in the *Mém. de Mathem. et de Physique*, and Barrow in his *Lect. Geomet.* In 1708, algebra

was applied to the laws of chance and gaming, by R. de Montmort; and since by de Moivre and James Bernouilli.

The elements of the art were compiled and published by Kersey, in 1671; wherein the specious arithmetic, and the nature of equations, are largely explained, and illustrated by a variety of examples; the whole substance of Diaphantus is here delivered, and many things added concerning mathematical composition and resolution from Ghetaldus. The like has been since done by Prestet in 1694, and by Ozanam in 1703. But these authors omit the application of algebra to geometry; which defect is supplied by Guisnee in a French treatise expressly on the subject published in 1704, and l'Hopital in his analytical treatise of the Conic Sections in 1707. The rules of algebra are also compendiously delivered by Sir Isaac New-

ton, in his *Arithmetica Universalis*, first published in 1707, which abounds in select examples, and contains several rules and methods invented by the author.

Algebra has since been much improved, and applied to the consideration and calculus of infinities, by Dr. Brooke Taylor, Nicole, Sterling, Campbell, Wolfius, Clairaut, Fontaine, Emerson, Landen, Euler, Malbranche, Waring, Hales, and others; from whence a new and extensive branch of knowledge has arisen, called the *Doktrine of Fluxions*, or *Analysis of Infinites*, or the *Calculus Differentialis*.

A very useful work, on the Principles of the Mathematics, in 4 vols. containing the elements of Algebra, Fluxions, Optics, &c. was lately published in the university of Cambridge, by J. Wood, B. D. and the Rev. Mr. Vince; on the plan of which the following treatise is given:

P A R T I.

DEFINITIONS AND EXPLANATIONS OF SIGNS.

KNOWN or determined quantities are usually represented by the first letters of the alphabet, a, b, c, d , &c. and unknown or undetermined quantities by the last, as w, x, y , &c. And the following signs are made use of to express the relations which these quantities bear to each other:

Plus $+$ signifies that the quantity to which it is prefixed must be added. Thus $a+b$ signifies that the quantity represented by b is to be added to that represented by a ; if a represents 5, and b 7, $a+b$ represents 12. If no sign be placed before a quantity the sign $+$ is understood. Thus a , signifies $+a$. Such quantities are called *positive* quantities.

Minus $-$ signifies that the quantity to which it is prefixed must be subtracted. Thus $a-b$, signifies that b must be taken from a ; if a be 7, and b 5, $a-b$ expresses 7 diminished by 5, or 2. Quantities to which the sign $-$ is prefixed are called *negative* quantities.

Into $\times$ signifies that the quantities between which it stands are to be multiplied together. Thus $a \times b$ signifies that the quantity represented by a is to be multiplied by the quantity represented by b ; for, since quantities may in each particular case be represented by numbers, we may without impropriety speak of the multiplication, division, &c. of quantities by each other. This sign is frequently omitted, thus abc signifies $a \times b \times c$. Or a full point is used instead of it; thus $1 \times 2 \times 3$ and $1.2.3$ signify the same thing. If in multiplication the same quantity be repeated any number of times, the product is usually expressed by placing above the quantity the number which represents how often it is repeated, thus $a, a \times a, a \times a \times a, a \times a \times a \times a$, and a^1, a^2, a^3, a^4 , have respectively the same signification. These quantities are called *powers*, thus a^1 , is called the first power of a ; a^2 , the second power or square; a^3 , the third power or cube of a , &c. The numbers 1, 2, 3, &c. are called the *indices* of a .

Divided by $\div$ signifies that the former of the quantities between which it is placed is to be divided by the latter. Thus $a \div b$ signifies that the quantity a is to be divided by b . The division of one quantity by another is frequently represented by placing the dividend over the divisor with a line between them, in which case the expression is called a fraction. Thus, $\frac{a}{b}$ signifies a divided by b , and a is

also the numerator and b the denominator of the fraction; $\frac{a+b+c}{e+f+g}$ signifies that a, b , and c , added together, are to be divided by e, f , and g , added together. A quantity in the denominator of a fraction is also expressed by placing it in the numerator, and prefixing the negative sign to its index; thus, $a^{-1}, a^{-2}, a^{-3}, a^{-n}$, signify $\frac{1}{a}, \frac{1}{a^2}, \frac{1}{a^3}, \frac{1}{a^n}$, respectively; these are called *negative powers* of a .

The sign $\sim$ between two quantities signifies their *difference*; $a \sim x$, is $a-x$ or $x-a$, according as a or x is the greater.

A line drawn over several quantities signifies that they are to be taken collectively, and it is called a *vinculum*.

Thus $\overline{a-b+c} \times d-e$ signifies that the quantity represented by $a-b+c$ is to be multiplied by the quantity represented by $d-e$. Let a stand for 6; b , 5; c , 4; d , 3; and e , 1; then $\overline{a-b+c}$ is $6-5+4$, or 5; and $d-e$ is $3-1$, or 2; therefore $\overline{a-b+c} \times d-e$ is 5×2 , or 10; $\overline{ab-cd} \times \overline{ab-cd}$ or $\overline{ab-cd}^2$ signifies that the quantity represented by $ab-cd$, is to be multiplied by itself.

Equal $=$ signifies that the quantities between which it is placed are equal to each other; thus $ax-by=cd+ad$ signifies that the quantity $ax-by$ is equal to the quantity $cd+ad$.

The *square root* of any proposed quantity is that quantity whose square or second power gives the proposed quantity. The *cube root* is the quantity whose cube gives the

proposed quantity, &c. $\sqrt{\quad}$ or $\sqrt[2]{\quad}$, $\sqrt[3]{\quad}$, $\sqrt[4]{\quad}$, &c. are used to express the square, cube, biquadrate, &c. roots of the quantities

before which they are placed: as, $\sqrt[2]{a^2}=a$, $\sqrt[3]{a^3}=a$, $\sqrt[4]{a^4}=a$, &c. If these roots cannot be exactly determined, the quantities are called *irrational* or *surds*.

Points are made use of to denote proportion, thus $a:b::c:d$, signifies that a bears the same proportion to b that c bears to d .

The number prefixed to any quantity, and which shews how often it is to be taken, is called its *coefficient*. Thus, 7, 6, and 3, are called the coefficients of $7ax$, $6by$, and $3dz$, respectively. When no number is prefixed, the quantity is to be taken once, or the coefficient 1 is understood. These numbers are sometimes represented by letters, which are also called coefficients.

Similar or *like* algebraical quantities are such as differ only in their coefficients; $4a$, $6ab$, $9a^2$, $3a^2bc$, are respectively similar to $15a$, $3ab$, $12a^2$, $15a^2bc$, &c. *Unlike* quantities are different combinations of letters; thus, ab , a^2b , ab^2 , abc , &c. are unlike.

A quantity is said to be a *multiple* of another, when it contains it a certain number of times exactly; thus $16a$ is a multiple of $4a$, as it contains it exactly four times. A quantity is called a *measure* of another when it is contained in it a certain number of times exactly; thus $4a$ is a measure of $16a$.

A *simple* algebraical quantity is one which consists of a single term, as a^2bc . A *binomial* is a quantity consisting of two terms, as $a+b$, or $2a-3bx$. A *trinomial* is a quantity consisting of three terms, as $2a+bd-3c$.

The following examples will serve to illustrate the method of representing quantities algebraically:

Let $a=8$, $b=7$, $c=6$, $d=5$, and $e=1$; then
 $3a-2b+4c-e=24-14+24-1=33$.

$$ab+cc-bd=56+6-35=27.$$

$$\frac{a+b}{c-e} = \frac{3b-2c}{a-d} = \frac{8+7}{6-1} = \frac{21-12}{8-5} = \frac{15}{5} = \frac{9}{3} = 6.$$

$$d^2 \times a - c - 3ce + d^2 = 25 \times 2 - 18 + 125 = 50 - 18 + 125 = 157.$$

AXIOMS.

If equal quantities be added to equal quantities the wholes will be equal.

If equal quantities be taken from equal quantities the remainders will be equal.

If equal quantities be multiplied by the same or equal quantities the products will be equal.

If equal quantities be divided by the same or equal quantities the quotients will be equal.

If the same quantity be added to and subtracted from another the value of the latter will not be altered.

If a quantity be both multiplied and divided by another its value will not be altered.

ADDITION of ALGEBRAICAL QUANTITIES.

To add quantities together is to connect them with their proper signs, uniting into one sum those that can be so united. Ex. 1. If the following quantities are to be added:

$\begin{array}{r} ax \\ -by \\ +e^2 \\ -cd \\ \hline \end{array}$	Ex. 2. $\begin{array}{r} a+2b-c \\ d-5e+f \\ \hline \text{Sum } a+2b-c+d-5e+f \end{array}$

Sum is $ax-by+e^2-cd$

It is immaterial in what order the quantities are set down, if we take care to prefix to each its proper sign. When any terms are similar they may be incorporated, and the general expression for the sum shortened.

First, When similar quantities have the *same* sign, their sum is found by taking the sum of the coefficients with that sign and annexing the common letters.

Ex. 3. $\begin{array}{r} 5a-3b \\ 4a-7b \\ \hline \text{Sum } 9a-10b \end{array}$	Ex. 4. $\begin{array}{r} 4a^2c-10bde \\ 6a^2c-9bde \\ 11a^2c-3bde \\ \hline \text{Sum } 21a^2c-22bde \end{array}$

The reason is evident; $5a$ to be added together with $4a$ to be added makes $9a$ to be added; and $3b$ to be subtracted together with $7b$ to be subtracted is $10b$ to be subtracted.

Secondly, If similar quantities have *different* signs, their sum is found by taking the difference of the coefficients with the sign of the greater and annexing the common letters as before.

Ex. 5.

$$\begin{array}{r} 7a+3b \\ -5a-9b \\ \hline \text{Sum } 2a-6b \end{array}$$

In the first part of the operation we have 7 times a to add, and 5 times a to take away, therefore upon the whole we have 2 to add. In the latter part, we have 3 times b to add, and 9 times b to take away, i. e. we have upon the whole 6 times b to take away; and thus the sum of all the quantities is $2a-6b$.

Ex. 6.

$$\begin{array}{r} a+b \\ a-b \\ \hline \text{Sum } 2a \end{array}$$

If several similar quantities are to be added together, some with positive and some with negative signs, take the difference between the sum of the positive coefficients and the sum of the negative, prefix the sign of the greater sum and annex the common letters.

Ex. 7.

$$\begin{array}{r} 3a^2+4bc-e^2+10 \\ -5a^2+6bc+2e^2-15 \\ -4a^2-9bc-10e^2+21 \\ \hline \text{Sum } -6a^2+bc-9e^2+16 \end{array}$$

The method of reasoning in this case is the same as in the last example.

SUBTRACTION.

Subtraction, or the taking away of one quantity from another, is performed by changing the sign of the quantity to be subtracted, and then adding it to the other.

Ex. 1. From $2bx$ take cy , and the difference is properly represented by $2bx-cy$; because the sign $-$ prefixed to cy , shews that it is to be subtracted from the other; and $2bx-cy$ is the sum of $2bx$ and $-cy$.

Ex. 2. Again from $2bx$ take $-cy$, and the difference is $2bx+cy$, because $2bx=-2bx+cy-cy$. Take away $-cy$ from these equal quantities, and the differences will be equal, i. e. the difference between $2bx$ and $-cy=2bx+cy$, the quantity which arises from adding $+cy$ to $2bx$.

Ex. 3. $\begin{array}{r} a+b \\ \text{Take } a-b \\ \hline \text{Difference } +2b \end{array}$	Ex. 4. $\begin{array}{r} 6a-12b \\ \text{Take } -5a-10b \\ \hline \text{Diff. } 11a-2b \end{array}$

Ex. 5. $\begin{array}{r} \text{From } 5a^2+4ab-6xy \\ \text{Take } 11a^2+6ab-4xy \\ \hline \text{Diff. } -6a^2-2ab-2xy \end{array}$	Ex. 6. $\begin{array}{r} 4a-3b+6c-11 \\ 10x+a-15-2y \\ \hline -10x+3a-3b+4+6c+2y \end{array}$

MULTIPLICATION.

The multiplication of simple algebraical quantities is performed thus: $a \times b$ or ab represents the product of a multiplied by b ; abc the product of the three quantities a , b , and c . It is also indifferent in what order they are placed, $a \times b$ and $b \times a$ being equal. For $1 \times a = a \times 1$ or one taken a times is the same with a taken once; also b taken a times, or $b \times a$, is b times as great as 1 taken a times, and a taken b times, or $a \times b$, is b times as great as a taken once; therefore $b \times a = a \times b$. Also $abc = cab = bac = acb$, &c. for, as in the former case, $1 \times a \times b = a \times b \times 1$ and $c \times a \times b$ is c times as great as $1 \times a \times b$, also $a \times b \times c$ is c times as great as $a \times b \times 1$, therefore $a \times b \times c = c \times a \times b$.

To determine the *sign* of the product observe the following rule:—If the multiplier and multiplicand have the same sign, the product is positive: if they have different signs, it is negative.

First, $+a \times +b = +ab$; because in this case a is to be taken positively b times, therefore the product ab must be positive.

Secondly, $-a \times +b = -ab$; because $-a$ is to be taken b times, that is, we must take $-ab$.

Thirdly, $+a \times -b = -ab$; for a quantity is said to be multiplied by a negative number $-b$, if it be subtracted b times; and a subtracted b times is $-ab$.

Fourthly, $-a \times -b = +ab$. Here $-a$ is to be subtracted b times, that is $-ab$ is to be subtracted, but subtracting $-ab$ is the same as adding $+ab$; therefore we have to add $+ab$.

The second and fourth cases may be thus proved: $a - a = 0$; multiply both sides by b , and $a \times b$ together with $-a \times b$ must be equal to $b \times 0$, or nothing; therefore, $-a$ multiplied by b must give $-ab$, a quantity which when added to ab makes the sum nothing. Again, $a - a = 0$; multiply both sides by $-b$, then $-ab$ together with $-a \times -b$ must be $= 0$, therefore $-a \times -b = +ab$.

If the quantities to be multiplied have coefficients, these must be multiplied together as in common arithmetic; the sign and the literal product being determined by the preceding rules. Thus $3a \times 5b = 15ab$; because $3 \times a \times 5 \times b = 3 \times 5 \times a \times b = 15ab$; $4x \times -11y = -44xy$; $-9b \times -5c = +45bc$; $-6d \times 4m = -24md$.

The powers of the same quantity are multiplied together by adding the indices; thus $a^2 \times a^3 = a^5$, for $aa \times aaa = aaaaa$. In the same manner $a^m \times a^n = a^{m+n}$; $-3a^2 \times 3 \times 5axy = -15a^3x^2y^2$.

If the multiplier or multiplicand consist of several terms, each term of the latter must be multiplied by every term of the former, and the sum of all the products taken, for the whole product of the two quantities.

Mult.

$$\begin{array}{r} \text{Mult. } a+b \\ \text{By } c+d \\ \hline \text{Prod. } ac+bc+ad+bd \end{array}$$

Here $a+b$ is to be added to itself $c+d$ times, i. e. c times and d times.

$$\begin{array}{r} \text{Mult. } a+b \\ \text{By } c-d \\ \hline \text{Prod. } ac+bc-ad-bd \end{array}$$

Here $a+b$ is to be taken $c-d$ times, that is c times wanting d times, or c times positively and d times negatively.

$$\begin{array}{r} \text{Ex. 1. Mult. } a+b \\ \text{By } a+b \\ \hline a^2+ab \\ +ab+b^2 \\ \hline \text{Prod. } a^2+2ab+b^2 \end{array}$$

$$\begin{array}{r} \text{Ex. 2. Mult. } a+b \\ \text{By } a-b \\ \hline a^2+ab \\ -ab-b^2 \\ \hline \text{Prod. } a^2-b^2 \end{array}$$

$$\begin{array}{r} \text{Ex. 3. Mult. } 3a^2-5bd \\ \text{By } -5a^2+4bd \\ \hline -15a^3+25a^2bd \\ +12a^2bd-20b^2d^2 \\ \hline \text{Prod. } -15a^3+37a^2bd-20b^2d^2 \end{array}$$

SCHOLIUM. The method of determining the sign of a product from the consideration of abstract quantities has been found fault with by some algebraical writers, who contend that $-a$, without reference to other quantities, is imaginary and consequently not the object of reason or demonstration. In answer to this objection we may observe; that whenever we make use of the notation $-a$, and say it signifies a quantity to be subtracted, we make a tacit reference to other quantities, and mean, that wherever a is concerned it is to be taken from the collective sum of those magnitudes with which it is connected; and when we speak of $-a$ being taken b times, or a subtracted b times, we must understand that it is to be taken b times from some other quantities.—If in the solution of any problem it should appear that a quantity results which is to be subtracted, and there is nothing to subtract it from, we must either conclude that the problem itself involves an absurdity, or, that some supposition made in the operation is inconsistent with the conditions of the problem. Vid. Simpson's Alg. p. 23.

DIVISION.

To divide one quantity by another, is to determine how often the latter is contained in the former, or what quantity multiplied by the latter will give the former. Thus to divide ab by a is to determine how often a must be taken to make up ab , that is, what quantity multiplied by a will give ab , which we know is b . From this consideration are derived all the rules for the division of algebraical quantities.

If the divisor and dividend be affected with like signs, the sign of the quotient is $+$; but, if their signs be unlike, the sign of the quotient is $-$. If $-ab$ be divided by $-a$, the quotient is $+b$, because $-a \times +b$ gives $-ab$; and a similar proof may be applied to the other cases.

In the division of simple quantities, if the coefficient and literal product of the divisor be found in the dividend, the other part of the dividend with the sign determined by the last rule is the quotient.

Thus $\frac{abc}{ab} = c$, because ab multiplied by c gives abc .

If we first divide by a and then by b , the result will be the same; for $\frac{abc}{a} = bc$, and $\frac{bc}{b} = c$ as before.

COR. Hence any power of a quantity is divided by any other power of the same quantity by taking the index of the divisor from the index of the dividend.

Thus, $\frac{a^5}{a^3} = a^2$; $\frac{a^5}{a^6} = \frac{1}{a}$; $\frac{a^m}{a^n} = a^{m-n}$.

If only a part of the product which forms the divisor be

contained in the dividend, the division must be represented as follows, and the quantities contained in both the divisor and dividend expunged.

Thus, $15a^3b^2c$ divided by $-3a^2bx$ or $\frac{15a^3b^2c}{-3a^2bx} = \frac{-5abc}{x}$.

First, divide by $-3a^2b$ and the quotient is $-5abc$; this quantity is still to be divided by x ; and, as x is not contained in it, the division can only be represented in the usual way, that is, $\frac{-5abc}{x}$ is the quotient.

If the dividend consist of several terms, and the divisor be a simple quantity, every term of the dividend must be divided by it.

Thus, $\frac{a^3x^2-5abx^3-6ax^4}{ax^2} = a^2-5bx-6x^2$.

When the divisor also consists of several terms, arrange both the divisor and dividend according to the powers of some one letter contained in them, then find how often the first term of the divisor is contained in the first term of the dividend, and write down this quantity for the first term in the quotient; multiply the whole divisor by it, subtract the product from the dividend, and bring down to the remainder as many other terms of the dividend as the case may require, and repeat the operation till all the terms are brought down.

Ex. If $a^2-2ab+b^2$ be divided by $a-b$, the operation will be as follows:

$$\begin{array}{r} a-b \overline{) a^2-2ab+b^2} \\ \underline{a^2-ab} \\ -ab+b^2 \\ \underline{-ab+b^2} \\ 0 \end{array}$$

The reason of this, and the preceding rule, is, that as the whole dividend is made up of all its parts, the divisor is contained in the whole as often as it is contained in all the parts. In the preceding operation we inquire first how often a is contained in a^2 , which gives a for the first term of the quotient; then multiplying the whole divisor by it, we have a^2-ab to be subtracted from the dividend, and the remainder is $-ab+b^2$, with which we are to proceed as before.

On the Transformation of Fractions to others of equal Value.

If the signs of all the terms both in the numerator and denominator of a fraction be changed, its value will not be altered. For $\frac{-ab}{-a} = +b = \frac{+ab}{+a}$.

If the numerator and denominator of a fraction be both multiplied or both divided by the same quantity, its value is not altered. For $\frac{ac}{bc} = \frac{a}{b}$. Hence a fraction is reduced to its lowest terms, by dividing both the numerator and denominator by the greatest quantity that measures them both.

The greatest common measure of two quantities is found by arranging them according to the powers of some letter, and then dividing the greater by the less, and the preceding divisor always by the last remainder, till the remainder is nothing; the last divisor will be the greatest common measure required.

Let a and b be the two quantities, and let b be contained in a , p times with a remainder c ; again let c be contained in b , q times with a remainder d , and so on till nothing remains; let d be the last divisor, and it will be the greatest common measure of a and b . The truth of this rule depends upon these two principles;

1. If one quantity measure another, it will also measure any multiple of it. Let x measure y by the units in n , then it will measure cy by the units in nc .

2. If a quantity measure two others, it will measure their sum or difference. Let a be contained in x , m times, and in

in y , n times, then $ma = x$ and $na = y$, therefore $x \pm y = ma \pm na = m \pm n \cdot a$, i. e. a is contained in $x \pm y$, $m \pm n$ times, or it measures $x \pm y$ by the units in $m \pm n$.

Now it appears that $a - pb = c$, and $b - qc = d$; every quantity therefore which measures a and b , measures pb , and $a - pb$ or c ; hence also it measures qc , and $b - qc$ or d ; that is, every common measure of a and b measures d . It appears also from the division, that $a = pb + c$, $b = qc + d$, $c = rd$, therefore d measures c , and qc , and $qc + d$ or b , hence it measures pb and $pb + c$ or a . Every common measure then of a and b measures d , and d measures a and b , therefore d is their greatest common measure.

Ex. To find the greatest common measure of $a^2 - x^2$ and $a^2 - a^2x - ax^2 + x^3$, and reduce $\frac{a^2 - x^2}{a^2 - a^2x - ax^2 + x^3}$ to its lowest terms.

$$\begin{array}{r} a^2 - a^2x - ax^2 + x^3 \quad a^2 - x^2 (a + x) \\ a^2 - a^2x - a^2x^2 + ax^3 \\ \hline a^3x + a^2x^2 - ax^3 - x^4 \\ a^2x - a^2x^2 - ax^3 + x^4 \\ \hline 2a^2x^2 - 2x^4 \end{array}$$

leaving out $2x^2$, which is found in each term of the remainder, the next divisor is $a^2 - x^2$.

$$\begin{array}{r} a^2 - x^2 \quad a^3 - a^2x - ax^2 + x^3 (a - x) \\ a^3 - ax^2 \\ \hline -a^2x + x^3 \\ -a^2x + x^3 \\ \hline * \quad * \end{array}$$

$a^2 - x^2$ is therefore the greatest common measure of the two quantities, and, if they be respectively divided by it, the fraction is reduced to $\frac{a^2 + x^2}{a - x}$ its lowest terms. The

quantity, $2x^2$, found in every term of one of the divisors, $2a^2x^2 - 2x^4$, but not in every term of the dividend, $a^3 - a^2x - ax^2 + x^3$, must be left out; otherwise the quotient will be fractional, which in the proof of the rule is supposed to be integral; and, by omitting this part, $2x^2$, no common measure of the divisor and dividend is left out, because, by the supposition, no part of $2x^2$ is found in all the terms of the dividend. If $2x^2$ be retained in the operation, and $a^3 - x^4$, or $a^3 - a^2x - ax^2 + x^3$ be divided by the last divisor thus obtained, the quotient will be fractional.

To find the greatest common measure of three quantities, a , b , c , take the greatest common measure d , of a and b , and also the greatest measure e , of b and c ; then the greatest measure of d and e is the greatest common measure required. Because every common measure of a , b , and c , measures d and e ; and every measure of d and e measures a , b , and c ; therefore the greatest common measure of d and e must be the greatest common measure of a , b , and c .

If one number be divided by another, and the preceding divisor by the remainder, the remainder will at length be less than any quantity that can be assigned. For $a = pb + c$; and b , and consequently pb , is greater than c , therefore $pb + c$ or a is greater than $2c$, and $\frac{a}{2}$ is greater than c ; there-

fore from a a quantity greater than its half has been taken; in the same manner, when c is the dividend, more than its half is taken away, and so on: but if from any quantity there be taken more than its half, and from the remainder more than its half, and so on, there will at length remain a quantity less than any that can be assigned.

If $\frac{a}{c}$ be a fraction in its lowest terms, and $\frac{b}{c}$ also in its lowest terms, $\frac{ab}{c}$ is in its lowest terms. If possible, let ab and c have a common measure m , and let $ab = mr$, and $c = ms$, then $\frac{a}{c} = \frac{mr}{ms}$ a whole number, and since $\frac{a}{c}$ is in its lowest terms, $\frac{mr}{ms}$ and ms have no common measure, there-

fore the factor m , in $\frac{mr}{b}$ is taken out by b , or m and b have a common measure, hence ms and b , that is, c and b have a common measure, which is contrary to the supposition; therefore ab and c have no common measure.

If b be supposed equal to a , it follows that a^2 and c have no common measure, or $\frac{a^2}{c}$ is a fraction in its lowest terms. In the same manner likewise $\frac{a^3}{c}$, $\frac{a^4}{c}$, &c. are in their lowest terms.

DEF. When two numbers have no common measure but unity, they are said to be *prime* to each other.

Fractions are changed to others of equal value, with a common denominator, by multiplying each numerator by every denominator except its own, for the new numerator; and all the denominators together for the common denominator.

Let $\frac{a}{b}$, $\frac{c}{d}$, $\frac{e}{f}$, be the proposed fractions; then $\frac{adf}{bdf}$, $\frac{cbf}{bdf}$, $\frac{edb}{bdf}$ are fractions of the same value with the former, having the common denominator bdf : for $\frac{adf}{bdf} = \frac{a}{b}$, $\frac{cbf}{bdf} = \frac{c}{d}$, and $\frac{edb}{bdf} = \frac{e}{f}$; the numerator and denominator of each fraction having been multiplied by the same quantity, viz. the product of the denominators of all the other fractions.

On the Addition and Subtraction of Fractions.

If the fractions to be added have a common denominator, their sum is found by adding the numerators together and retaining the common denominator; thus $\frac{a}{b} + \frac{c}{b} = \frac{a+c}{b}$.

If the fractions have not a common denominator, they must be transformed to others of the same value which have a common denominator, and then the addition may take place as before. Ex. $\frac{a}{b} + \frac{c}{d} = \frac{ad}{bd} + \frac{bc}{bd} = \frac{ad+bc}{bd}$.

If two fractions have a common denominator, their difference is found by taking the difference of the numerators and retaining the common denominator. Thus, $\frac{a}{b} - \frac{c}{b} = \frac{a-c}{b}$.

If they have not a common denominator, they must be transformed to others of the same value which have a common denominator, and then the subtraction may take place as before. Ex. $\frac{a}{b} - \frac{c}{d} = \frac{ad}{bd} - \frac{bc}{bd} = \frac{ad-bc}{bd}$.

On the Multiplication and Division of Fractions.

A fraction is multiplied by any quantity, by multiplying the numerator by that quantity and retaining the denominator. Thus, $\frac{a}{b} \times c = \frac{ac}{b}$; for, if the quantity to be divided be c times as great as before, and the divisor the same, the quotient must be c times as great.

COR. 1. $\frac{a}{b} \times b = \frac{ab}{b} = a$. That is, if a fraction be multiplied by its denominator, the product is the numerator.

COR. 2. The result is the same whether the numerator be multiplied by a given quantity, or the denominator divided by it. Let the fraction be $\frac{ad}{bc}$, and let its numerator be multiplied by c , the result then is $\frac{adc}{bc}$, or $\frac{ad}{b}$, being the quantity which arises from dividing its denominator by c .

The product of two fractions is found by multiplying

the numerators together for a new numerator, and the denominators for a new denominator. Let $\frac{a}{b}$ and $\frac{c}{d}$ be the two fractions, then $\frac{a}{b} \times \frac{c}{d} = \frac{ac}{bd}$. For if $\frac{a}{b} = x$, and $\frac{c}{d} = y$, by multiplying the equal quantities $\frac{a}{b}$ and x by b , $a = bx$; in the same manner $c = dy$, and by the same axiom $ac = bdx$; dividing these equal quantities, ac and bdx , by bd , we have $\frac{ac}{bd} = xy = \frac{a}{b} \times \frac{c}{d}$.

To divide a fraction by any quantity, multiply the denominator by that quantity, and retain the numerator. The fraction $\frac{a}{b}$ divided by c is $\frac{a}{bc}$. Because $\frac{a}{b} = \frac{ac}{bc}$, and each part of this is $\frac{a}{bc}$; the quantity to be divided being each part of what it was before, and the divisor the same.

COR. The result is the same whether the denominator is multiplied by the quantity or the numerator divided by it.

Let the fraction be $\frac{ac}{bd}$; if the denominator be multiplied by c , it becomes $\frac{ac}{bdc}$ or $\frac{a}{bd}$, the quantity which arises from dividing the numerator by c .

To divide one fraction by another, invert the numerator and denominator of the divisor, and proceed as in multiplication. Let $\frac{a}{b}$ and $\frac{c}{d}$ be the two fractions, then $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c} = \frac{ad}{bc}$. Proof. Let $\frac{a}{b} = x$, and $\frac{c}{d} = y$; then $a = bx$, and $c = dy$, also $ad = bdx$, and $bc = bdy$; therefore, $\frac{ad}{bc} = \frac{bdx}{bdy} = \frac{x}{y} = \frac{a}{b} \div \frac{c}{d}$.

On Involution and Evolution.

If a quantity be continually multiplied by itself, it is said to be involved or raised; and the power to which it is raised is expressed by the number of times the quantity has been employed in the multiplication. Thus $a \times a$, or a^2 , is called the second power of a ; $a \times a \times a$, or a^3 , the third power; a^n , the n th power.

If the quantity to be involved be negative, the signs of the even powers will be positive, and the signs of the odd powers negative. For $-a \times -a = a^2$; $-a \times -a \times -a = -a^3$, &c.

A simple quantity is raised to any power by multiplying the index of every factor in the quantity by the exponent of the power, and prefixing the proper sign determined by the last article. Thus a^m , raised to the n th power, is a^{mn} . Because $a^m \times a^m \times a^m \dots$ to n factors, by the rule for multiplication, is a^{mn} ; $(ab)^n = ab \times ab \times ab \times \dots$ to n factors, or $a \times a \times a \dots$ to n factors, $\times b \times b \times b \dots$ to n factors, $= a^n \times b^n$; $a^m b^c$ raised to the fifth power is $a^{5m} b^{5c}$. Also $-a^m$ raised to the n th power is $\pm a^{mn}$, where the positive or negative sign is to be prefixed according as n is even or odd.

If the quantity to be involved be a fraction, both the numerator and denominator must be raised to the proposed power.

If the quantity proposed be a compound one, the involution may either be represented by the proper index, or it may actually take place.

Let $a+b$ be the quantity to be raised to any power.

$$\begin{array}{r} a+b \\ a+b \\ \hline a^2+ab \\ +ab+b^2 \\ \hline a+b)^2 \text{ or } a^2+2ab+b^2 \text{ the square, or second power.} \\ a+b \\ \hline a^3+2a^2b+ab^2 \\ +a^2b+2ab^2+b^3 \\ \hline a+b)^3 \text{ or } a^3+3a^2b+3ab^2+b^3 \text{ the third power.} \end{array}$$

$a+b)^3$ or $a^3+3a^2b+3ab^2+b^3$ the third power.

$a+b$

$$\frac{a^3+3a^2b+3ab^2+b^3}{a+b}$$

$a+b)^4$ or $a^4+4a^3b+6a^2b^2+4ab^3+b^4$ the fourth power.

If b be negative, or the quantity to be involved $a-b$, whenever an odd power of b enters, the sign of the term must be negative; hence $a-b)^4 = a^4-4a^3b+6a^2b^2-4ab^3+b^4$.

Evolution, or the extraction of roots, is the method of determining a quantity, which, raised to a proposed power, will produce a given quantity.

Since the n th power of a^m is a^{mn} , the n th root of a^{mn} must be a^m ; i. e. to extract any root of a simple quantity, we must divide the index of the proposed quantity by the index of the root required.

COR. The square, cube, fourth, n th, root of a , are properly represented by $a^{\frac{1}{2}}$, $a^{\frac{1}{3}}$, $a^{\frac{1}{4}}$, $a^{\frac{1}{n}}$; and in like manner the same roots of any compound quantity; a^2+x^2 , are properly represented by $\overline{a^2+x^2}^{\frac{1}{2}}$, $\overline{a^2+x^2}^{\frac{1}{3}}$, $\overline{a^2+x^2}^{\frac{1}{4}}$, $\overline{a^2+x^2}^{\frac{1}{n}}$; also the n th root of the m th power of a , is expressed by $a^{\frac{m}{n}}$, of $a+x$, by $\overline{a+x}^{\frac{m}{n}}$, &c. and the square, cube, fourth, &c. root of $\frac{a}{b}$ or a^{-1} , by $a^{-\frac{1}{2}}$, $a^{-\frac{1}{3}}$, $a^{-\frac{1}{4}}$, &c. and of

$\frac{1}{a^2+x^2}$ or $\overline{a^2+x^2}^{-1}$, by $\overline{a^2+x^2}^{-\frac{1}{2}}$, $\overline{a^2+x^2}^{-\frac{1}{3}}$, $\overline{a^2+x^2}^{-\frac{1}{4}}$, &c. Here we suppose the rule for the multiplication of the powers of the same quantity to extend to roots; and since, according to this rule, $a^{\frac{1}{2}} \times a^{\frac{1}{2}} = a^1$, the square root of a^1 , or a , is properly represented by $a^{\frac{1}{2}}$. Again, $a^{-\frac{1}{3}} \times a^{-\frac{1}{3}} \times a^{-\frac{1}{3}} = a^{-1}$, therefore $a^{-\frac{1}{3}}$ represents the cube root of a^{-1} ; and the same reasoning extends to the other examples.

If the root to be extracted be represented by an odd number, the sign of the root will be the same with the sign of the proposed quantity. If the root to be extracted be represented by an even number, and the quantity proposed positive, the root may be either positive or negative. Because either a positive or negative quantity, raised to such a power, is positive.

If the root proposed to be extracted be represented by an even number, and the sign of the proposed quantity be negative, the root cannot be extracted; because no quantity raised to an even power can produce a negative result. Such roots are called *impossible*.

Any root of a product may be found by taking that root of each factor, and multiplying the roots, so taken, together. Thus $\overline{ab}^{\frac{1}{n}} = a^{\frac{1}{n}} \times b^{\frac{1}{n}}$; because $a^{\frac{1}{n}} \times b^{\frac{1}{n}}$ raised to the n th power is ab .

Any root of a fraction may be found by taking that root of both the numerator and denominator. Thus, the cube root of $\frac{a^2}{b^2}$ is $\frac{a^{\frac{2}{3}}}{b^{\frac{2}{3}}}$ or $a^{\frac{2}{3}} \times b^{-\frac{2}{3}}$; $\overline{\frac{a^2}{b^2}}^{\frac{1}{3}} = \frac{a^{\frac{2}{3}}}{b^{\frac{2}{3}}}$.

The method of extracting the root of a compound quantity will be understood by attending to the involution. The square root of $a^2+2ab+b^2$ is known to be $a+b$. In order then to establish a general rule for the extraction of the square root, observe in what manner a and b may be determined from $a^2+2ab+b^2$.

Having arranged the terms according to the dimensions of one letter, (a), the square root of the first term a^2 is a , the first factor in the root; subtract its square from the whole quantity, and bring down the remainder $2ab+b^2$; divide $2ab$ by $2a$, and the result is b , the other factor in the root; then multiply the sum of twice the first factor and the second ($2a+b$) by

$$\begin{array}{r} a^2+2ab+b^2(a+b) \\ a^2 \\ \hline 2a+b)2ab+b^2 \\ 2ab+b^2 \\ \hline * * * \end{array}$$

by the second (b), and subtract this product ($2ab + b^2$) from the remainder. If there be more terms, proceed as before, always dividing the remainder by twice the root already obtained, for a new factor in the root; and, for a new subtrahend, multiply this factor by twice the sum of the former factors increased by this factor.

Ex. 1. To extract the square root of $a^2 - ax + \frac{x^2}{4}$.

$$\begin{array}{r} a^2 - ax + \frac{x^2}{4} \\ \underline{a^2} \phantom{- ax + \frac{x^2}{4}} \\ -ax + \frac{x^2}{4} \\ \underline{-ax + \frac{x^2}{4}} \\ * * * \end{array}$$

It appears from this example, that a trinomial $a^2 - ax + \frac{x^2}{4}$, in which four times the product of the first and last terms is equal to the square of the middle term, is a complete square.

The method of extracting the cube root is discovered in the same manner. The cube root of $a^3 + 3a^2b + 3ab^2 + b^3$ is $a + b$.

Having arranged the terms as before, the cube root of the first term a^3 is a , the first factor in the root; subtract its cube from the whole quantity, and divide the first term of the remainder by $3a^2$, the result is b , the second factor in the root; then subtract $3a^2b + 3ab^2 + b^3$ from the remainder, and the whole cube of $a + b$ has been subtracted. If any quantity be left, proceed with $a + b$ as a new a , and divide the last remainder by $3 \cdot a + b^2$ for a third factor in the root; and thus any number of factors may be obtained.

$$\begin{array}{r} a^3 + 3a^2b + 3ab^2 + b^3 \\ \underline{a^3} \\ 3a^2b + 3ab^2 + b^3 \\ \underline{3a^2b + 3ab^2 + b^3} \\ * * * \end{array}$$

SCHOLIUM. These rules for the extraction of the roots of compound quantities, are but little used in algebraical or fluxional operations; but it was necessary to give them at full length, for the purpose of investigating rules for the extraction of the square and cube roots in numbers.

The square root of 100 is 10, of 10,000 is 100, of 1,000,000 is 1,000, &c. from which consideration it follows that the square root of a number less than 100 must consist of only one figure, of a number between 100 and 10,000 of two places of figures, of any number from 10,000 to 1,000,000 of three places of figures, &c. If then a point be made over every second figure in any number, beginning with the units, the number of points will shew the number of figures or places in the square root. Thus the square root of 4357 consists of two figures, the square root of 56478, of three figures, &c. Ex. Let the square root of 4357 be required.

Having pointed it according to the direction, it appears that the root consists of two places of figures; let $a + b$ be the root, where a is the value of the figure in the ten's place, and b of that in the unit's; then is a the nearest square root of 4300, which does not exceed the true root, this appears to be 60; subtract the square of 60 (a^2) from the given number, and the remainder is 757; divide this remainder by 120 ($2a$), and the quotient is 6 (the value of b), and the subtrahend, or quantity to be taken from the last remainder 757, is 126×6 ($2a + b \cdot b$) or 756.

It is said that a must be the greatest number whose square does not exceed 4300. It evidently cannot be a greater number than this, and if possible let it be some quantity

(x) less than this; then since x is in the ten's place, and b in the unit's, $x + b$ is less than a , therefore the square of $x + b$, whatever be the value of b , must be less than a^2 , and consequently $x + b$ less than the true root.

If the root consists of three places of figures, let a represent the hundreds, and b the tens; then, having obtained a and b as before, let the new value of a be the hundreds and tens together, and find a new value of b for the units; and thus the process may be continued if there be more places of figures in the root.

The cyphers being omitted for the sake of expedition, the following rule is obtained from the foregoing process:

Point every second figure beginning with the unit's place, dividing by this means the whole number into several periods; find the greatest number whose square is contained in the first period, this is the first figure in the root; subtract its square from the first period, and to the remainder bring down the next period; divide this quantity, omitting the last figure, by twice the part of the root already obtained, and annex the result to the root and also to the divisor; then multiply the divisor as it now stands by the part of the root last obtained, for the subtrahend. If there be more periods to bring down, the process must be repeated.

In extracting the square root of a decimal, the pointing must be made the contrary way, beginning with the place of hundredths; or care must be taken to have an even number of decimal places, because, if the root has 1, 2, 3, 4, &c. decimal places, the square must have 2, 4, 6, 8, &c. places.

Ex. To extract the square root of 64.853.

$$\begin{array}{r} 64.8530(8.053 \text{ \&c.} \\ \underline{64} \\ 1605) 8530 \\ 8025 \\ 50500 \\ 48309 \\ 2191 \text{ \&c.} \end{array}$$

For every pair of cyphers which we suppose annexed to the decimal, another figure is obtained in the root.

The cube root of 1,000 is 10, of 1,000,000 is 100, &c. therefore the cube root of a number less than 1,000 consists of one figure, of any number between 1,000 and 1,000,000 of two places of figures, &c. If then a point be made over every third figure contained in any number, beginning with the units, the number of points will shew the number of places in its cube root.

Let the cube root of 405224 be required.

$$\begin{array}{r} 405224(70+4 \\ \underline{a^3 = 343000} \\ 3a^2 = 14700) 62224 \text{ the first remainder.} \\ 58800 = 3a^2b \\ 3360 = 3ab^2 \\ 64 = b^3 \\ 62224 \text{ subtrahend.} \end{array}$$

By pointing the number according to the direction, it appears, that the root consists of two places; let a be the value of the figure in the ten's place, and b of that in the unit's. Then a is the greatest number whose cube is contained in 405000, or 70; subtract its cube from the whole quantity, and the remainder is 62224; divide this remainder by $3a^2$, or 14700, and the quotient 4, or b , is the second term in the root; then subtract the cube of 74 from the original number, and, as the remainder is nothing, 74 is the cube root required. Observe, that the cyphers may be omitted in the operation; and that, as a^3 was at first subtracted, if, from the first remainder, $3a^2b + 3ab^2 + b^3$ be taken, the whole cube of $a + b$ will be taken from the original quantity.

In extracting the cube root of a decimal, care must be taken that the decimal places be three, or some multiple of three, before the operation is begun; because there are three times as many decimal places in the cube as there are in the root.

On Simple Equations.

If one quantity be equal to another, or to nothing, and this equality be expressed algebraically, it constitutes an equation. Thus $x - a = b - x$ is an equation, of which $x - a$ forms one side and $b - x$ the other.

An equation, in any of whose terms the first power of one unknown quantity only is contained, is called a *simple equation*, or an equation of one dimension; if the *square* of an unknown quantity be in any way involved, it is called a *quadratic*, or equation of two dimensions; and, in general, if the index of the highest power of the unknown quantity be n , it is called an *equation of n dimensions*.

In any equation, quantities may be transposed from one side to the other, if their signs be changed, and the two sides will still be equal. Let $x + 10 = 15$, then by subtracting 10 from both sides, $x + 10 - 10 = 15 - 10$, or $x = 15 - 10$.

Let $x - 4 = 6$, by adding 4 to both sides, $x - 4 + 4 = 6 + 4$, or $x = 6 + 4$.

If $x - a + b = y$, adding $a - b$ to both sides, $x - a + b + a - b = y + a - b$, or $x = y + a - b$.

COR. Hence, if the signs of all the terms on each side be changed, the two sides will still be equal. Let $x - a = b - 2x$; by transposition, $-b + 2x = -x + a$; or $a - x = 2x - b$.

If every term on each side be multiplied by the same quantity, the results will be equal.

COR. An equation may be cleared of fractions by multiplying every term, successively, by the denominators of those fractions. Let $3x + \frac{5x}{4} = 34$; multiplying by 4, $12x + 5x = 136$.

An equation may be cleared of fractions at once, by multiplying both sides by the product of all the denominators, or by any quantity which is a multiple of them all.

Let $\frac{x}{2} + \frac{x}{3} + \frac{x}{4} = 13$; multiplying by $2 \times 3 \times 4$, $3 \times 4 \times x + 2 \times 4 \times x + 2 \times 3 \times x = 2 \times 3 \times 4 \times 13$, or $12x + 8x + 6x = 312$; that is, $26x = 312$.

If both sides be multiplied by 12, which is a multiple of 2, 3, and 4, the equation will become $\frac{12x}{2} + \frac{12x}{3} + \frac{12x}{4} = 156$, or $6x + 4x + 3x = 156$; that is, $13x = 156$.

If each side of an equation be divided by the same quantity, the results will be equal. Let $17x = 136$, then $x = \frac{136}{17} = 8$.

If each side of an equation be raised to the same power, the results will be equal. Let $x^2 = 9$, then $x = 9 \times 9 = 81$.

Also, if the same root be extracted on both sides, the results will be equal. Let $x = 81$, then $x^{\frac{1}{4}} = 9$.

To find the value of the unknown quantity in a simple equation, let the equation first be cleared of fractions, then transpose all the terms which involve the unknown quantity to one side of the equation, and the known quantities to the other; divide both sides by the coefficient, or sum of the coefficients, of the unknown quantity, and the value required is obtained.

Ex. To find the value of x in the equation $3x - 5 = 23 - x$.

By transp. $3x + x = 23 + 5$

Or $4x = 28$

By division $x = \frac{28}{4} = 7$

If there be two independent simple equations involving two unknown quantities, they may be reduced to one which involves only one of the unknown quantities, by either of the following methods:

First, In either equation find the value of one of the unknown quantities in terms of the other and known quantities, and for it substitute this value in the other equation, which will then only contain one unknown quantity, whose value may be found by the rules before laid down.

Let $x + y = 10$

And $2x - 3y = 5$

From the first equat. $x = 10 - y$ and $2x = 20 - 2y$

By sub. $20 - 2y - 3y = 5$

$20 - 5 = 2y + 3y$

$15 = 5y$

$y = \frac{15}{5} = 3$

Hence also $x = 10 - y = 10 - 3 = 7$.

Secondly, If either of the unknown quantities have the same coefficient in both equations, it may be exterminated by subtracting or adding the equations according as the sign of the unknown quantity, in the two cases, is the same or different.

Let $\begin{cases} x + y = 15 \\ x - y = 7 \end{cases}$ To find x and y .

By subtraction, $2y = 8$, and $y = 4$

By addition, $2x = 22$, and $x = 11$.

If the coefficients of the unknown quantity to be exterminated be different, multiply the terms of the first equation by the coefficient of that unknown quantity in the second, and the terms of the second equation by its coefficient in the first, then add or subtract the resulting equations as in the former case.

Let $\begin{cases} 3x - 5y = 13 \\ 2x + 7y = 81 \end{cases}$ To find x and y .

Multiply the terms of the first equation by 2, and the terms of the other by 3,

Then $6x - 10y = 26$

$6x + 21y = 243$

By subtraction, $-31y = -217$

And $y = \frac{217}{31} = 7$

Also $3x - 5y = 13$ or $3x - 35 = 13$

Therefore $3x = 13 + 35 = 48$

And $x = \frac{48}{3} = 16$.

If there be three independent simple equations, and three unknown quantities, reduce two of the equations to one, containing only two of the unknown quantities, by the preceding rules; then reduce the third equation and either of the former to one, containing the same two unknown quantities; and, from the two equations thus obtained, the unknown quantities which they involve may be found. The third quantity may be found by substituting their values in any of the proposed equations.

Ex. Let $\begin{cases} 2x + 3y + 4z = 16 \\ 3x + 2y - 5z = 8 \\ 5x - 6y + 3z = 6 \end{cases}$ To find x , y , and z .

From the two first equat. $6x + 9y + 12z = 48$

$6x + 4y - 10z = 16$

By subtr. $5y + 22z = 32$

From the first and third, $10x + 15y + 20z = 80$

$10x - 12y + 6z = 12$

By subtr. $27y + 14z = 68$

And $5y + 22z = 32$

Hence $135y + 70z = 340$

And $135y + 594z = 864$

By subtr. $524z = 524$

$z = 1$

$5y + 22z = 32$

That is, $5y + 22 = 32$

$5y = 32 - 22 = 10$

$y = \frac{10}{5} = 2$

$2x + 3y + 4z = 16$

That is, $2x + 6 + 4 = 16$

$2x = 16 - 6 - 4 = 6$

$x = 3$.

The same method may be applied to any number of simple equations.

That the unknown quantities may have definite values, there must be as many independent equations as unknown quantities. When there are more equations than unknown quantities, the value of any one of these quantities may be determined from different equations; and should the values, thus found, differ, the equations are incongruous; should they be the same, one or more of the equations are unnecessary. When there are fewer equations than unknown quantities, one of these quantities cannot be found, but in terms which involve some of the rest, whose value may be assumed at pleasure; and in such cases the number of answers is indefinite. Thus, if $x+y=a$, $x=a-y$; and, assuming y at pleasure, we obtain a value of x , such, that $x+y=a$.

These equations must also be independent, that is, not deducible one from another.

Let $x+y=a$, and $2x+2y=2a$; this latter equation being deducible from the former, involves no different supposition, or requires any thing more for its truth than that $x+y=a$ should be a just equation.

Problems which produce Simple Equations.

From certain quantities which are known, to investigate others which have a given relation to them, is the business of algebra. When a question is proposed to be resolved, we must first consider fully its meaning and conditions. Then, substituting for such unknown quantities as appear most convenient, we must proceed as if they were already determined, and we wished to try whether they would answer all the proposed conditions or not, till as many independent equations arise as we have assumed unknown quantities, which will always be the case if the question be properly limited; and, by the solution of these equations, the quantities sought will be determined.

PROB. 1. A bankrupt owes A twice as much as he owes B , and C as much as he owes A and B together; out of 300l. which is to be divided amongst them, what must each receive?

Let x represent what B must receive;
Then $2x$ is equal to what A must receive,
And $x+2x$, or $3x$, is equal to what C must receive.
Amongst them they receive 300l. therefore,

$$x+2x+3x=300$$

$$6x=300$$

$$x=\frac{300}{6}=50, \text{ what } B \text{ must receive.}$$

$$2x=100, \text{ what } A \text{ must receive.}$$

$$3x=150, \text{ what } C \text{ must receive.}$$

PROB. 2. A workman was employed for sixty days, on condition that for every day he worked he should receive 15 pence, and for every day he played he should forfeit 5 pence; at the end of the time he had 20s. to receive; required the number of days he worked.

Let x be the number of days he worked;

Then $60-x$ is the number he played.

15x his pay, in pence.

300-5x, sum forfeited.

15x-300+5x=240, by the question.

$$20x=240+300=540$$

$$x=27, \text{ the days he worked.}$$

$$60-x=33, \text{ the days he played.}$$

PROB. 3. A and B play at bowls, and A bets B three shillings to two upon every game; after a certain number of games it appears that A has won three shillings, but had he ventured to bet five shillings to two, and lost one game more out of the same number, he would have lost thirty shillings: how many games did they play?

Let x be the number of games A won;

y the number B won.

Then $2x$ is what A won of B ,

And $3y$ what B won of A .

$$2x-3y=3, \text{ by the question;}$$

$x-1.2 A$ would win on the 2d supposition.

$y+1.5 B$ would win.

$$5y+5-2x+2=30$$

$$5y-2x=30-5-2=23$$

Therefore, $2x-3y=3$

And $5y-2x=23$

By addition, $5y-3y=26$

$$2y=26$$

$$y=13$$

$$2x=3+3y=3+39=42$$

$$x=21$$

$$x+y=34; \text{ the number of games.}$$

On Quadratic Equations.

When the terms of an equation involve the square of the unknown quantity, but the first power does not appear, the value of the square is obtained by the preceding rules; and, by extracting the square root on both sides, the quantity itself is found.

Ex. Let $5x^2-45=0$; to find x .

By transf. $5x^2=45$

$$x^2=9$$

Therefore, $x=\sqrt{9}=\pm 3$.

The signs $+$ and $-$ are both prefixed to the root, because the square root of a quantity may be either positive or negative. The sign of x may also be negative, but still x will be either equal to $+3$ or -3 .

Ex. Let $ax^2=bcd$; to find x .

$$x^2=\frac{bcd}{a}$$

$$x=\pm\sqrt{\frac{bcd}{a}}$$

If both the first and second powers of the unknown quantity be found in an equation, arrange the terms according to the dimensions of the unknown quantity, beginning with the highest, and transpose the known quantities to the other side; then, if the square of the unknown quantity be affected with a coefficient, divide all the terms by this coefficient, and, if its sign be negative, change the signs of all the terms; that the equation may be reduced to this form, $x^2\pm px=\pm q$. Then add to both sides the square of half the coefficient of the first power of the unknown quantity, by which means the first side of the equation is made a complete square, and the other consists of known quantities; and, by extracting the square root on both sides, a simple equation is produced, from which the value of the unknown quantity may be found.

Ex. 1. Let $x^2+px=q$; now we know that $x^2+px+\frac{p^2}{4}$ is the square of $x+\frac{p}{2}$; add therefore $\frac{p^2}{4}$ to both sides, and we have.

$x^2+px+\frac{p^2}{4}=q+\frac{p^2}{4}$; then, by extracting the square root on both sides,

$$x+\frac{p}{2}=\pm\sqrt{q+\frac{p^2}{4}}; \text{ and by transposition,}$$

$$x=-\frac{p}{2}\pm\sqrt{q+\frac{p^2}{4}}$$

In the same manner, if $x^2-px=q$, x is found to be $\frac{p}{2}\pm\sqrt{q+\frac{p^2}{4}}$.

Ex. 2. Let $x^2-12x+35=0$; to find x .

By transf. $x^2-12x=-35$, and, adding the square of 6 to both sides of the equation,

$x^2-12x+36=36-35=1$; then, extracting the square root on both sides,

$$x-6=\pm 1$$

And $x=6\pm 1=7$, or 5 ; either of which, substituted

stituted for x in the original equation, answers the condition, that is, makes the whole equal to nothing.

It should be particularly observed, that, since $+x \times +y$ is equal to $-x \times -y$, in the multiplication and involution of quantities, new values are always introduced, which, if not again excluded by the nature of the question, will at length appear.

Every equation, where the unknown quantity is found in two terms, and its index in one is twice as great as in the other, may be resolved as follows:

Ex. 3. Let $z + 4z^{\frac{1}{2}} = 21$

$$z + 4z^{\frac{1}{2}} + 4 = 21 + 4 = 25$$

$$z^{\frac{1}{2}} + 2 = \pm 5$$

$$z^{\frac{1}{2}} = \pm 5 - 2 = 3, \text{ or } -7.$$

Therefore, $z = 9$, or 49 .

When there are more equations and unknown quantities than one, a single equation, involving only one of the unknown quantities, may sometimes be obtained by the rules laid down for the solution of simple equations; and, one of the unknown quantities being discovered, the others may be obtained by substituting its value in the preceding equations.

Ex. 4. Let $\begin{cases} x - \frac{x-y}{2} = 4 \\ y - \frac{x+3y}{x+2} = 1 \end{cases}$ To find x and y .

From the first equation, $2x - x + y = 8$

$$x + y = 8$$

$$\text{And } x = 8 - y$$

From the 2d equation, $xy + 2y - x - 3y = x + 2$

$$\text{Or } xy - 2x - y = 2$$

By substitution, $8 - y \times y - 2 \times 8 - y - y = 2$

$$8y - y^2 - 16 + 2y - y = 2$$

$$9y - y^2 = 16 + 2 = 18.$$

$$y^2 - 9y = -18$$

$$y^2 - 9y + \frac{81}{4} = \frac{81}{4} - 18 = \frac{9}{4}$$

$$y - \frac{9}{2} = \pm \frac{3}{2}$$

$$y = \frac{9 \pm 3}{2} = 6, \text{ or } 3$$

$$x = 8 - y = 2, \text{ or } 5.$$

The solution will often be rendered more simple by particular artifices, the proper application of which can only be learned by experience.

Problems producing Quadratic Equations.

Prob. 1. A person bought a certain number of oxen for eighty guineas, and, if he had bought four more for the same sum, they would have cost a guinea a-piece less; required the number of oxen and price of each.

Let x be the number

Then $\frac{80}{x}$ is the price of each

And $\frac{80}{x+4}$ the price of each on the second supposition

$$\frac{80}{x+4} = \frac{80}{x} - 1, \text{ by the question,}$$

$$80 = \frac{80x + 320}{x} - x - 4$$

$$80x = 80x + 320 - x^2 - 4x$$

$$x^2 + 4x = 320$$

$$x^2 + 4x + 4 = 324$$

$$x + 2 = \pm 18$$

$$x = \pm 18 - 2 = 16, \text{ or } -20.$$

$$\frac{80}{16} = 5 \text{ guineas, the price of each.}$$

In this and in many other cases, especially in the solution of philosophical questions, we deduce, from the alge-

braical process, answers which do not correspond with the conditions. The reason seems to be, that the algebraical expression is more general than the common language, and the equation which is a proper representation of the conditions will also express other conditions and answer other suppositions. In the foregoing instance, since x may either represent a positive or a negative quantity, the equation

$\frac{80}{x+4} = \frac{80}{x} - 1$, when x is negative or represents the diminution of stock, will be a proper expression for the solution of the following problem. A person sells a certain number of oxen for 80 guineas, had he sold four less for the same sum he would have received a guinea a-piece more for them; required the number sold.

Prob. 2. To divide a line of 20 inches into two parts, such, that the rectangle under the whole and one part may be equal to the square of the other.

Let x be the greater part; then will $20 - x$ be the less,

And $x^2 = 20 - x \cdot 20 = 400 - 20x$, by the question,

$$x^2 + 20x = 400$$

$$x^2 + 20x + 100 = 400 + 100 = 500$$

$$x + 10 = \pm \sqrt{500}$$

$$x = \pm \sqrt{500} - 10 \text{ or } -\sqrt{500} - 10.$$

The observation contained in the preceding article may be applied here; and it is to be remarked, that the negative values thus deduced are not insignificant or useless. Here the negative value shews, that, if the line be produced $\sqrt{500} + 10$ inches, the square of the part produced is equal to the rectangle under the line given, and the line made up of the whole and part produced.

On Ratios.

Ratio is the relation which one quantity bears to another in respect of magnitude, the comparison being made by considering how often one contains, or is contained by, the other.

Thus, in comparing 6 with 3, we observe that it has a certain magnitude with respect to it, as it contains it twice; again, in comparing it with 2, we see that it has a different relative magnitude, for it contains 2 three times, or it is greater when compared with 2 than it is when compared with 3. The ratio of a to b is usually expressed by two points placed between them, thus, $a : b$; and the former is called the *antecedent* of the ratio, the latter the *consequent*.

COR. 1. When one antecedent is the same multiple, part, or parts, of its consequent, that another antecedent is of its consequent, the ratios are equal. Thus the ratio of 4 : 6 is equal to the ratio of 2 : 3, i. e. 4 has the same magnitude when compared with 6, that 2 has when compared

with 3, since $\frac{4}{6} = \frac{2}{3}$; also the ratio of $a : b$ is equal to the ratio of $c : d$ if $\frac{a}{b} = \frac{c}{d}$, because $\frac{a}{b}$ and $\frac{c}{d}$ represent the multiple, part, or parts, that a is of b , and c of d .

COR. 2. If the terms of a ratio be multiplied or divided by the same quantity, the ratio is not altered. For $\frac{a}{b} = \frac{ma}{mb}$.

COR. 3. That ratio is greater than another, whose antecedent is the greater multiple, part, or parts, of its consequent. Thus the ratio of 7 : 4 is greater than the ratio of 8 : 5, because $\frac{7}{4}$, or $\frac{35}{20}$, is greater than $\frac{8}{5}$, or $\frac{32}{20}$. These conclusions follow immediately from our idea of ratio.

A ratio is called a ratio of *greater inequality*, of *less inequality*, or of *equality*, according as the antecedent is greater, less than, or equal to, the consequent.

A ratio of greater inequality is diminished, and of less inequality increased, by adding any quantity to both its terms. If to the terms of the ratio 7 : 4, 1 be added, it becomes the ratio of 8 : 5, which is less than the former. And, in general, let x be added to the ratio $a : b$, and it becomes

becomes $a+x:b+x$, which is greater or less than the former, according as $\frac{a+x}{b+x}$ is greater or less than $\frac{a}{b}$, or by reducing them to a common denominator, as $\frac{ab+bx}{b \cdot b+x}$ is greater or less than $\frac{ab+ax}{b \cdot b+x}$, that is, as b is greater or less than a .

Hence a ratio of greater inequality is increased, and of less inequality diminished, by taking from the terms a quantity less than either of them.

If the antecedents of any ratios be multiplied together, and also the consequents, a new ratio results which is said to be compounded of the former. Thus $ac:bd$ is said to be compounded of the two, $a:b$ and $c:d$. It is also sometimes called the sum of the ratios; and, when the ratio $a:b$ is compounded with itself, the resulting ratio $a^2:b^2$ is called the double of the ratio of $a:b$; and, if three of these ratios be compounded together, the result, $a^3:b^3$, is called the triple of the first, &c. Also the ratio of $a:b$ is said to be one third of the ratio of $a^3:b^3$; and $\frac{1}{m}a:\frac{1}{m}b$ is said to be an m th part of the ratio of $a:b$.

If the consequent of the preceding ratio be the antecedent of the succeeding one, and any number of such ratios be taken, the ratio which arises from their composition is that of the first antecedent to the last consequent. Let $a:b, b:c, c:d$, &c. be the ratios, the compound ratio is $a \times b \times c : b \times c \times d$; or, dividing by $b \times c$, $a:d$.

A ratio of greater inequality compounded with another increases, and a ratio of less inequality diminishes, it. Let the ratio of $x:y$ be compounded with the ratio of $a:b$, the resulting ratio $ax:by$ is greater or less than the ratio $a:b$, according as $\frac{ax}{by}$ is greater or less than $\frac{a}{b}$, i. e. according as x is greater or less than y .

On Proportion.

Four quantities are said to be *proportionals*, when the first is the same multiple, part, or parts, of the second, that the third is of the fourth. That is, when $\frac{a}{b} = \frac{c}{d}$, the four quantities, a, b, c, d , are called proportionals. This is usually expressed by saying, a is to b as c is to d ; and thus represented, $a:b::c:d$. The terms a and d are called the *extremes*, and b and c the *means*.

When four quantities are proportionals, the product of the extremes is equal to the product of the means. Let a, b, c, d , be the four quantities; then, since they are proportionals, $\frac{a}{b} = \frac{c}{d}$, and, by multiplying both sides by bd , $ad=bc$.

COR. 1. If the first be to the second as the second to the third, the product of the extremes is equal to the square of the mean.

COR. 2. Any three terms in a proportion being given, the fourth may be determined from the equation $ad=bc$.

If the product of two quantities be equal to the product of two others, the four are proportionals, making the terms of one product the means, and the terms of the other the extremes. Let $xy=ab$; then, dividing by ay , $\frac{x}{a} = \frac{b}{y}$, or $x:a::b:y$.

If $a:b::c:d$, and $c:d::e:f$, then will $a:b::e:f$; because $\frac{a}{b} = \frac{c}{d}$, and $\frac{c}{d} = \frac{e}{f}$, therefore $\frac{a}{b} = \frac{e}{f}$, or $a:b::e:f$.

If four quantities be proportionals, they are also proportionals when taken *inversely*. If $a:b::c:d$, then $b:a::d:c$. For $\frac{a}{b} = \frac{c}{d}$, and dividing unit by each of these

equal quantities, or taking their reciprocals, $\frac{b}{a} = \frac{d}{c}$; i. e. $b:a::d:c$.

If four quantities be proportionals, they are also proportionals when taken *alternately*. If $a:b::c:d$, then $a:c::b:d$. Because the quantities are proportionals, $\frac{a}{b} = \frac{c}{d}$; and, multiplying by $\frac{b}{c}$, $\frac{a}{c} = \frac{b}{d}$; or $a:c::b:d$. Unless the four quantities are of the same kind, the alternation cannot take place, because this supposes the first to be some multiple, part, or parts, of the third. One line may have to another line the same ratio that one weight has to another; but a line has no relation, in respect of magnitude, to a weight. In cases of this kind, if the four quantities be represented by numbers, or other quantities which are similar, the alternation may take place, and the conclusions drawn from it will be just.

When four quantities are proportionals, the first together with the second is to the second as the third together with the fourth is to the fourth.

Let $a:b::c:d$, then *componendo*, $a+b:b::c+d:d$.

Because $\frac{a}{b} = \frac{c}{d}$, by adding one to both sides, $\frac{a}{b} + 1 = \frac{c}{d} + 1$, that is, $\frac{a+b}{b} = \frac{c+d}{d}$, or $a+b:b::c+d:d$.

Also *dividendo*, $a-b:b::c-d:d$.

Because $\frac{a}{b} = \frac{c}{d}$, by subtracting one from both sides, $\frac{a}{b} - 1 = \frac{c}{d} - 1$, that is $\frac{a-b}{b} = \frac{c-d}{d}$, or $a-b:b::c-d:d$.

Again *convertendo*, $a-a-b::c-c-d$. By the last article, $\frac{a-b}{b} = \frac{c-d}{d}$, and $\frac{b}{a} = \frac{d}{c}$, therefore $\frac{a-b}{b} \times \frac{b}{a} = \frac{c-d}{d} \times \frac{d}{c}$, or $\frac{a-b}{a} = \frac{c-d}{c}$; that is, $a-b:a::c-d:c$, and, inversely, $a:a-b::c:c-d$.

When any number of quantities are proportionals, as one antecedent is to its consequent, so are all the antecedents taken together to all the consequents taken together.

Let $a:b::c:d::e:f$, &c.

Then $a:b::a+c+e:b+d+f$.

Because $\frac{a}{b} = \frac{c}{d}$, $ad=bc$; in the same manner, $af=be$, also $ab=ba$; hence $ab+ad+af=ba+bc+be$, or $a \cdot b + d + f = b \cdot a + c + e$, and $a:b::a+c+e:b+d+f$.

When four quantities are proportionals, if the first and second be multiplied, or divided, by any quantity, as also the third and fourth, the resulting quantities will be proportionals:

Let $a:b::c:d$, then will $ma:mb::\frac{c}{n}:\frac{d}{n}$. For $\frac{a}{b} = \frac{c}{d}$; therefore, $\frac{ma}{mb} = \frac{\frac{c}{n}}{\frac{d}{n}}$, or $ma:mb::\frac{c}{n}:\frac{d}{n}$.

If the first and third be multiplied, or divided, by any quantity, and also the second and fourth, the resulting quantities will be proportionals.

For $\frac{a}{b} = \frac{c}{d}$, therefore $\frac{ma}{b} = \frac{mc}{d}$, and $\frac{ma}{\frac{1}{n} \cdot b} = \frac{mc}{\frac{1}{n} \cdot d}$, or $ma:\frac{b}{n}::mc:\frac{d}{n}$.

COR. Hence in any proportion, if, instead of the second and fourth terms, quantities proportional to them be substituted, we have still a proportion. For $\frac{b}{n}$ and $\frac{d}{n}$ are in the same proportion with b and d .

In two ranks of proportionals, if the corresponding terms be multiplied together, the products will be proportionals.

Let $a:b::c:d$

And $e:f::g:h$

Then will $ae:bf::cg:dh$.

Because $\frac{a}{b}=\frac{c}{d}$ and $\frac{e}{f}=\frac{g}{h}$, therefore $\frac{ae}{bf}=\frac{cg}{dh}$, or $ae:bf::cg:dh$.

This is called *compounding* the proportions. The proposition is true if applied to any number of proportions.

On Variable Quantities.

In the investigation of the relation which varying and dependent quantities bear to each other, the conclusions are more easily obtained, by expressing only two terms in each proportion, than by retaining the four. But though, in considering the variations of such quantities, two terms only are expressed, it will be necessary for the learner to keep constantly in mind that four are supposed, and that the operations which this method admits are in reality the operations of proportions.

DEF. 1. One quantity is said to *vary directly* as another, when their magnitudes depend wholly upon each other, and in such a manner, that, if one be changed, the other is changed in the same proportion. Let A and B be mutually dependent upon each other, in such a way, that if A be changed to any other value a , B must be changed to another value b , such, that $A:a::B:b$, then A is said to vary directly as B . This sign $\propto$, placed between two quantities, shews that they vary as each other.

DEF. 2. One quantity is said to *vary inversely* as another, when one cannot be changed in any manner, but the reciprocal of the other is changed in the same proportion. A

varies inversely as B , ($A \propto \frac{1}{B}$), if, when A is changed to a , B be changed to b , in such a manner that $A:a::\frac{1}{B}:\frac{1}{b}$, or $A:a::b:B$.

DEF. 3. One quantity is said to *vary as two others jointly*, if, when the former is changed in any manner, the product of the other two be changed in the same proportion. Thus, A varies as B and C jointly, ($A \propto BC$), when A cannot be changed to a , but the product BC must be changed to bc , such, that $A:a::BC:bc$.

DEF. 4. One quantity is said to *vary directly* as a second, and *inversely* as a third, when the first cannot be changed in any manner, but the second multiplied by the reciprocal of the third is changed in the same proportion. A

varies directly as B , and inversely as C , ($A \propto \frac{B}{C}$), when $A:a::\frac{B}{C}:\frac{b}{c}$; A, B, C , and a, b, c , being corresponding values of the three quantities.

In the following articles, A, B, C , &c. represent corresponding values of any quantities, and a, b, c , &c. any other corresponding values of the same quantities.

If one quantity vary as a second, and that second as a third, the first varies as the third. Let $A:a::B:b$, and $B:b::C:c$, then $A:a::C:c$; that is $A \propto C$. In the same manner, if $A \propto B$ and $B \propto \frac{1}{C}$, then $A \propto \frac{1}{C}$.

If two quantities vary respectively as a third, their sum, or difference, or the square root of their product, will vary as the third. Let $A \propto C$ and $B \propto C$, then $A \pm B \propto C$, or $\sqrt{AB} \propto C$. By the supposition $A:a::C:c$; $B:b$, therefore $A:a::B:b$, alternately $A:B::a:b$, and by composition or division $A \pm B:B::a \pm b:b$, alt. $A \pm B:a \pm b::B:b$; that is, $C \propto A \pm B$.

Again, $A:a::C:c$

And $B:b::C:c$

Therefore, $AB:ab::C^2:c^2$

And $\sqrt{AB}:\sqrt{ab}::C:c$; that is, $C \propto \sqrt{AB}$.

If one quantity vary as two others jointly, either of the latter varies as the first directly and the other inversely.

Let $V \propto FT$, then

$$F \propto \frac{V}{T} \text{ or } T \propto \frac{V}{F}.$$

COR. If the product of the two quantities be invariable, they vary inversely as each other.

Let $B \times P$ be constant, or $B \propto \frac{1}{P}$; by division, $B \propto \frac{1}{P}$.

If four quantities be always proportionals, and one or two of them be invariable, we may find how the others vary.

Ex. Let p, q, r, s , be always proportionals, and p invariable, then $s \propto qr$. Because $ps=qr$, $p \propto qr$, and, since p is constant, $s \propto qr$.

When the increase or decrease of one quantity depends upon the increase or decrease of two others, and it appears, that, if either of these latter be invariable, the first varies as the other; when they both vary, the first is as their product.

Let $S \propto V$ when T is given,

And $S \propto T$ when V is given.

When neither T nor V is given, $S \propto TV$. The variation of S depends upon the variations of the two quantities T and V ; let the changes take place separately, and whilst T is changed to t , let S be changed to s' , then, by the supposition, $S:S'::T:t$; but this value, s' , will again be changed to s , by the variation of V , and in the same proportion that V is changed, that is, $S':s::V:v$; and, by compounding this with the last proportion, $S:S::TV:tv$, or $S:S::TV:tv$.

In the same manner, if there be any number of magnitudes, P, Q, R, S , each of which varies as another, V , when the rest are constant; when they are all changed, V varies as their product.

On Arithmetical Progression.

Quantities are said to be in *arithmetical progression*, when they increase or decrease by a common difference. Thus, 1, 3, 5, 7, 9, &c. $a, a+b, a+2b, a+3b$, &c. $a, a-b, a-2b, a-3b$, &c. are in arithmetical progression. Hence it is manifest that if a be the first term, and $a+b$ the second, $a+2b$ is the third, $a+3b$ the fourth, &c. and $a+n-1.b$ the n th term.

The sum of a series of quantities in arithmetical progression is found by multiplying the sum of the first and last terms by half the number of terms. Let a be the first term, b the common difference, n the number of terms, and s the sum of the series. Then

$$\begin{array}{c} a \quad +a+b \quad +a+2b \quad \dots \quad a+n-1.b=s. \\ \text{Or } a+n-1.b+a+n-2.b+a+n-3.b \quad \dots \quad +a=s. \end{array}$$

Sum $2a+n-1.b+2a+n-1.b+2a+n-1.b$ &c. to n terms, $=2s$.

$$\text{Or } 2a+n-1.b \times n=2s$$

$$\text{And } s=2a+n-1.b \times \frac{n}{2}.$$

COR. Any three of the quantities, s, a, n, b , being given, the fourth may be found, from the equation $s=2a+n-1.b \times \frac{n}{2}$.

Ex. 1. To find the sum of 14 terms of the series, 1, 3, 5, 7, &c. Here $a=1, b=2, n=14$; therefore, $s=2+26 \times 7=196$.

Ex. 2. Required the sum of 9 terms of the series, 11, 9, 7, 5, &c. In this case, $a=11, b=-2, n=9$; therefore, $s=22-16 \times \frac{9}{2}=6 \times \frac{9}{2}=27$.

Ex.

Ex. 3. If the first term of an arithmetical progression be 14, and the sum of 8 terms 28, what is the common difference?

$$\text{Since } 2a + n - 1 \cdot b \times \frac{n}{2} = s$$

$$2a + n - 1 \cdot b = \frac{2s}{n}$$

$$\frac{n-1 \cdot b}{n} = \frac{2s-2an}{n}$$

Therefore $b = \frac{2s-2an}{n-1}$. In the case proposed, $s=28$,

$$a=14, n=8; \text{ therefore, } b = \frac{56-224}{8 \times 7} = \frac{7-28}{7} = -3.$$

Hence the series is, 14, 11, 8, 5, &c.

On Geometrical Progression.

Quantities are said to be in *geometrical progression*, or continual proportion, when the first is to the second as the second to the third, and as the third to the fourth, &c. that is, when every succeeding term is a certain multiple, or part, of the preceding. If a be the first term, ar the second, the series will be, a, ar, ar^2, ar^3, ar^4 , &c. For $a : ar :: ar : ar^2 :: ar^2 : ar^3$, &c.

The constant multiplier is called the *common ratio*, and it may be found by dividing the second term by the first.

If the two extremes, and the number of terms in a geometrical progression be given, the means may be found.

Let a and b be the extremes, n the number of terms, and r the common ratio; then the progression is $a, ar, ar^2, ar^3, \dots, ar^{n-1}$, and, since b is the last term, $ar^{n-1} = b$,

and $r^{n-1} = \frac{b}{a}$, therefore $r = \sqrt[n-1]{\frac{b}{a}}$; and, r being known, the terms of the progression ar, ar^2, ar^3 , &c. are known.

To find the sum of a series of quantities in geometrical progression, subtract the first term from the product of the last term and common ratio, and divide the remainder by the difference between the common ratio and unity. Let a be the first term, r the common ratio, n the number of terms, y the last term, and s the sum of the series:

Then $a + ar + ar^2 + \dots + ar^{n-2} + ar^{n-1} = s$; and multiplying both sides by r ,

$$\text{Sub. } \begin{array}{r} ar + ar^2 + ar^3 + \dots + ar^{n-1} + ar^n = rs \\ a + ar + ar^2 + ar^3 + \dots + ar^{n-1} = s \end{array}$$

$$\text{Rem. } -a + ar^n = rs - s = r-1 \times s.$$

$$\text{Or } s = \frac{ar^n - a}{r - 1} = \frac{ry - a}{r - 1}.$$

COR. 1. From the equation $s = \frac{ry - a}{r - 1}$, any three of the quantities, s, r, y, a , being given, the fourth may be found.

COR. 2. When r is a proper fraction, as n increases, the value of r^n , or of ar^n , decreases, and when n is increased without limit, ar^n becomes less, with respect to a , than any magnitude that can be assigned; and therefore $s =$

$\frac{-a}{r-1} = \frac{a}{1-r}$. This quantity, $\frac{a}{1-r}$ is the limit to which the sum of the terms approaches, but never actually attains; yet, as it differs from the sum by a quantity less than any that can be assigned, it may always be substituted for it without error.

Ex. To find the sum of 20 terms of the series, 1, 2, 4, 8, &c.

Here $a=1, r=2, n=20$;

$$\text{Therefore } s = \frac{1 \times 2^{20} - 1}{2 - 1} = 2^{20} - 1.$$

Recurring decimals are quantities in geometrical progression, where $\frac{1}{10}, \frac{1}{100}, \frac{1}{1000}$, &c. is the common ratio, according as one, two, three, &c. figures recur; and

the vulgar fraction, corresponding to such a decimal, is found by summing the series.

Ex. Required the vulgar fraction corresponding to the decimal .123123123, &c.

Let .123123123, &c. $= s$; then, multiply both sides by 1000, and 123.123123123 , &c. $= 1000s$; and, by subtracting the former equation from the latter, $123 = 999s$; therefore, $s = \frac{123}{999} = \frac{41}{333}$.

On Permutations and Combinations.

The different arrangements that any quantities admit, are called their *permutations*. Thus the permutations of a, b, c , taken two and two together, are ab, ba, ac, ca, bc, cb .

The *combinations* of quantities are the different collections that can be formed out of them, without regarding the order in which they are placed. Thus ab, ac, bc , are the combinations of the quantities, a, b, c , taken two and two; ab and ba , though different permutations, forming the same combination.

The number of permutations which n quantities admit, taken two and two together, is $n \cdot n - 1$; taken three and three together, is $n \cdot n - 1 \cdot n - 2$. In n things, a, b, c, d , &c. a may be placed before each of the rest, and thus form $n - 1$ permutations; in the same manner, there are $n - 1$ permutations where b stands first, and so of the rest; therefore, there are upon the whole $n \cdot n - 1$ permutations of this kind, ab, ba, ac, ca , &c.

Again, of $n - 1$ things, b, c, d , &c. taken two and two together, there are $n - 1 \cdot n - 2$ permutations, by the former part of the article, and, by prefixing a to each of these, there are $n - 1 \cdot n - 2$ permutations, taken three and three, where a stands first; the same may be said of b, c, d , &c. therefore there are upon the whole $n \cdot n - 1 \cdot n - 2$ such permutations.

COR. By following the same method, it appears, that in n things, if r of them be always taken together, there are $n \cdot n - 1 \cdot n - 2 \cdot n - 3 \cdot \dots \cdot n - r + 1$ permutations.

The number of combinations that can be formed out of n things, taken two and two together, is $\frac{n \cdot n - 1}{2}$; or, taken three and three together, the number is $\frac{n \cdot n - 1 \cdot n - 2}{2 \cdot 3}$.

The number of permutations in the first case is $n \cdot n - 1$, but each combination ab , admits of two permutations, ab, ba ; therefore there are twice as many permutations as combinations, or the number of combinations is $\frac{n \cdot n - 1}{2}$.

Again, there are $n \cdot n - 1 \cdot n - 2$ permutations in n things, taken three and three together; and each combination of three things admits of $3 \cdot 2 \cdot 1$ permutations; therefore there are $3 \cdot 2 \cdot 1$ times as many permutations as combinations, and consequently the number of combinations is $\frac{n \cdot n - 1 \cdot n - 2}{1 \cdot 2 \cdot 3}$.

COR. In the same manner it appears, that the number of combinations in n things, each of which contains r of them, is $\frac{n \cdot n - 1 \cdot n - 2 \cdot \dots \cdot n - r + 1}{1 \cdot 2 \cdot 3 \cdot \dots \cdot r}$.

On the Binomial Theorem.

The method of raising a binomial to any power, by repeated multiplication, has already been laid down, under *Involution and Evolution*. A general rule by which this may be done much more expeditiously was first discovered by Sir I. Newton. Let $x + a$ be the given binomial; the n th power of it is $x^n + nax^{n-1} + \frac{n \cdot n - 1}{2} a^2 x^{n-2} + \frac{n \cdot n - 1 \cdot n - 2}{2 \cdot 3} a^3 x^{n-3} + \dots$. Where the index of x , beginning from n , is diminished by unity, and the index of a , beginning from

from a , is increased by unity, in every succeeding term. Also the coefficient of each term is found by multiplying the coefficient of the preceding term, by the index of x in that term, and dividing by the index of a increased by unity.

$$\text{Thus, } (x+a)^6 = x^6 + 6ax^5 + \frac{6 \cdot 5}{2} a^2 x^4 + \frac{6 \cdot 5 \cdot 4}{2 \cdot 3} a^3 x^3 + \frac{6 \cdot 5 \cdot 4 \cdot 3}{2 \cdot 3 \cdot 4} a^4 x^2 + \frac{6 \cdot 5 \cdot 4 \cdot 3 \cdot 2}{2 \cdot 3 \cdot 4 \cdot 5} a^5 x + \frac{6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{2 \cdot 3 \cdot 4 \cdot 5 \cdot 6} a^6 = x^6 + 6ax^5 + 15a^2x^4 + 20a^3x^3 + 15a^4x^2 + 6a^5x + a^6.$$

To investigate this theorem, suppose n quantities, $x+a$, $x+b$, $x+c$, &c. multiplied together; it is manifest that the first term of the product will be x^n , and that x^{n-1} , x^{n-2} , &c. the other powers of x , will all be found in the remaining terms, with different combinations of a , b , c , d , &c.

Let $x+b \cdot x+c \cdot x+d$, &c. $= x^{n-1} + Px^{n-2} + Qx^{n-3} + \&c.$ and $x+a \cdot x+b \cdot x+c \cdot x+d$, &c. $= x^n + Ax^{n-1} + Bx^{n-2} + \&c.$ then $x^n + Ax^{n-1} + Bx^{n-2} + \&c.$ and $x+a \times (x^{n-1} + Px^{n-2} + Qx^{n-3} + \&c.)$ or $x^n + Px^{n-1} + Qx^{n-2} + \&c.$ are the same series;

$+ax^{n-1} + aPx^{n-2} + \&c.$ } therefore $A=P+a$, $B=Q+aP$, &c. that is, by introducing one factor, $x+a$, into the product, the coefficient of the second term is increased by a , and by introducing $x+b$ into the product, that coefficient is increased by b , &c. therefore the whole value of A is $a+b+c+d$, &c. Again, by the introduction of one factor, $x+a$, the coefficient of the third term, Q , is increased by aP , i. e. by a multiplied by the preceding value of A , or by $a \times b+c+d$, &c. and the same may be said with respect to the introduction of every other factor; therefore, upon the whole,

$$B = a \cdot b + c + d + \&c.$$

$$+ b \cdot c + d + \&c.$$

$$+ c \cdot d + \&c.$$

In the same manner,

$$C = a \cdot b \cdot c + d + \&c.$$

$$+ a \cdot c \cdot d + \&c.$$

$$+ b \cdot c \cdot d + \&c.$$

and so on; that is, A is the sum of the quantities a , b , c , &c. B , the sum of the products of any two; C , the sum of the products of any three, &c.

If either term of the binomial be negative, its odd powers will be negative, and consequently the signs of the terms, in which those odd powers are found, will be changed.

$$\text{Ex. } (a-x)^8 = a^8 - 8a^7x + 28a^6x^2 - 56a^5x^3 + 70a^4x^4 - 56a^3x^5 + 28a^2x^6 - 8ax^7 + x^8.$$

The trinomial $a+b+c$ may be raised to any power by considering two terms as one factor, and proceeding as before.

Thus, $(a+b+c)^n = a^n + n \cdot b+c \cdot a^{n-1} + n \cdot \frac{n-1}{2} \cdot (b+c)^2 \cdot a^{n-2} + \&c.$ and the powers of $b+c$ may be determined by the binomial theorem.

The theorem by which a multinomial may be raised to any power is given by M. Demoivre, *Analyt.* p. 37.

On Surds.

A quantity may be reduced to the form of a given surd, by raising it to the power whose root the surd expresses, and affixing the radical sign. Thus, $a = \sqrt[n]{a^n} = \sqrt[n]{a^n}$ &c.

$a+x = \sqrt[n]{a+x}^m$. In the same manner, the form of any surd may be altered; thus, $\sqrt[n]{a+x}^{\frac{1}{2}} = \sqrt[n]{a+x}^{\frac{2}{4}} = \sqrt[n]{a+x}^{\frac{3}{6}}$, &c. The quantities are here raised to certain powers, and the same roots of those powers taken, therefore the values of the quantities are not altered.

If two surds have the same index, their product is found by taking the product of the quantities under the

signs, and retaining the common index. Thus, $\sqrt[n]{a} \times \sqrt[n]{b} = \sqrt[n]{ab}$; $\sqrt{2} \times \sqrt{3} = \sqrt{6}$; $\sqrt[n]{a+b} \times \sqrt[n]{a-b} = \sqrt[n]{a^2-b^2}$.

If the surds have coefficients, the product of these coefficients must be prefixed. Thus, $a\sqrt{x} \times b\sqrt{y} = ab\sqrt{xy}$.

We must observe, that $\sqrt{-a^2} \times \sqrt{-a^2}$, or the square of $\sqrt{-a^2}$, is $-a^2$; because it is that quantity whose square root is $\sqrt{-a^2}$.

COR. Hence $x-a + \sqrt{-b^2} \times x-a - \sqrt{-b^2} = x^2 - 2ax + a^2 + b^2$.

If the indices of two surds have a common denominator, let the quantities be raised to the powers expressed by their respective numerators, and their product may be found as before.

$$\text{Example. } 2^{\frac{2}{3}} \times 3^{\frac{1}{3}} = 8^{\frac{1}{3}} \times 3^{\frac{1}{3}} = 24^{\frac{1}{3}}; \sqrt[n]{a+x}^{\frac{1}{2}} \times \sqrt[n]{a-x}^{\frac{1}{2}} = \sqrt[n]{a+x \cdot a-x}^{\frac{1}{2}}$$

If the indices have not a common denominator, they must be transformed to others of the same value, with a common denominator, and their product found by the last rule.

$$\text{Example. } \sqrt[n]{a-x}^{\frac{1}{4}} \times \sqrt[n]{a-x}^{\frac{1}{2}} = \sqrt[n]{a-x}^{\frac{1}{4}} \times \sqrt[n]{a-x}^{\frac{2}{4}} = \sqrt[n]{a-x \cdot a-x}^{\frac{3}{4}}; 2^{\frac{1}{2}} \times 3^{\frac{1}{3}} = 2^{\frac{2}{6}} \times 3^{\frac{2}{6}} = 8 \times 9^{\frac{1}{6}}.$$

If two surds have the same rational quantity under the radical signs, their product is found by making the sum of the indices the index of that quantity.

$$\text{Thus, } \sqrt[n]{a} \times \sqrt[n]{a} = \sqrt[n]{a^n} \times \sqrt[n]{a^n} = \sqrt[n]{a^{m+n}}.$$

If the indices of two quantities have a common denominator, the quotient of one divided by the other is obtained by raising them, respectively, to the powers expressed by the numerators of their indices, and extracting that root of the quotient which is expressed by the common denominator.

$$\text{For, } \frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}; \text{ and } \frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \frac{a^{\frac{1}{n}}}{b^{\frac{1}{n}}} = \sqrt[n]{\frac{a}{b}}.$$

$$\text{Ex. } 4^{\frac{1}{2}} \div 2^{\frac{3}{2}} = \sqrt[4]{\frac{4}{8}} = \frac{1}{\sqrt{2}}; \sqrt[n]{p}^{\frac{1}{m}} \div \sqrt[n]{q}^{\frac{2}{m}} = \sqrt[n]{\frac{ps^{\frac{1}{m}}}{qr^{\frac{2}{m}}}}.$$

If the indices have not a common denominator, reduce them to others of the same value, with a common denominator, and proceed as before.

$$\text{Ex. } \sqrt[n]{a^2-x^2}^{\frac{1}{2}} \div \sqrt[n]{a^4-x^4}^{\frac{1}{3}} = \sqrt[n]{a^2-x^2}^{\frac{3}{6}} \div \sqrt[n]{a^4-x^4}^{\frac{2}{6}} = \sqrt[n]{\frac{a^6-x^6}{a^8-x^8}}.$$

If two surds have the same rational quantity under the radical signs, their quotient is obtained by making the difference of the indices the index of that quantity.

$$\text{Thus, } \sqrt[n]{a} \div \sqrt[n]{a} = \sqrt[n]{a^{\frac{1}{n}}} \div \sqrt[n]{a^{\frac{n}{n}}} = \sqrt[n]{a^{\frac{1-n}{n}}}.$$

$$\text{Ex. } 2^{\frac{1}{2}} \div 2^{\frac{1}{3}} = 2^{\frac{3}{6}} \div 2^{\frac{2}{6}} = 2^{\frac{1}{6}}.$$

The square root of a quantity cannot be partly rational and partly irrational. If possible, let $\sqrt{n} = a + \sqrt{m}$; then by squaring both sides, $n = a^2 + 2a\sqrt{m} + m$, and $2a\sqrt{m} = n - a^2 - m$; therefore, $\sqrt{m} = \frac{n-a^2-m}{2a}$, a rational quantity, which is contrary to the supposition.

In any equation, $x + \sqrt{y} = a + \sqrt{b}$, consisting of rational quantities and quadratic surds, the rational parts on each side are equal, and also the irrational parts. If x be not equal to a , let $x = a + m$, then $a + m + \sqrt{y} = a + \sqrt{b}$, or $m + \sqrt{y} = \sqrt{b}$;

$\sqrt{b}$; that is, $\sqrt{b}$ is partly rational and partly irrational, which is impossible; therefore $x=a$, and consequently $\sqrt{y}=\sqrt{b}$.

If two surds, $\sqrt{x}$ and $\sqrt{y}$, cannot be reduced to others which have the same irrational part, their product is irrational.

If possible, let $\sqrt{xy}=x+n$, then $xy=x^2+2nx+n^2$, and $y=x+\frac{2nx+n^2}{x}$; and, since x and y are integers, $\frac{2nx+n^2}{x}$ is an integer, or n is a multiple of x ; let $n=rx$, then $y=x+2rx+r^2x=1+2r+r^2$, and $\sqrt{y}=1+r\sqrt{x}$, i. e. $\sqrt{y}$ and $\sqrt{x}$ may be reduced to the same irrational part, which is contrary to the supposition.

One surd, $\sqrt{x}$ cannot be made up of two others, $\sqrt{m}$ and $\sqrt{n}$, which have not the same irrational part.

If possible, let $\sqrt{x}=\sqrt{m}+\sqrt{n}$; then, by squaring both sides, $x=m+n+2\sqrt{mn}$, and $x-m-n=2\sqrt{mn}$, a rational quantity equal to an irrational one, which is absurd.

Let $\frac{1}{a+b}=\frac{1}{x+y}$, where a is an even number, a a rational quantity, b a quadratic surd, x and y one or both of them quadratic surds, then $\frac{1}{a-b}=\frac{1}{x-y}$.

By involution, $a+b=x^c+cx^{c-1}y+c\frac{c-1}{2}x^{c-2}y^2+\dots$ and, since c is even, the odd terms of the series are rational, and the even terms irrational; therefore, $a=x^c+c\frac{c-1}{2}x^{c-2}y^2+\dots$ and $b=cx^{c-1}y+c\frac{c-1}{2}\frac{c-2}{3}x^{c-3}y^3+\dots$ hence $a-b=x^c-cx^{c-1}y+c\frac{c-1}{2}x^{c-2}y^2-c\frac{c-1}{2}\frac{c-2}{3}x^{c-3}y^3+\dots$ and, consequently, $\frac{1}{a-b}=\frac{1}{x-y}$.

If c be an odd number, a and b , one or both, quadratic surds, and x and y involve the same surds that a and b do, respectively, when $\frac{1}{a+b}=\frac{1}{x+y}$, then $\frac{1}{a-b}=\frac{1}{x-y}$.

By involution, $a+b=x^c+cx^{c-1}y+c\frac{c-1}{2}x^{c-2}y^2+\dots$ and, where the odd terms involve the same surd that x does, because c is an odd number, and the even terms the same surd that y does; and, since no part of a can consist of y , or its parts, $a=x^c+c\frac{c-1}{2}x^{c-2}y^2+\dots$ and $b=cx^{c-1}y+c\frac{c-1}{2}\frac{c-2}{3}x^{c-3}y^3+\dots$ hence $a-b=x^c-cx^{c-1}y+c\frac{c-1}{2}x^{c-2}y^2-c\frac{c-1}{2}\frac{c-2}{3}x^{c-3}y^3+\dots$ therefore, by evolution, $\frac{1}{a-b}=\frac{1}{x-y}$.

The square root of a binomial, one of whose factors is a quadratic surd, and the other rational, may sometimes be expressed by a binomial, one or both of whose factors are quadratic surds.

Let $a+\sqrt{b}$ be the given binomial, and suppose $\sqrt{a+\sqrt{b}}=x+y$, where x and y are one or both quadratic surds,

Then $\sqrt{a-\sqrt{b}}=x-y$

By multiplication, $\sqrt{a^2-b}=x^2-y^2$

Also, by squaring both sides of the first equation,

$$a+\sqrt{b}=x^2+2xy+y^2$$

And $a-\sqrt{b}=x^2-y^2$

By addition, $a+\sqrt{a^2-b}=2x^2$

By subtraction, $a-\sqrt{a^2-b}=2y^2$, and the root $x+y$

$$\sqrt{\frac{a+\sqrt{a^2-b}}{2}} + \sqrt{\frac{a-\sqrt{a^2-b}}{2}}$$

From this conclusion it appears that the square root of $a+\sqrt{b}$ can only be expressed by a binomial of the form $x+y$, one or both of which are quadratic surds, when a^2-b is a perfect square.

The values of x and y are $\pm\sqrt{\frac{a+\sqrt{a^2-b}}{2}}$ and $\pm\sqrt{\frac{a-\sqrt{a^2-b}}{2}}$; there are therefore four different values of $x+y$.

Ex. 1. Required the square root of $3+2\sqrt{2}$.

In this case, $a=3$, $\sqrt{b}=2\sqrt{2}$, and $a^2-b=9-8=1$; hence, $x=\sqrt{\frac{3+1}{2}}=\sqrt{2}$, and $y=\sqrt{\frac{3-1}{2}}=1$; therefore, $x+y=\sqrt{2}+1$.

Ex. 2. Required the square root of $7-2\sqrt{10}$.

Here $a=7$, $\sqrt{b}=2\sqrt{10}$, $a^2-b=49-40=9$, and $x=\sqrt{\frac{7+3}{2}}=\sqrt{5}$; also $y=\sqrt{\frac{7-3}{2}}=\sqrt{2}$; therefore, $x-y=\sqrt{5}-\sqrt{2}$, the root required.

Ex. 3. Required the square root of $4\sqrt{5}-1$.

Here $a=-1$, $\sqrt{b}=4\sqrt{5}$, $a^2-b=1-80=-79$, and $x=\sqrt{\frac{-1+9}{2}}=2$; also, $y=\sqrt{\frac{-1-9}{2}}=\sqrt{-5}$; therefore, the root required is $2+\sqrt{-5}$.

PART II.

ON THE NATURE OF EQUATIONS.

ANY equation, involving the powers of one unknown quantity, may be reduced to the form $x^n-px^{n-1}+qx^{n-2}-\dots+Q=0$; where the whole expression is made equal to nothing, the terms are arranged according to the dimensions of the unknown quantity, the coefficient of the highest dimension is unity, and the coefficients, $p, q, r, \&c.$ are affected with their proper signs.

An equation, where the index of the highest power of the unknown quantity is n , is said to be of n dimensions; and, in speaking simply of an equation of n dimensions, we understand one reduced to the above form, unless the contrary be expressed.

Any quantity, $x^n-px^{n-1}+qx^{n-2}-\dots+Px-Q$, may be supposed to arise from the multiplication of $x-a, x-b, x-c, \&c.$ continued to n factors. For, by actually multiplying the factors together, we obtain a quantity of n dimensions, similar to the proposed quantity, $x^n-px^{n-1}+qx^{n-2}-\dots+Q$, and, if $a, b, c, d, \&c.$ can be so assumed that the coefficients of the corresponding terms in the two quantities become equal, the whole expressions coincide. And these coefficients may be made equal, because we shall have n equations to determine the n quantities, $a, b, c, d, \&c.$ If then the quantities, $a, b, c, d, \&c.$ be properly assumed, the equation $x^n-px^{n-1}+qx^{n-2}-\dots+Q=0$, is the same with $x-a, x-b, x-c, \&c.=0$.

This proof, however, though usually given, is imperfect; for, if the n equations be reduced to one, containing only

only one of the quantities, a , this equation is $a^n - pa^{n-1} + qa^{n-2} - \&c. = 0$, which exactly coincides with the proposed equation; in supposing, therefore, that a can be found, we take for granted the proposition to be proved. The subject has exercised the skill of the most eminent algebraical writers, but their reasonings upon it are of too abstruse a nature to be introduced in this place. The learner must, at present, take for granted, that an equation may be made up of as many simple factors as it has dimensions.

The quantities, $a, b, c, d, \&c.$ are called *roots* of the equation, or *values* of x , because, if any one of them be substituted for x , the whole expression becomes nothing, which is the only condition proposed by the equation.

Every equation has as many roots as it has dimensions. If $x^n - px^{n-1} + qx^{n-2} - \&c. = 0$, or $x - a, x - b, x - c, \&c.$ to n factors $= 0$; there are n quantities, $a, b, c, \&c.$ each of which, when substituted for x , makes the whole $= 0$; but any quantity different from these, as e , when substituted for x , gives the product $e - a, e - b, e - c, \&c.$ which does not vanish, that is, e will not answer the condition which the equation requires.

When one of the roots, a , is obtained, the equation $x - a, x - b, x - c, \&c. = 0$, or $x^n - px^{n-1} + qx^{n-2} - \&c. = 0$, is divisible by $x - a$, without a remainder, and is thus reducible to $x - b, x - c, \&c. = 0$, an equation one dimension lower, whose roots are $b, c, \&c.$

Ex. One root of the equation $y^3 + 1 = 0$, is -1 , and the equation may be depressed to a quadratic, in the following manner:

$$\begin{array}{r} y+1 \quad y^3+1 \quad (y^2-y+1) \\ \underline{y^3+y^2} \\ -y^2 \\ \underline{-y^2-y} \\ +y+1 \\ \underline{y+1} \\ * \end{array}$$

Hence the other two roots are the roots of the quadratic $y^2 - y + 1 = 0$.

If two roots a and b be obtained, the equation is divisible by $x - a, x - b$; and thus it may be reduced two dimensions lower.

Ex. Two roots of the equation $x^6 - 1 = 0$, are $+1$ and -1 , therefore it may be depressed to a biquadratic by dividing by $x - 1, x + 1$, or by $x^2 - 1$.

$$\begin{array}{r} x^2-1 \quad x^6-1 \quad (x^4+x^2+1) \\ \underline{x^6-x^4} \\ +x^2-1 \\ \underline{+x^2+1} \\ x^2+1 \\ \underline{x^2+1} \\ * \end{array}$$

Hence the equation $x^4 + x^2 + 1 = 0$, contains the other four roots of the proposed equation.

Conversely, if the equation be divisible by $x - a$, without a remainder, a is a root; if by $x - a, x - b$, a and b are both roots, &c. Let Q be the quotient arising from the division, then the equation is $x - a, x - b, Q = 0$, in which, if a or b be substituted for x , the whole vanishes.

COR. 1. If $a, b, c, \&c.$ be the roots of an equation, that equation is $x - a, x - b, x - c, \&c. = 0$. Thus the equation, whose roots are, $1, 2, 3, 4$, is $x - 1, x - 2, x - 3, x - 4 = 0$, or $x^4 - 10x^3 + 35x^2 - 50x + 24 = 0$. The equation whose roots are $1, 2$, and -3 , is $x - 1, x - 2, x + 3 = 0$, or $x^3 - 7x + 6 = 0$.

COR. 2. If the last term of an equation vanish, it is of the form $x^n - px^{n-1} + qx^{n-2} - \dots - Px = 0$, which is divisible by x , or $x - 0$, without remainder, therefore 0 is one

of its roots; if the two last terms vanish, it is divisible by x^2 without remainder, or by $x - 0, x - 0$, that is, two of its roots are $0, \&c.$

The coefficient of the second term of an equation, is the sum of the roots with their signs changed; the coefficient of the third term, is the sum of the products of every two roots, with their signs changed; the coefficient of the fourth term, the sum of the products of every three roots, with their signs changed, &c. and the last term is the product of all the roots, with their signs changed.

COR. If the roots be all positive, the signs of the terms will be alternately $+$ and $-$. For the product of an odd number of negative quantities is negative, and of an even number, positive. But, if the roots be all negative, the signs of all the terms will be positive, because the equation arises from the multiplication of the positive quantities, $x + a, x + b, x + c, \&c.$

The roots, $a, b, c, \&c.$ of an equation are *impossible*, when, as is frequently the case, they involve the square root of a negative quantity.

Impossible roots enter equations by pairs. If $a + \sqrt{-b^2}$ be a root of the equation $x^n - px^{n-1} + \&c. = 0$, $a - \sqrt{-b^2}$ is also a root.

For x in the equation, substitute $a + \sqrt{-b^2}$, and the result will consist of two parts, possible quantities, which involve the powers of a and the even powers of $\sqrt{-b^2}$, and impossible quantities which involve the odd powers of $\sqrt{-b^2}$; call the sum of the possible quantities A , and of the impossible quantities B , then $A + B$ is the whole result. Let now, $a - \sqrt{-b^2}$, be substituted for x , and the possible part of the result will be the same as before, and the impossible part which arises from the odd powers of $-\sqrt{-b^2}$, will only differ from the former impossible part by its sign; therefore the result is $A - B$; and since by the supposition $a + \sqrt{-b^2}$ is a root of the equation, $A + B = 0$, in which, as no part of A can be destroyed by B , $A = 0$ and $B = 0$, therefore $A - B = 0$; that is, the result, arising from the substitution of $a - \sqrt{-b^2}$ for x , is nothing, or $a - \sqrt{-b^2}$ is a root of the equation.

COR. 1. Hence it follows that an equation of an odd number of dimensions must have, at least, one possible root, unless some of the coefficients are impossible; in which case the equation may have an odd number of impossible roots.

COR. 2. By the same mode of reasoning it appears, that, when the coefficients are rational, surd roots of the form $\pm\sqrt{b}$, or $a \pm \sqrt{b}$, enter equations by pairs.

On the Transformation of Equations.

If the signs of all the terms in an equation be changed, its roots are not altered. Let $x - a, x - b, x - c, \&c. = 0$; then $-x + a, -x + b, -x + c, \&c. = 0$, when $x = a, b, c, \&c.$

If the signs of the alternate terms, beginning with the second, be changed, the signs of all the roots are changed. Let $x^n - px^{n-1} + qx^{n-2} + \&c. = 0$, be an equation whose roots are $a, b, c, \&c.$ for x substitute $-y$, and, when n is an even number, $y^n + py^{n-1} - qy^{n-2} - \&c. = 0$; but when n is an odd number, $-y^n - py^{n-1} + qy^{n-2} + \&c. = 0$; or, changing all the signs, $y^n + py^{n-1} - qy^{n-2} - \&c. = 0$, as before; and since $x = -y$, or $y = -x$, the values of y are, $-a, -b, -c, \&c.$

Ex. Let it be required to change the signs of the roots of the equation, $x^3 - qx + r = 0$. This equation with all its terms is $x^3 + 0 - qx + r = 0$, and, changing the signs of the alternate terms, we have $x^3 - 0 - qx - r = 0$, or $x^3 - qx - r = 0$, an equation whose roots differ from the roots of the former only in their signs.

To transform an equation into one whose roots are greater or less than the corresponding roots of the original equation by any given quantity. Let the roots of the equation

equation $x^3 - px^2 + qx - r = 0$, be a, b, c ; to transform it into one whose roots are $a + e, b + e, c + e$.

$$\left. \begin{aligned} \text{Assume } x + e = y, \text{ or } x = y - e; \text{ then} \\ x^3 = y^3 - 3ey^2 + 3e^2y - e^3 \\ -px^2 = -py^2 + 2pey - pe^2 \\ +qx = +qy - qe \\ -r = -r \end{aligned} \right\} = 0.$$

$$\left. \begin{aligned} x^n &= y^n + ney^{n-1} + \frac{n(n-1)}{2}e^2y^{n-2} + \dots + ne^{n-1}y + e^n \\ -px^{n-1} &= -py^{n-1} - \frac{n-1}{1}pey^{n-2} - \dots - \frac{n-1}{1}pe^{n-2}y - pe^{n-1} \\ +qx^{n-2} &= +qy^{n-2} + \dots + \frac{n-2}{2}qe^{n-3}y + qe^{n-2} \\ &\&c. = &c. \end{aligned} \right\} = 0.$$

and, since $y = x + e$, the values of y are $a + e, b + e, c + e$, &c.

We may observe, that the last term of the transformed equation, $e^n - pe^{n-1} + qe^{n-2} - \&c.$ is the original quantity, with e in the place of x ; the coefficient of the last term but one is obtained by multiplying every term of $e^n - pe^{n-1} + qe^{n-2} - \&c.$ by the index of e in that term, and diminishing the index by unity; the coefficient of the last term but two, $\frac{n-1}{2}e^{n-2} - \frac{n-1}{2}pe^{n-3} + \frac{n-2}{2}qe^{n-4} - \&c.$ is obtained in the same manner from the coefficient of the last term but one, and dividing every term by 2, &c.

One use of this transformation is, to take away any term out of an equation. Thus, to transform an equation into one which shall want the second term, e must be so assumed that $ne - p = 0$, or $e = \frac{p}{n}$, (where p is the coefficient of the second term with its sign changed, and n the index of the highest power of the unknown quantity;) and, if the roots of the transformed equation can be found, the roots of the original equation may also be found; because, $x = y + \frac{p}{n}$.

Ex. To transform the equation $x^3 - 9x^2 + 7x + 12 = 0$ into one which shall want the second term.

Assume $x = y + 3$, then

$$\left. \begin{aligned} x^3 &= y^3 + 9y^2 + 27y + 27 \\ -9x^2 &= -9y^2 - 54y - 81 \\ +7x &= +7y + 21 \\ +12 &= +12 \end{aligned} \right\} = 0.$$

That is, $y^3 - 20y - 21 = 0$; and, if the values of y be a, b, c , the values of x are $a + 3, b + 3$, and $c + 3$.

To transform an equation into one whose roots are the reciprocals of the roots of the given equation. Let the roots of the equation, $x^n - px^{n-1} + qx^{n-2} - \dots - Px + Q = 0$, be a, b, c , &c. to transform it into one whose roots are $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$, &c.

Assume $y = \frac{1}{x}$, or $x = \frac{1}{y}$; then, by substitution, $\frac{1}{y^n} - \frac{p}{y^{n-1}} + \frac{q}{y^{n-2}} - \dots - \frac{P}{y} + Q = 0$, or multiplying by y^n , $1 - py + qy^2 - \dots - Py^{n-1} + Qy^n = 0$, that is, $Qy^n - Py^{n-1} + \dots + qy^2 - py + 1 = 0$; and since $y = \frac{1}{x}$, the values of y are, $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$, &c.

COR. 1. If any term in the given equation be wanting, the corresponding term will be wanting in the transformed equation; thus, if the original equation want the second term, the transformed equation will want the last term but one, &c. because the coefficients in the transformed equation are the coefficients in the original equation in an inverted order.

COR. 2. If the coefficients of the terms, taken from the beginning of an equation, be the same with the coefficients of the terms, taken from the end, the equation will be palindromic.

In this last equation, since $y = x + e$, the values of y are $a + e, b + e, c + e$.

If $y + e$ be substituted for x , the values of y in the resulting equation will be $a - e, b - e, c - e$.

In general, let the roots of the equation $x^n - px^{n-1} + qx^{n-2} - \&c. = 0$, be a, b, c , &c. Assume $y = x - e$, or $x = y + e$, and, by substitution,

the corresponding terms, taken from the end, with the same signs, the transformed equation will coincide with the original, and their roots will therefore be the same. Let a, b, c , be roots of the equation $x^n - px^{n-1} + qx^{n-2} - \dots + qx^2 - px + 1 = 0$; the transformed equation will be $y^n - py^{n-1} + qy^{n-2} - \dots + qy^2 - py + 1 = 0$, and, a, b, c , must also be roots of this equation, but the roots of this equation are the reciprocals of the roots of the original equation; therefore, $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$, are also roots of the original equation.

Ex. The roots of the equations, $x^4 - px^3 + qx^2 - px + 1 = 0$; $x^4 + qx^2 + 1 = 0$; and $x^4 + 1 = 0$, are of the form $a, b, \frac{1}{a}, \frac{1}{b}$.

COR. 3. If the equation be of an odd number of dimensions, or if the middle term of an equation of an even number of dimensions be wanting, the same thing will hold when the signs of the corresponding terms, taken from the beginning and end, are different.

Ex. The roots of the equation $x^3 - px^2 + px - 1 = 0$, are of the form $1, a, \frac{1}{a}$. For, in this case, if the signs of all the terms of the transformed equation be changed, it will coincide with the original equation; and, by changing the signs of all the terms, we do not alter the roots.

The equations described in the two last corollaries are called *recurring equations*.

COR. 4. One root of a recurring equation of an odd number of dimensions, will be $+1$, or -1 , according as the sign of the last term is $-$ or $+$; and the rest will be of the form $a, \frac{1}{a}, b, \frac{1}{b}$, &c. For, if $+1$ in the former case, and -1 in the latter, be substituted for the unknown quantity, the whole vanishes; and, if a, b, c , &c. be roots of the equation, $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$, are also roots.

To transform an equation into one whose roots are the squares of the roots of the given equation. Let $x^n - px^{n-1} + qx^{n-2} - \dots + qx^2 - px + 1 = 0$; by transposition, $x^n + qx^{n-2} + \dots + qx^2 = px^{n-1} - 1$, and, by squaring both sides, $x^{2n} + 2qx^{2n-2} + \dots + q^2x^4 + 2qx^2 + 1 = p^2x^{2n-2} - 2px^{n-1} + 1$, and again, by transposition, $x^{2n} - p^2x^{2n-2} - 2qx^{2n-2} + q^2x^4 + 2qx^2 + 1 = 2px^{n-1} - 2$, &c. = 0; assume $y = x^2$, then $y^n - p^2y^{n-2} - 2qy^{n-2} + q^2y^2 + 2qy + 1 = 2py^{n-1} - 2$, &c. = 0, in which equation the values of y are the squares of the values of x .

COR. If the roots of the original equation be a, b, c , &c. then $p^2 - 2q = a^2 + b^2 + c^2 + \&c.$ $q^2 - 2pr + 2s = a^2b^2 + a^2c^2 + b^2c^2 + \&c.$

Those who wish to see other transformations, may consult Dr. Waring's *Meditationes Algebraicæ*.

On the Limits of the Roots of Equations.

If $a, b, c, -d$, &c. be the roots of an equation taken in order, that is, a greater than b , b greater than c , &c. the equation is $x - a.x - b.x - c.x + d$, &c. = 0; and, if a quantity

quantity greater than a be substituted for x , as every factor is, on this supposition, positive, the result will be positive; if a quantity less than a , but greater than b , be substituted, the result will be negative, because one factor will be negative and the rest positive. If a quantity between b and c be substituted, the result will again be positive, because two factors are negative and the rest positive, and so on. Thus, quantities which are limits to the roots of an equation, if substituted for the unknown quantity, give results alternately positive and negative.

Conversely, if two magnitudes, when substituted for the unknown quantity, give results affected with different signs, an odd number of roots must lie between them; and if a series of quantities can be found, which give as many results, alternately positive and negative, as the equation has dimensions, these must be limits to the roots of the equation; because an odd number of roots lies between each two succeeding terms of the series, and there are as many terms as the equation has dimensions; therefore this odd number cannot exceed one.

If the results arising from the substitution of two magnitudes for the unknown quantity, be both positive or both negative, either no root of the equation, or an even number of roots, lies between them.

COR. If m , and every quantity greater than m , when substituted for the unknown quantity, give positive results, m is greater than the greatest root of the equation.

To find a limit greater than the greatest root of an equation. Let the roots of the equation be a, b, c , &c. transform it into one whose roots are $a-e, b-e, c-e$, &c. and if, by trial, such a value of e be found, that every term of the transformed equation is positive, all its roots are negative, and consequently e is greater than the greatest root of the proposed equation.

Ex. 1. To find a number greater than the greatest root of the equation $x^3-5x^2+7x-1=0$.

Assume $x=y+e$, and we have

$$\left. \begin{array}{r} y^3+3y^2+3e^2y+e^3 \\ -5y^2-10ey-5e^2 \\ +7y+7e \\ -1 \end{array} \right\} = 0.$$

in which equation, if 3 be substituted for e , each of the quantities, e^3-5e^2+7e-1 , $3e^2-10e+7$, $3e-5$, is positive, or all the values of y are negative; therefore, 3 is greater than the greatest value of x .

Ex. 2. In any cubic equation of this form, $x^3-qx+r=0$, $\sqrt[3]{q}$ is greater than the greatest root.

By transforming the equation, as before,

$$\left. \begin{array}{r} y^3+3y^2+3e^2y+e^3 \\ -qy-qe \\ +r \end{array} \right\} = 0.$$

and, substituting $\sqrt[3]{q}$ for e , $y^3+3\sqrt[3]{q}y^2+2qy+r=0$, every term of which is positive; therefore, $\sqrt[3]{q}$ is greater than the greatest value of x .

If the equation have both positive and negative roots, and $-d$ be the least root; when d is greater than the greatest root, it is greater than $\sqrt{\frac{p^2-2q}{n}}$, or

$$\sqrt{\frac{q^2-2pr+2s}{n-1}}.$$

The original equation has as many positive roots, and as many negative, as the limiting equation, and one more, which will be positive or negative according to the nature of the equation.

Every equation whose roots are possible, has as many changes of signs from $+$ to $-$, and from $-$ to $+$, as it has positive roots; and as many continuations of the same sign, from $+$ to $+$, and from $-$ to $-$, as it has negative roots. Let $x^n-px^{n-1}+\dots\pm Sx^2+Px\pm Q=0$, the equation of limits is $nx^{n-1}-n-1.p x^{n-2}+\dots\pm 2Sx\pm P$

$=0$, which, as far as it goes, has the same signs with the former; and therefore the original equation will have one more change of signs, or one more continuation of the same sign, than the limiting equation, according as the signs of P and Q are different, or the same.

Suppose α, β, γ , &c. to be the roots of the limiting equation; $a, b, c, \pm d$, the roots of the original equation; then $P=-\alpha\times-\beta\times-\gamma\times\&c.$ and $Q=-\alpha\times-\beta\times-\gamma\times\&c.$ which rectangles will have the same sign when the multiplier d is positive, or the root $(-d)$ negative, and different signs when that root is positive. It appears then, that if the original equation have one more change of signs than the limiting equation, it has one more positive root, and, if it have one more continuation of the same sign, it has one more negative root; therefore, if the equation $Ax^{n-1}-Bx^{n-2}+\&c.=0$ have as many changes of signs as it has positive roots, and as many continuations of the same sign as it has negative roots, the same rule will be true in the next superior equation $x^n-px^{n-1}+qx^{n-2}-\&c.=0$. Now, in every simple equation, $x-a=0$, or $x+a=0$, the rule is true, therefore it is true in every quadratic $x^2\pm px\pm q=0$; and if it be true in every quadratic, it is true in every cubic, and so on; that is, the rule is true in all cases.

In the demonstration, each root, $\pm d$, is supposed to be a distinct possible quantity. Hence, when all the roots are possible, the number of positive roots is exactly known.

When any coefficient vanishes, it may be considered either as positive or negative, because the value of the whole expression is the same on either supposition.

Ex. 1. The equation $x^3+x^2-14x+8=0$, has two positive and one negative root; because the signs are $+$, $+$, $-$, $+$, in which there are two changes, one from $+$ to $-$, and the other from $-$ to $+$, and one continuation of the sign $+$.

Ex. 2. If the roots of the equation $x^3-qx+r=0$ be possible, two of them are positive and the third negative; for there are two changes of signs in the equation $x^3\pm 0-qx+r=0$, and one continuation of the same sign.

To find between which of the roots of a proposed equation, any given number lies. Let the roots of the proposed equation be diminished by the given number, and the number of negative roots in the transformed equation will shew its place among the roots of the original equation.

Ex. To find between which of the roots of the equation $x^3-9x^2+23x-15=0$, the number 2 lies.

Assume $x=y+2$, then,

$$\left. \begin{array}{r} y^3+6y^2+12y+8 \\ -9y^2-36y-36 \\ +23y+46 \\ -15 \end{array} \right\} = 0,$$

or $y^3-3y^2-y+3=0$, which has one negative root; and the roots of the proposed equation are all positive; therefore two of them are greater, and one less, than 2.

In general, the last term and the coefficients of the other terms of the transformed equation are found by substituting the number, by which the roots are to be diminished, for x , in the quantities,

$$\left. \begin{array}{l} x^n-px^{n-1}+qx^{n-2}-\&c. \\ nx^{n-1}-n-1.px^{n-2}+n-2.qx^{n-3}-\&c. \\ n-1.x^{n-2}-n-1.p x^{n-3}+n-2.qx^{n-4}-\&c. \end{array} \right\}$$

And by substituting, successively, different numbers for x , the limits of the roots of the proposed equation may be found.

On the Depression and Solution of Equations.

If an equation contain equal roots, these may be found, and the equation reduced as many dimensions lower as there are equal roots. Let the roots of the equation $x^n-px^{n-1}+qx^{n-2}-\&c.=0$, be a, b, c, d , &c. then,

$$nx^{n-1}-$$

$$\left. \begin{array}{l} nx^{n-1} - (n-1).px^{n-2} + \\ n-2.qx^{n-3} - \&c. \end{array} \right\} = \left\{ \begin{array}{l} x-a.x-b.x-c. \&c. \\ +x-a.x-b.x-d. \&c. \\ +x-a.x-c.x-d. \&c. \\ +x-b.x-c.x-d. \&c. \end{array} \right.$$

Suppose $a=b$, then

$$\left. \begin{array}{l} nx^{n-1} - (n-1).px^{n-2} + \\ n-2.qx^{n-3} - \&c. \end{array} \right\} = \left\{ \begin{array}{l} x-a.x-a.x-c. \&c. \\ +x-a.x-a.x-d. \&c. \\ +x-a.x-c.x-d. \&c. \\ +x-a.x-c.x-d. \&c. \end{array} \right.$$

the whole of which is divisible by $x-a$ without remainder, that is, a is a root of the equation $nx^{n-1} - (n-1).px^{n-2} + n-2.qx^{n-3} - \&c. = 0$.

If three roots, a, b, c , be equal, $x-a.x-a.x-a$ will be found in every product; therefore the equation is divisible by $x-a.x-a.x-a$ without remainder, or two of its roots are a, a . In the same manner, if the original equation have m equal roots, the equation $nx^{n-1} - (n-1).px^{n-2} + n-2.qx^{n-3} - \&c. = 0$, has $m-1$ of those roots. Hence it appears, that when there are m equal roots, the two equations have a common measure of the form $(x-a)^{m-1}$ and m roots of the original equation known. Divide this equation by $(x-a)^m$, and the resulting equation, of $n-m$ dimensions, contains the other roots.

Ex. Let the equation $x^3 - px^2 + qx - r = 0$, have two equal roots; then $3x^2 - 2px + q = 0$ has one of them, and the two equations have a common measure which is a simple equation; also the quantities $3x^2 - 3px^2 + 3qx - 3r$, and $3x^2 - 2px + q$, have the same common measure, which is thus found,

$$\begin{array}{r} 3x^2 - 2px + q \quad 3x^2 - 3px^2 + 3qx - 3r \quad x - \frac{p}{3} \\ \underline{3x^3 - 2px^2 + qx} \\ -px^2 + 2qx - 3r \\ \underline{-px^2 + \frac{2p^2x}{3} - \frac{pq}{3}} \\ 6q - 2p^2 \quad x - \frac{9r - pq}{3} \end{array}$$

Hence $\frac{6q-2p^2}{3}x - \frac{9r-pq}{3}$ is a divisor of the equation $x^3 - px^2 + qx - r = 0$; that is, $\frac{6q-2p^2}{3}x - \frac{9r-pq}{3} = 0$, and $x = \frac{9r-pq}{6q-2p^2}$.

Thus two roots of the equation are discovered; and, since r is the product of all the roots, r divided by $\left(\frac{9r-pq}{6q-2p^2}\right)^2$ is the third root.

Let the proposed equation be $x^2 - 4x^2 + 5x - 2 = 0$. Here $p=4, q=5, r=2$; and $\frac{9r-pq}{6q-2p^2} = 1$. If then the equation have two equal roots, each of them is 1, and the third root is 2.

But it must be observed, that though 1 be a root of the proposed equation, it has not another root also 1, unless 1 be a root of the depressed equation $3x^2 - 8x + 5 = 0$.

If two roots of an equation be of the form $+a, -a$, differing only in their signs, they may be found, and the equation depressed. Change the signs of the roots, and the resulting equation has two roots $+a, -a$; thus we have two equations with a common measure, $x^2 - a^2$, which may be found, and the equation depressed, as in the preceding case.

Ex. Required the roots of the equation $x^3 + 3x^2 - 7x^2 - 27x - 18 = 0$, two of which are of the form $+a, -a$.

By changing the signs of the alternate terms we obtain the equation $x^3 - 3x^2 - 7x^2 + 27x - 18 = 0$, which has two roots of the form $+a, -a$; their common quadratic divisor is $x^2 - 9 = 0$, hence $x = \pm 3$. To obtain the other roots, divide $x^3 + 3x^2 - 7x^2 - 27x - 18 = 0$, by $x^2 - 9 = 0$, and the roots of the resulting equation, $x^2 + 3x + 2 = 0$, are the roots sought.

By this method surd roots, of the form $\pm \sqrt{a}$, may be constantly discovered; because they are always of this form when the coefficients are rational.

Solution of Recurring Equations.

The roots of a recurring equation, of an even number of dimensions, exceeding a quadratic, may be found by the solution of an equation of half the number of dimensions. Let $x^n - px^{n-1} - \dots - px + 1 = 0$; its roots are of the form $a, \frac{1}{a}, b, \frac{1}{b}, \&c.$ or it may be conceived to be

made up of quadratic factors, $\frac{x-a.x-\frac{1}{a}}{a}, \frac{x-b.x-\frac{1}{b}}{b}, \&c.$ i. e. if $m=a+\frac{1}{a}, n=b+\frac{1}{b}, \&c.$ of the quadratic

factors, $x^2 - mx + 1, x^2 - nx + 1, \&c.$ Then, by multiplying these together, and equating the coefficients with those of the proposed equation, the values of $m, n, \&c.$ may be found. Moreover, since n is only of one dimension, where x is of two, the equation for determining the value of m will rise only to half as many dimensions as x rises to in the original equation.

If the recurring equation be of an odd number of dimensions, $+1$, or -1 , is a root; and the equation may therefore be reduced to one of the same kind, of an even number of dimensions, by division.

Ex. Let $x^3 - 1 = 0$. Unity is one root of this equation, and, by dividing $x^3 - 1$ by $x - 1$, the equation $x^2 + x + 1 = 0$ is obtained, which contains the other two, $\frac{-1 \pm \sqrt{-3}}{2}$ and $\frac{-1 - \sqrt{-3}}{2}$.

$$\begin{array}{l} x^2 + x + 1 = 0 \\ x^2 + x + \frac{1}{4} - \frac{1}{4} = -\frac{3}{4} \\ x + \frac{1}{2} = \pm \frac{\sqrt{-3}}{2} \end{array}$$

or $x = \frac{-1 \pm \sqrt{-3}}{2}$; that is, the three roots of the equation $x^3 - 1 = 0$, or the three cube roots of 1, are 1, $\frac{-1 + \sqrt{-3}}{2}$ and $\frac{-1 - \sqrt{-3}}{2}$.

In the same manner the roots of the equation $x^3 + 1 = 0$ are found to be $-1, \frac{1 + \sqrt{-3}}{2}$ and $\frac{1 - \sqrt{-3}}{2}$.

Solution of a Cubic Equation by Cardan's Rule.

Let the equation be reduced to the form $x^3 - qx + r = 0$, where q and r may be positive or negative. Assume $x = a + b$, then the equation becomes $(a+b)^3 - q(a+b) + r = 0$, or $a^3 + b^3 + 3ab(a+b) - q(a+b) + r = 0$; and, since we have two unknown quantities, a and b , and have made only one supposition respecting them, viz. that $a+b=x$, we are at liberty to make another; let $3ab - q = 0$, then the equation becomes $a^3 + b^3 + r = 0$; also, since $3ab - q = 0, b = \frac{q}{3a}$, and, by substitution, $a^3 + \frac{q^3}{27a^3} + r = 0$, or $a^6 + ra^3 + \frac{q^3}{27} = 0$, an equation of a quadratic form; and, by completing

pleting the square, $a^6 + 7a^3 + \frac{r^2}{4} = \frac{r^2}{4} - \frac{q^2}{27}$, and $a^3 + \frac{r}{2} =$

$\pm \sqrt{\frac{r^2}{4} - \frac{q^2}{27}}$, therefore, $a^3 = -\frac{r}{2} \pm \sqrt{\frac{r^2}{4} - \frac{q^2}{27}}$, and $a =$

$\sqrt[3]{-\frac{r}{2} \pm \sqrt{\frac{r^2}{4} - \frac{q^2}{27}}}$. Also, since $a^3 + b^3 + r = 0$, $b^3 =$

$-\frac{r}{2} \mp \sqrt{\frac{r^2}{4} - \frac{q^2}{27}}$, and $b = \sqrt[3]{-\frac{r}{2} \mp \sqrt{\frac{r^2}{4} - \frac{q^2}{27}}}$; there-

fore $x = a + b = \sqrt[3]{-\frac{r}{2} \pm \sqrt{\frac{r^2}{4} - \frac{q^2}{27}}} +$

$\sqrt[3]{-\frac{r}{2} \mp \sqrt{\frac{r^2}{4} - \frac{q^2}{27}}}$.

We may observe that when the sign of $\sqrt{\frac{r^2}{4} - \frac{q^2}{27}}$ in one part of the expression is positive, it is negative

in the other, that is $x = \sqrt[3]{-\frac{r}{2} + \sqrt{\frac{r^2}{4} - \frac{q^2}{27}}} +$

$\sqrt[3]{-\frac{r}{2} - \sqrt{\frac{r^2}{4} - \frac{q^2}{27}}}$.

Since $b = \frac{q}{3a}$, the value of x is also

$\sqrt[3]{-\frac{r}{2} \pm \sqrt{\frac{r^2}{4} - \frac{q^2}{27}}} + \frac{q}{\sqrt[3]{-\frac{r}{2} \pm \sqrt{\frac{r^2}{4} - \frac{q^2}{27}}}}$

Ex. Let $x^3 + 6x - 20 = 0$; here $q = -6$, $r = -20$, $x =$
 $\sqrt[3]{10 + \sqrt{108}} + \sqrt[3]{10 - \sqrt{108}} = 2.73 - .73 = 2.$

COR. 1. Having obtained one value of x , the equation may be depressed to a quadratic, and the other roots found.

COR. 2. The possible values of a and b being discovered, the other roots are known without the solution of a quadratic.

The values of the cube roots of a^3 are $a, \frac{-1 + \sqrt{-3}}{2}a,$
 $\frac{-1 - \sqrt{-3}}{2}a$; and the values of the cube root of b^3 are $b,$
 $\frac{-1 + \sqrt{-3}}{2}b, \frac{-1 - \sqrt{-3}}{2}b.$

Hence it appears that there are nine values of $a + b$, three only of which can answer the conditions of the equation, the others having been introduced by involution. These values are,

1. $a + b$
2. $a + \frac{-1 + \sqrt{-3}}{2}b$
3. $a + \frac{-1 - \sqrt{-3}}{2}b$
4. $\frac{-1 + \sqrt{-3}}{2}a + b$
5. $\frac{-1 + \sqrt{-3}}{2}a + \frac{-1 + \sqrt{-3}}{2}b$
6. $\frac{-1 + \sqrt{-3}}{2}a + \frac{-1 - \sqrt{-3}}{2}b$
7. $\frac{-1 - \sqrt{-3}}{2}a + b$

$$8. \frac{-1 - \sqrt{-3}}{2}a + \frac{-1 + \sqrt{-3}}{2}b$$

$$9. \frac{-1 - \sqrt{-3}}{2}a + \frac{-1 - \sqrt{-3}}{2}b$$

In the operation we assume $3ab = q$, that is, the product of the corresponding values of a and b is supposed to be possible. This consideration excludes the second, third, fourth, fifth, seventh, and ninth, values of $a + b$, or x ; therefore, the three roots of the equation are $a + b,$
 $\frac{-1 + \sqrt{-3}}{2}a + \frac{-1 - \sqrt{-3}}{2}b,$ and $\frac{-1 - \sqrt{-3}}{2}a +$
 $\frac{-1 + \sqrt{-3}}{2}b.$

COR. 3. This solution only extends to those cases in which the cubic has two impossible roots. For if the roots be $m + \sqrt{3n}$, $m - \sqrt{3n}$ and $-2m$, then $-q$, (the sum of the products of every two with their signs changed,) $= -3m^2 - 3n$, and $\frac{q}{27} = m^2 + n$; also r , the product of all the roots with their signs changed, $= 2m^3 - 6mn$, and $\frac{r}{2} = m^3 - 3mn$. And, by involution,

$$\frac{r^2}{4} = m^6 - 6m^2n + 9m^2n^2$$

$$\frac{q^3}{27} = m^6 + 3m^2n + 3m^2n^2 + n^3$$

$$\text{Hence } \frac{r^2}{4} - \frac{q^3}{27} = -9m^2n + 6m^2n^2 - n^3 =$$

$$-n \times 9m^2 - 6m^2n + n^3, \text{ and } \sqrt{\frac{r^2}{4} - \frac{q^3}{27}} = \sqrt{-n} \times \sqrt{3m^2 - n},$$

a quantity manifestly impossible, unless n is negative; that is, unless two roots of the proposed cubic are impossible.

Solution of a Biquadratic by Des Cartes's Method.

Any biquadratic may be reduced to the form $x^4 + qx^2 + rx + s = 0$, by taking away the second term. Suppose this to be made up of the two quadratics, $x^2 + ex + f = 0$, and $x^2 - ex + g = 0$, where $+e$ and $-e$ are made the coefficients of the second terms, because the second term of the biquadratic is wanting, that is, the sum of the roots is 0. By multiplying these quadratics together, we have $x^4 + g + f - e^2 \cdot x^2 + eg - ef \cdot x + fg = 0$, which equation is made to coincide with the former by equating their coefficients, or making $g + f - e^2 = q$, $eg - ef = r$, and $fg = s$; hence $g + f = q + e^2$, also $g - f = \frac{r}{e}$, and, by taking the sum

and difference of these equations, $2g = q + e^2 + \frac{r}{e}$, and $2f = q + e^2 - \frac{r}{e}$; therefore $4fg = q^2 + 2qe^2 + e^4 - \frac{r^2}{e^2} = 4s$, and multiplying by e^2 , and arranging the terms according to the dimensions of e , $e^6 + 2qe^4 + q^2e^2 - 4s \times e^2 - r^2 = 0$; or, making $y = e^2$, $y^3 + 2qy^2 + q^2y - 4sy - r^2 = 0$.

By the solution of this cubic, a value of y , and therefore of $\sqrt{y}$, or e , is obtained; also f and g , which are

respectively equal to $\frac{q + e^2 - \frac{r}{e}}{2}$ and $\frac{q + e^2 + \frac{r}{e}}{2}$, are known;

the biquadratic is thus resolved into two quadratics, whose roots may be found. It may be observed, that whichever value of y is used, the same values of x are obtained.

This solution can only be applied to those cases, in which two roots of the biquadratic are possible, and two impossible. Let the roots be $a, b, c, -a - b - c$; then, since e , the coefficient of the second term of one of the reducing quadratics,

quadratics, is the sum of two roots, its different values are $a+b$, $a+c$, $b+c$, $-a+b$, $-a+c$, $-b+c$, and the values of e , or y , are $a+b$, $a+c$, $b+c$; all of which being possible, the cubic cannot be solved by any direct method. Suppose the roots of the biquadratic to be $a+b\sqrt{-1}$, $a-b\sqrt{-1}$, $-a+c\sqrt{-1}$, $-a-c\sqrt{-1}$; the values of e are $2a$, $b+c\sqrt{-1}$, $b-c\sqrt{-1}$, $-b-c\sqrt{-1}$, $-b+c\sqrt{-1}$, and $-2a$; and the three values of y are, $2a$, $-b+c$, $-b-c$, which are all possible, as in the preceding case. But if the roots of the biquadratic be $a+b\sqrt{-1}$, $a-b\sqrt{-1}$, $-a+c$, $-a-c$, the values of y are $2a$, $c+b\sqrt{-1}$, $c-b\sqrt{-1}$, two of which are impossible; therefore the cubic may be solved by Cardan's rule.

Dr. Waring's Solution of a Biquadratic.

Let the proposed biquadratic be $x^4+2px^2=qx^2+rx+s$; now $x^2+px+n = x^2+2px^2+p^2+2n.x^2+2pnx+n^2$, if therefore $p^2+2n.x^2+2pnx+n^2$ be added to both sides of the proposed biquadratic, the first part is a complete square, x^2+px+n , and the latter part, $p^2+2n+q.x^2+2pn+r.x+n^2+s$, is a complete square, if $4 \times p^2+2n+q \times n^2+s = 2pn+r$; that is, multiplying and arranging the terms according to the dimensions of n , if $8n^3+4qn^2+8s-4rp.n+4qs+4p^2s-r^2=0$. From this equation let a value of n be obtained and substituted in the equation $x^2+px+n = p^2+2n+q.x^2+2pn+r.x+n^2+s$, then extracting the square root on both sides, $x^2+px+n = \pm \sqrt{p^2+2n+q.x^2+2pn+r.x+n^2+s}$ when $2pn+r$ is positive, or $x^2+px+n = \pm \sqrt{p^2+2n+q.x^2+2pn+r.x+n^2+s}$, when $2pn+r$ is negative, and from these two quadratics the four roots of the given biquadratic may be determined.

Ex. Let $x^4-6x^3+5x^2+2x-10=0$ be the proposed equation. By comparing this with the equation $x^4+2px^2=qx^2+rx+s=0$, we have $2p=-6$ or $p=-3$, $q=5$, $r=2$, $s=-10$; and $8n^3+4qn^2+8s-4rp.n+4qs+4p^2s-r^2=0$, is $8n^3-20n^2+56n+156=0$, or $2n^3-5n^2+14n+39=0$, one of whose roots is $-\frac{3}{2}$; hence $x^2-3x-\frac{3}{2} = x^2+7x+\frac{49}{4}$, and $x^2-3x-\frac{3}{2} = \pm x+\frac{7}{2}$, or $x^2-4x-5=0$, and $x^2-2x+2=0$; the roots of these quadratics, $-1, 5, 1+\sqrt{-1}, 1-\sqrt{-1}$, are the roots of the proposed biquadratic.

This solution can only be applied to those cases in which two roots of the biquadratic are possible, and two impossible. Let the roots be a, b, c, d , then $n = \sqrt{n^2+s}$, the last term of one of the quadratics to which the equation is reduced, is the product of two of them, as ab ; therefore, $n-ab = \sqrt{n^2+s}$, and, squaring both sides, $n^2-2nab+a^2b^2 = n^2+s$, or $-2nab+a^2b^2 = s = -abcd$, and dividing both sides by $-ab$, $2n-ab=cd$, or $2n=ab+cd$, and $n = \frac{ab+cd}{2}$; the other values of n are $\frac{ac+bd}{2}$, and $\frac{ad+bc}{2}$; therefore, when a, b, c, d , are possible, the values of n are possible. Also, when these quantities are all impossible, the values of n are all possible; in neither case, therefore, can the value of n be obtained by Cardan's rule; but, if two roots of the biquadratic be possible, and two impossible, two values of n will be impossible, and the cubic may be solved; and consequently the roots of the proposed equation may be found.

The Method of Divisors.

Since the last term of an equation is the product of all the roots with their signs changed, if any root be a whole number it must be found amongst the divisors of the last term.

Ex. Suppose $x^3-4x^2-6x+12=0$; the divisors of the last term are 1, -1, 2, -2, 3, -3, 4, -4, 6, -6, 12, -12; and, by substituting these successively for x , we find that -2 is a root of the equation.

When the last term admits of many divisors, the number of trials may be lessened by finding the limits between which the roots of the equation lie; or, by increasing or diminishing the roots of the equation, and thus lessening the number of divisors of the last term.

The number of trials may also be lessened by substituting three or more terms of the arithmetical progression 1, 0, -1, &c. for the unknown quantity, and forming the divisors of the results, taken in order, into arithmetical progressions, in which the common difference is unity; as it will only be necessary to try those divisors of the last term of the equation which are terms in these progressions.

Let $x+a.Q=0$ be the equation, one factor of which is $x+a$, and Q the product of the rest; if 1, 0, -1, be successively substituted for x , the results are respectively divisible by $a+1$, a , and $a-1$; therefore amongst the divisors of the results, formed into arithmetical progressions in which the common difference is unity, is found the decreasing progression $a+1, a, a-1$; and, if all the terms corresponding to a , with their signs changed, be substituted in the equation for x , the integral values of x will be discovered.

Ex. Let the proposed equation be $x^3-4x^2-6x+12=0$.

Supp.	Results.	Divisors.	Progr.
$x=1$	3	1, 3	3
$x=0$	12	1, 2, 3, 4, 6, 12	2
$x=-1$	13	1, 13	1

The only decreasing progression that can be formed out of the divisors is 3, 2, 1; therefore if one root of the equation be a whole number, -2 is that root, and on trial it is found to succeed.

If the highest power of the unknown quantity be affected with a coefficient, let $mx+a \times Q=0$ be the equation, and substitute 1, 0, -1, successively for x , then $a+m$, a , and $a-m$ are divisors of the results, if the equation have a factor of the form $mx+a$, or a root $-\frac{a}{m}$. Also m , the common difference in the arithmetical progression $a+m, a, a-m$, is a divisor of the coefficient of the first term of the equation. In this case, therefore, all the decreasing progressions must be taken, out of the divisors of the resulting quantities, in which the common difference is unity, or some divisor of the coefficient of the highest term of the equation, and amongst them is the progression $a+m, a, a-m$; therefore, by making trial of the progressions thus obtained, successively, the factor $mx+a$, which divides the equation without remainder, will be found.

Ex. To find a divisor of the equation $8x^3-26x^2+11x+10=0$, if it admit one of the form $mx+a$.

Sup.	Ref.	Divisors.	Progress.
$x=1$	3	1, 3, -1, -3	3, 3, -3
$x=0$	10	1, 2, 5, 10, -1, -2, -5, -10	1, 2, -5
$x=-1$	-35	1, 5, 7, 35, -1, -5, -7, -35	-1, 1, -7

The decreasing progressions, in which the common difference is a divisor of 8, formed out of the divisors, are 3, 1, -1; 3, 2, 1; and -3, -5, -7; therefore the factors to be tried are $2x+1$, $x+2$, and $2x-5$, the last of which succeeds, and consequently $2x-5=0$, or $x=\frac{5}{2}$.

If an equation be of four or more dimensions, though it admit of no divisor of the form $mx+a$, it may admit one of the form $\pm mx^2 \pm nx \pm r$. To find when this is the case, let $\pm mx^2 + nx + r \times Q = 0$ be the equation; and for x substitute, successively, $p+e$, p , $p-e$, &c. then $\pm m.p+e^2 + n.p+e+r$, $\pm mp^2 + np+r$, $\pm m.p-e^2 + n.p-e+r$ &c. are divisors of the resulting quantities; and, if they be respectively subtracted from, or added to, $m.p+e^2$, $m.p^2$, $m.p-e^2$, &c. the remainders, or sums, are $n.p+e+r$, $np+r$, $n.p-e+r$, &c. which form a decreasing arithmetical progression whose common difference is ne . When

$p=0$, and $e=1$, this progression becomes $n+r$, r , $-n+r$, &c. and in all cases m is a divisor of the first term of the equation. Let therefore 1, 0, -1, -2, &c. be substituted for x in the proposed equation, and the differences and sums of the divisors of the results, and m , 0, m , $4m$, &c. taken; then if all the arithmetical progressions possible be formed out of these quantities, in order, amongst them will be found the progression $n+r$, r , $-n+r$, &c. therefore, by trial, the divisor $mx^2 + nx + r$ will be discovered, if the equation admit one of a quadratic form.

Let the proposed equation be $3x^3 + 4x^2 + 3x - 2x + 2 = 0$.

Sup.	Ref.	Divisors.	Sq.	Sums and Differences.	Progress.
$x=1$	10	1, 2, 5, 10	3	-7, -2, 1, 2, 4, 5, 8, 13	-2, 1
$x=0$	2	1, 2	0	-2, -1, 1, 2	2, -1
$x=-1$	6	1, 2, 3, 6	3	-3, 0, 1, 2, 4, 5, 6, 9	6, -3
$x=-2$	34	1, 2, 17, 34	12	-22, -5, 10, 11, 13, 14, 29, 46	10, -5

From the first progression $n=-4$, $r=2$; from the other, $n=2$, and $r=-1$; therefore, since m may either be positive or negative, the divisors to be tried are $\pm 3x^2 - 4x + 2$, and $\pm 3x^2 + 2x - 1$; of which $-3x^2 + 2x - 1$, or $3x^2 - 2x + 1$ succeeds; consequently the roots of the equation $3x^2 - 2x + 1 = 0$, are two roots of the proposed biquadratic.

The Method of Approximation.

The most useful and general method of discovering the possible roots of numeral equations, is approximation. Find by trial two numbers, which substituted for the unknown quantity give, one a positive, and the other a negative, result; and an odd number of roots lies between these two quantities, that is, one possible root, at least, lies between them; then, by increasing one of the limits, and diminishing the other, an approximation may be made to the root; substitute this approximate value, increased or diminished by v , for the unknown quantity in the equation, neglect all the powers of v above the first, as being small when compared with the other terms, and a simple equation is obtained for determining v nearly; thus a nearer approximation is made to the root, and, by repeating the operation, the approximation may be made to any required degree of exactness.

Ex. Let the roots of the equation $y^3 - 3y + 1 = 0$ be required. When 1 is substituted for x the result is -1, and when 2 is substituted, the result is +3, therefore one root lies between 1 and 2; try 1.5, and the result is -.125, or the root lies between 1.5 and 2.

Let $1.5 + v = y$, then

$$\left. \begin{aligned} y^3 &= 3.375 + 6.75v + 4.5v^2 + v^3 \\ -3y &= -4.5 - 3v \\ +1 &= +1 \end{aligned} \right\} = 0,$$

that is, $-.125 + 3.75v + 4.5v^2 + v^3 = 0$, and, neglecting the two last terms, $-.125 + 3.75v = 0$, or $v = \frac{.125}{3.75} = .033$

nearly, and $y = 1.5 + v = 1.533$ nearly; again, suppose $1.533 + v = y$; by proceeding as before we find $.003686437 + 4.050267v = 0$, and $v = \frac{.003686437}{4.050267} = .0009101$, &c.

hence $y = 1.532089$ nearly. The other roots may be found by the solution of a quadratic.

If two roots $a+m$, $a+n$, be nearly equal to each other and to a , the quantities m and n , must both be determined; therefore the third term of the equation must be retained, or a quadratic, $P - Qv + Rv^2 = 0$, solved.

When m and n are much less than r , s , &c. and both positive or both negative, then $\frac{P}{Q} = \frac{1}{\frac{1}{m} + \frac{1}{n}} = \frac{m}{1 + \frac{m}{n}}$, nearly,

ly, which is an approximation to m the less of the two; but, if one of these quantities be positive and the other ne-

gative, $\frac{1}{m} + \frac{1}{n}$ may be either positive or negative, and

greater, equal to, or less, than $\frac{1}{r} + \frac{1}{s} + \&c.$ and conse-

quently $\frac{P}{Q}$ is not necessarily an approximation to any of the quantities m , n , r , s , &c.

Let $P - Qv + Rv^2 = 0$; the roots of this equation will be m and n nearly. For if m , n , r , s , be the roots of the equation $P - Qv + Rv^2 = Sv^3 + \&c. = 0$, $P = mnrs$, $Q = mns + mur + mrs + nrs$, $R = mn + mr + ms + nr + ns + rs$, and since m and n are small when compared with r and s , $Q = mrs + nrs$ nearly, and $R = rs$ nearly; therefore the equation $P - Qv + Rv^2 = 0$ becomes $mns - mrs + nrs.v + rs.v^2 = 0$; hence $v^2 - m + n.v + mn = 0$, whose roots are m and n . By the solution then of this quadratic a much nearer approximation is made to the root $a+m$ than by the former method, and at the same time an approximation is also made to the root $a+n$; but in this case, as in the former, m and n must both be positive or both negative, otherwise mns and mur do not necessarily vanish with respect to $mrs + nrs$, which is supposed in determining the value of Q .

On the Reversion of Series.

If two quantities $Ax + Bx^2 + Cx^3 + \&c.$ and $ax + bx^2 + cx^3 + \&c.$ be always equal, the invariable coefficients of the corresponding terms are equal. For if these equal quantities be divided by x , we have $A + Bx + Cx^2 + \&c. = a + bx + cx^2 + \&c.$ or when x is indefinitely small, $A=a$, and A and a are invariable; therefore, in all cases, $A=a$. Hence also $Bx + Cx^2 + \&c. = bx + cx^2 + \&c.$ or, dividing by x , $B + Cx + \&c. = b + cx + \&c.$ and when x is indefinitely small, $B=b$, therefore in all cases $B=b$. In the same manner $C=c$, &c.

COR. If $A + Bx + Cx^2 + \&c. = 0$ in all cases, then $A=0$, $B=0$, $C=0$, &c.

Approximation may be made to a root of an equation by assuming for it a series, involving the powers of that quantity in terms of which it is sought, with indeterminate coefficients; this series being substituted for the unknown quantity in the proposed equation, the coefficients may be found by making each term equal to 0, and thus the series which expresses the value of the unknown quantity may be determined.

Ex. Let $y^3 - 3y + x = 0$; required the value of y in terms of x .

$$\left. \begin{aligned} \text{Let } y &= ax + bx^2 + cx^3 + dx^4 + \&c. \text{ then} \\ y^3 &= a^3x^3 + 3a^2bx^4 + 3a^2cx^5 + 3ab^2x^7 + \&c. \\ -3y &= -3ax - 3bx^2 - 3cx^3 - 3dx^4 - \&c. \\ +x &= +x \end{aligned} \right\} = 0,$$

and, supposing each term to vanish, $-3a + 1 = 0$, or $a = \frac{1}{3}$

$$a = \frac{1}{3}; a^3 - 3b = 0, b = \frac{a^3}{3} = \frac{1}{27}; 3a^2b - 3c = 0, \text{ and } c = a^2b = \frac{1}{81}, \&c. \text{ therefore}$$

$$y = \frac{x}{3} + \frac{x^3}{3^4} + \frac{x^5}{3^6} + \&c. \text{ and when } x=1, y = \frac{1}{3} + \frac{1}{3^4} + \frac{1}{3^6} + \&c. = .347 \&c. \text{ which is one root of the equation } y^3 - 3y + 1 = 0.$$

If for y , the series $ax + bx^2 + cx^3 + dx^4 + \&c.$ had been assumed, the quantities $b, d, \&c.$ would have been found $= 0$, therefore the even terms are unnecessary.

COR. The less x is assumed, the faster will this series converge, and the more accurately will y be obtained.

This method of approximation is similar to the former, in this respect, that the series will have a slow degree of convergency, except one value of y is much less than any other. If this be not the case, find m , an approximate value of y , by trial, and assume $m \pm v = y$; then when one value of v is much less than any other it may be found by this reversion, and consequently that value of y known, which is nearest to m .

On the Sums of the Powers of the Roots of an Equation.

Let $a, b, c, \&c.$ be the roots of the equation $x^n - px^{n-1} + qx^{n-2} - \dots + wx^{n-m} - \&c. = 0$, and $A, B, C, \dots P, Q, R, S$, the sum of the roots, sum of their squares, cubes, $\dots m-3, m-2, m-1, m$, powers respectively; then will $A = p, B = pA - 2q, C = pB - qA + 3r, \&c.$ and $S = pR - qQ + rP - \dots - mw$; where $+w$ is the coefficient of the $m+1$ th term. Then,

$$\frac{nx^{n-1} - n-1.p x^{n-2} + n-2.q x^{n-3} - \dots + n-m.w x^{n-m-1} - \&c.}{x^n - p x^{n-1} + q x^{n-2} - \dots + w x^{n-m} - \&c.}$$

$$= \frac{1}{x-a} + \frac{1}{x-b} + \frac{1}{x-c} + \&c. \text{ whatever be the value of } x;$$

and, by actual division,

$$\frac{1}{x-a} = \frac{1}{x} + \frac{a}{x^2} + \frac{a^2}{x^3} + \dots + \frac{a^m}{x^{m+1}} + \&c.$$

$$\frac{1}{x-b} = \frac{1}{x} + \frac{b}{x^2} + \frac{b^2}{x^3} + \dots + \frac{b^m}{x^{m+1}} + \&c.$$

$$\frac{1}{x-c} = \frac{1}{x} + \frac{c}{x^2} + \frac{c^2}{x^3} + \dots + \frac{c^m}{x^{m+1}} + \&c.$$

and if x be supposed greater than any of the magnitudes $a, b, c, \&c.$ no quantity is lost in the division; therefore, by addition,

$$\frac{nx^{n-1} - n-1.p x^{n-2} + n-2.q x^{n-3} - \dots + n-m.w x^{n-m-1} - \&c.}{x^n - p x^{n-1} + q x^{n-2} - \dots + w x^{n-m} - \&c.}$$

$$= \frac{n}{x} + \frac{A}{x^2} + \frac{B}{x^3} + \dots + \frac{P}{x^{m-2}} + \frac{Q}{x^{m-1}} + \frac{R}{x^m} + \frac{S}{x^{m+1}} + \&c.$$

and multiplying by $x^n - p x^{n-1} + q x^{n-2} - \dots + w x^{n-m} - \&c.$

$$nx^{n-1} - n-1.p x^{n-2} + n-2.q x^{n-3} - \dots + n-m.w x^{n-m-1} - \&c. =$$

$$\left. \begin{aligned} &nx^{n-1} + Ax^{n-2} + Bx^{n-3} + \dots + Sx^{n-m-1} + \&c. \\ &- np x^{n-2} - pAx^{n-3} - \dots - pR x^{n-m-1} + \&c. \\ &+ nq x^{n-3} + \dots + qQ x^{n-m-2} + \&c. \\ &\dots - rP x^{n-m-1} + \&c. \\ &+ nwx^{n-m-1} + \&c. \end{aligned} \right\}$$

and by equating the coefficients, $A - np = -n-1.p$, and $A = p$; $B - pA + nq = n-2.q$, or $B = pA - 2q, \&c.$ $S - pR + qQ - rP + \dots + nw = n-m.w$, or $S = pR - qQ + rP - \dots - mw$.

Ex. Let $x^3 + 5x^2 - 6x - 8 = 0$; then, by comparing the terms of this with the terms of the equation $x^n - p x^{n-1} + q x^{n-2} - \&c. = 0$, we have $p = -5, q = -6, r = 3$.

Hence the sum of the roots $= p = -5 = A$.

Sum of the squares $= pA - 2q = 25 + 12 = 37 = B$.

Sum of the cubes $= pB - qA + 3r = -185 - 30 + 24 = -191 = C, \&c.$

The proposition also admits of the following proof. The same notation being retained, let m and n be equal, and since $a, b, c, \&c.$ are roots of the equation,

$$\begin{aligned} a^n - p a^{n-1} + q a^{n-2} - \dots + w &= 0 \\ b^n - p b^{n-1} + q b^{n-2} - \dots + w &= 0 \\ c^n - p c^{n-1} + q c^{n-2} - \dots + w &= 0 \\ \&c. \end{aligned}$$

$$\text{By add. } S - pR + qQ - \dots + nw = 0 \\ \text{Or } S = pR - qQ + \dots - nw.$$

If m be greater than n , multiply the proposed equation by x^{m-n} , then $x^m - p x^{m-1} + q x^{m-2} - \dots + w x^{m-n} = 0$; which equation has the roots $a, b, c, \&c.$ and $m-n$ roots, each equal to 0; therefore the sum of the m th powers of the roots of this equation is equal to the sum of the m th powers of the roots of the former; that is, $S = pR - qQ + \&c.$ to n terms.

When m is less than n , the sum of the m th powers of the roots may be expressed in terms of $p, q, r, \dots w$, where w is the coefficient of the $m+1$ th term of the equation. For p^2 contains $a^2 + b^2 + c^2 + \&c.$ with other combinations of the roots, as $ab, ac, bc, \&c.$ which combinations are contained in a multiple of q ; also p^3 contains $a^3 + b^3 + c^3 + \&c.$ with other combinations, such as $a^2b, a^2c, b^2a, \&c. abc, acd, bcd, \&c.$ and these combinations may be made up of p, q , and r ; for $p \times q$ contains the quantities $a^2b, a^2c, b^2a, \&c.$ and r is the sum of the quantities $abc, acd, bcd, \&c.$ In the same manner it appears, that $a^4 + b^4 + c^4 + \&c.$ may be found in terms of p, q, r , and s ; and, in general, $a^m + b^m + c^m + \&c.$ may be expressed in terms of $p, q, r, \dots w$. Also, the number of combinations of any particular form, as a^2b , cannot be altered by the introduction of the root c ; consequently, the coefficient of the product pq , by which the combinations of that form are taken away, is the same, whatever be the number of roots. Hence the expression for $a^m + b^m + c^m + \&c.$ in the equation $x^n - p x^{n-1} + q x^{n-2} - \dots + w x^{n-m} - \&c. = 0$, is the same with the expression for the sum of the m th powers of the roots of the equation $x^m - p x^{m-1} + q x^{m-2} - \dots + w = 0$; that is $S = pR - qQ + \dots - mw$.

This rule was given by Sir I. Newton for the purpose of approximating to the greatest root of an equation. Suppose the roots all possible, and one greater than the rest, the powers of this root increase in a higher ratio than those of any other, and the m th power of this root will approach nearer and nearer to a ratio of equality with the sum of the m th powers of the roots, as m increases; therefore, by extracting the m th root of this sum, an approximation is made to the greatest positive or least negative root.

On the Impossible Roots of an Equation.

It has before been shewn, that there are as many positive roots in an equation as it has changes of signs, and as many negative roots as continuations of the same sign, when the roots are all possible. But this rule cannot be applied to impossible roots; as appears by the consideration, that an impossible quantity cannot be termed either positive or negative.

If then it appear from the terms of an equation that some roots may either be called positive or negative, according to the above rule, they must be impossible. Thus two roots of the equation $x^3 + qx + r = 0$, or $x^3 \pm 0 + qx + r = 0$, are impossible; because it has two changes of signs or none, according as the second term is supposed to be -0 or $+0$. In the same manner, if any term of an equation be wanting, and the signs of the adjacent terms be both positive, or both negative, the equation has, at least, two impossible roots; and, if two succeeding terms be wanting, it must always have, at least, two impossible roots.

Impossible roots enter equations by pairs; they also lie under the form of two positive or two negative roots.

Let $\pm a + \sqrt{-b^2}$, and $\pm a - \sqrt{-b^2}$, be the roots; then $x \mp a - \sqrt{-b^2} \times x \mp a + \sqrt{-b^2} = x^2 \mp 2ax + a^2 + b^2 = 0$, which equation shews either two positive or two negative roots.

COR.

COR. Hence, if the last term of an equation of an even number of dimensions be negative, it will have at least two possible roots, one positive and the other negative.

Let an equation be transformed into one whose roots are the squares of the roots of the former; then as many negative roots as the transformed equation contains, so many impossible roots, at least, are in the original equation, because the square of a possible quantity is always positive.

If any series of magnitudes be substituted for the unknown quantity in an equation, there can only be as many changes of signs in the results, as the equation contains possible roots. Let $x^2 - 2ax + a^2 + b^2 \times x - c \cdot x - d \cdot \&c. = 0$, be an equation whose roots are $a + \sqrt{-b^2}$, $a - \sqrt{-b^2}$, c , d , &c. whatever magnitude is substituted for x , the quantity $x^2 - 2ax + a^2 + b^2$, which is the sum of two squares $x - a)^2 + b^2$, is positive; therefore, the changes of signs can only arise from the substitution of quantities for x in the rectangle $x - c \cdot x - d \cdot \&c.$ which changes are as many as there are possible roots c , d , &c.

The limiting equation has at least as many possible roots as the original, wanting one.

Let $x^2 - 2ax + a^2 + b^2 \times x - c \cdot x - d \cdot \&c. = 0$ be the proposed equation, the limiting equation is

$$\left. \begin{array}{l} x^2 - 2ax + a^2 + b^2 \times x - c \cdot \&c. \\ + x^2 - 2ax + a^2 + b^2 \times x - d \cdot \&c. \\ + x - a + \sqrt{-b^2} \times x - c \cdot x - d \cdot \&c. \\ + x - a - \sqrt{-b^2} \times x - c \cdot x - d \cdot \&c. \end{array} \right\} = 0,$$

Or by adding the two last terms together, it is

$$\left. \begin{array}{l} x^2 - 2ax + a^2 + b^2 \times x - c \cdot \&c. \\ + x^2 - 2ax + a^2 + b^2 \times x - d \cdot \&c. \\ + 2 \cdot x - a \cdot x - c \cdot x - d \cdot \&c. \end{array} \right\} = 0,$$

In which if c , d , &c. be successively substituted for x , the results are $+$, $-$, &c. therefore there are possible roots in this latter equation which lie between c , d , &c. or it contains, at least, as many possible roots, wanting one, as the original equation. It may contain more.

COR. 1. Hence it follows that there are, at least, as many impossible roots in the original equation as in the equation of limits. There may be more; therefore, from the number of impossible roots in the limiting equation we cannot determine exactly the number in the original equation.

COR. 2. Hence also it appears, that if the possible roots of the limiting equation be substituted successively in the

original equation, we know from the signs of the results, what possible roots it contains. For roots of the limiting equation lie between the possible roots of the proposed equation.

Ex. Let $x^{n+3} - a^{n+1}x^2 + b^2d^{n+1} = 0$.

Its limit is $n+3 \cdot x^{n+2} - 2a^{n+1}x = 0$; whose possible roots

when n is an odd number are $-\frac{2}{n+3} \sqrt[n+1]{\frac{1}{a}}$, 0 , and

$\frac{2}{n+3} \sqrt[n+1]{\frac{1}{a}}$; which substituted in the original equation

give the results either $-$, $+$, $-$, or $+$, $+$, $+$; therefore it has either four possible roots or none. When n is even, the possible roots of the limiting equation are 0 and

$\frac{2}{n+3} \sqrt[n+1]{\frac{1}{a}}$; therefore the equation itself will have one

possible root, or three, according as $\frac{2}{n+3} \sqrt[n+1]{\frac{1}{a}}$, when substituted for x , gives a positive or a negative result.

The roots of a quadratic equation are impossible, if the square of the middle term be less than four times the product of the extremes.

Let $ax^2 + bx + c = 0$; then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$, which

expression becomes impossible when b^2 is less than $4ac$.

There are impossible roots in an equation, whenever there are impossible roots in its limiting equation. In the same manner, if the next limit be taken, there are impossible roots in the original equation, whenever there are impossible roots in this limit; and, if the limit be thus brought down to a quadratic, when the roots of the quadratic are impossible, there are impossible roots in the original equation corresponding to them. On this principle the following rule of Sir H. Newton's is founded, for discovering impossible roots in any equation.

Let the proposed equation be $x^n - px^{n-1} + \dots + Dx^{n-r+1} - Ex^{n-r} + Fx^{n-r-1} - \dots = 0$. To obtain a limiting equation, which shall be a quadratic corresponding to the terms $Dx^{n-r+1} - Ex^{n-r} + Fx^{n-r-1}$, let the succeeding terms be taken away, by multiplying by the terms of the arithmetical progressions n , $n-1$, $n-2$, $\dots$, 2 , 1 , 0 ; $n-1$, $n-2$, $\dots$, 2 , 1 , 0 ; $n-2$, $n-3$, $\dots$, 2 , 1 , 0 , &c. and, let the preceding terms be taken away, by multiplying by the terms of the progressions 0 , 1 , 2 , $\dots$, $r+1$; 0 , 1 , 2 , $\dots$, r , &c. as follows:

$$\begin{array}{cccccccc} x^n & -px^{n-1} & +qx^{n-2} & \dots & +Dx^{n-r+1} & -Ex^{n-r} & +Fx^{n-r-1} & \dots = 0 \\ n, & n-1, & n-2, & \dots & n-r+1, & n-r, & n-r-1, & \dots \\ n-1, & n-2, & n-3, & \dots & n-r, & n-r-1, & n-r-2, & \dots \\ n-2, & n-3, & n-4, & \dots & n-r-1, & n-r-2, & n-r-3, & \dots \\ \&c. & & & & \&c. & & & \\ & & & & 4, & 3, & 2, & \\ & & & & 3, & 2, & 1, & \\ 0, & 1, & 2, & \dots & r-1, & r, & r+1, & \\ & 0, & 1, & \dots & r-2, & r-1, & r, & \\ & & 0, & \dots & r-3, & r-2, & r-1, & \\ & & & & \&c. & & & \\ & & & & \dots & 2, & 3, & 4, \\ & & & & \dots & 1, & 2, & 3, \end{array}$$

$$* \quad * \quad * \quad +n-r+1 \cdot n-r \cdot Dx^2 - 2 \cdot n-r \cdot rEx + r+1 \cdot rF \quad * = 0$$

The respective products being taken, and those quantities left out which are found in every product, we obtain a limiting quadratic $n-r+1 \cdot n-r \cdot Dx^2 - 2 \cdot n-r \cdot rEx + r+1 \cdot rF = 0$, corresponding to the three terms $Dx^{n-r+1} - Ex^{n-r} + Fx^{n-r-1}$; and, if two roots of this quadratic be impossible, that is, if $\frac{n-r}{r} \times r^2 E^2$ be less than $n-r+1$.

$n-r+1 \cdot rDF$, or $\frac{n-r \cdot r}{n-r+1 \cdot r+1} E^2$ less than DF , there

are impossible roots in the proposed equation corresponding to them.

Write down, therefore, a series of fractions $\frac{n}{1}, \frac{n-1}{2}, \frac{n-2}{3}, \dots, \frac{n-r+1}{r}, \frac{n-r}{r+1}$; divide each fraction by that

which precedes it, and place the results $\frac{n-1}{2n}, \frac{n-2}{n-1 \cdot 3}, \dots$

... $\frac{n-r}{n-r+1}$, over the succeeding terms of the equation, beginning with the second; also, place the sign + under the first and last terms, and under every other term + or - according as the square of that term multiplied by the fraction which stands over it is greater or less than the product of the adjacent terms; then there will be as many impossible roots in the equation as there are changes of these signs from + to - and from - to +.

Ex. Let the proposed equation be $x^3 - 4x^2 + 4x - 6 = 0$.

In the series of fractions $\frac{3}{1}, \frac{2}{2}, \frac{1}{3}$, if each term be divided by that which precedes it, we obtain $\frac{1}{3}, \frac{1}{3}$, to be placed over the terms of the equation;

$$\begin{array}{ccccccc} x^3 & - & 4x^2 & + & 4x & - & 6 = 0 \\ + & + & & & & & \\ - & 4 & & & & & \end{array}$$

and since $\frac{1}{3}$, or $\frac{16}{3}$, is greater than 4×1 , the sign + must be placed under the second term; but $\frac{4}{3}$, or $\frac{16}{3}$, is less than -4×-6 , or 24, therefore the sign - must be placed under the third term; and + being placed under the first and last terms, there are two changes of signs; therefore the equation contains two impossible roots.

SCHOLIUM. The discovery of the number of impossible roots in an equation has given great trouble to algebraists, and their researches, hitherto, have not been attended with any great success. In a cubic equation $x^3 - qx + r = 0$ two roots are impossible or not, according as $\frac{r^2}{4} - \frac{q^3}{27}$ is positive or negative. A biquadratic, $x^4 + qx^2 + rx + s = 0$, has two impossible roots when two roots of the equation $y^3 + 2qy^2 + q^2y - r^2 = 0$, are impossible; and all its roots are impossible, when the roots of this cubic are all possible and two of them negative.

Dr. Waring has given rules for determining the number of impossible roots in equations of five and six dimensions, but the investigation of these rules cannot possibly be introduced within our limits.

Sir If. Newton's rule, specified as above, is general and easily applied, but as it is deduced from the nature of the inferior limits, it will not always detect impossible roots. The proof also is defective, as it does not extend to that part of the rule which respects the number of impossible roots. Thus far, however, it may be depended upon, that it never shews impossible roots, but when there are such in the proposed equation.

PART III.

ON UNLIMITED PROBLEMS.

WHEN there are more unknown quantities than independent equations, the number of corresponding values which those quantities admit is indefinite. This number may be lessened by rejecting all the values which are not integers; it may be farther lessened by rejecting all the negative values; and still farther, by rejecting all values which are not square or cube numbers, &c. By restrictions of this kind the number of answers may be confined within definite limits.

If a simple equation expresses the relation of two unknown quantities, and their corresponding integral values be required, divide the whole equation by the coefficient which is the less of the two, and suppose that part of the quotient, which is in a fractional form, equal to some whole number; thus a new simple equation is obtained, with which we may proceed as before; let the operation

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be repeated till the coefficient of one of the unknown quantities is unity, and the coefficient of the other a whole number; then an integral value of the former may be obtained by substituting nothing, or any whole number, for the other; and, from the preceding equations, integral values of the quantities proposed may be found.

Ex. 1. Let $5x + 7y = 29$; to find the corresponding integral values of x and y . Dividing the whole equation by 5, the less coefficient,

$$x + y + \frac{2y}{5} = 5 + \frac{4}{5}$$

$$\text{Or } x = 5 - y + \frac{4 - 2y}{5}$$

$$\text{Assume } \frac{4 - 2y}{5} = p, \text{ or } 4 - 2y = 5p.$$

$$\text{Then } 2 - y = 2p + \frac{p}{2}$$

$$y = 2 - 2p - \frac{p}{2}$$

Let $p = 2s$, then $y = 2 - 5s$, and $x = 5 - y + p = 3 + 5s + 2s = 3 + 7s$.

If $s = 0$, then $x = 3$ and $y = 2$, the only positive whole numbers which answer the condition of the equation; for if $s = 1$, then $x = 10$ and $y = -3$; and if $s = -1$, then $x = -4$ and $y = 7$.

If the simple equation contain more unknown quantities, their corresponding integral values may be found in the same manner.

Ex. 2. Let $4x + 3y + 10 = 5v$; to find the corresponding integral values of x , y , and v . Dividing the whole equation by 3, the least coefficient,

$$x + y + 3 + \frac{x + 1}{3} = v + \frac{2v}{3}$$

$$y = v - x - 3 + \frac{2v - x - 1}{3}$$

$$\text{Assume } \frac{2v - x - 1}{3} = p, \text{ or } 2v - x - 1 = 3p$$

$$\text{Then } x = 2v - 3p - 1$$

And $y = v - 2v + 3p + 1 - 3 + p = 4p - v - 2$, and substituting for p and v nothing, or any whole numbers, integral values of x and y are known. If $v = 3$, and $p = 1$, then $x = 2$ and $y = -1$; if $v = 4$ and $p = 0$, then $x = 7$ and $y = -6$, &c.

Ex. 3. To find what numbers are divisible by 3 without remainders.

Let a, b, c, d , &c. be the digits, or figures in the unit's, ten's, hundred's, thousand's, &c. place of any number, then the number is $a + 10b + 100c + 1000d + \&c.$ this divided by 3 is $\frac{a}{3} + 3b + \frac{b}{3} + 33c + \frac{c}{3} + 333d + \frac{d}{3} + \&c.$ or

$$\frac{a + b + c + d + \&c.}{3} + 3b + 33c + 333d + \&c. \text{ which is a whole number when } \frac{a + b + c + d + \&c.}{3} \text{ is a whole number.}$$

Thus 111, 252, 7851, &c. are divisible by 3. In the same manner, any number is divisible by 9 if the sum of its digits be divisible by 9.

$$\text{For } \frac{a + 10b + 100c + 1000d + \&c.}{9} = \frac{a}{9} + b + \frac{b}{9} + 11c + \frac{c}{9} + 111d + \frac{d}{9} + \&c. = \frac{a + b + c + d + \&c.}{9} + b + 11c + 111d + \&c. \text{ which is a whole number when } \frac{a + b + c + d + \&c.}{9} \text{ is a whole number.}$$

Thus 684, 6588, &c. are divisible by 9.

COR. 1. Hence, if any number and the sum of its digits be each divided by 9, the remainders are equal.

COR. 2. From this property of 9 may be deduced the rule

rule which is usually given for discovering when the multiplication of two numbers is not just.

Let $9a+x$ be the multiplicand

$9b+y$ the multiplier

Then $81ab+9bx+9ay+xy$ is the product;

and, if the sum of the digits in the multiplicand be divided by 9, the remainder is x ; if the sum of the digits in the multiplier be divided by 9, the remainder is y ; and, if the sum of the digits in the product be divided by 9, the remainder is the same as when the sum of the digits in xy is divided by 9, unless the work is wrong.

No general rule can be laid down for finding integral corresponding values when the final equation is not a simple one, almost every particular case requiring a different process.

On Continued Fractions.

To represent $\frac{a}{b}$ in a continued fraction.

Let b be contained in a , p times, with a remainder c ; again, let c be contained in b , q times, with a remainder d , and so on, then we have,

$$\begin{array}{l} b)a(p \\ c)b(q \\ d)c(r \\ \text{\&c.} \end{array}$$

$$\begin{array}{l} a=pb+c \\ b=qc+d \\ c=rd+\text{\&c.} \end{array}$$

$$\text{Or } \frac{a}{b}=p+\frac{c}{b}=p+\frac{c}{qc+d}$$

$$=p+\frac{1}{q+\frac{d}{c}}$$

$$=p+\frac{1}{q+\frac{1}{r+\frac{e}{d}}}$$

$$=p+\frac{1}{q+\frac{1}{r+\frac{1}{\text{\&c.}}}}$$

$$\text{That is, } \frac{a}{b}=p+\frac{1}{q+\frac{1}{r+\frac{1}{\text{\&c.}}}}$$

COR. 1. An approximation may thus be made to the value of a fraction whose numerator and denominator are in too high terms, and, the farther the division is continued, the nearer will the approximation be to the true value.

COR. 2. This approximation is alternately less and greater than the true value. Thus p is less than $\frac{a}{b}$, and $p+\frac{1}{q}$ is greater, because a part of the denominator of the fraction is omitted; also $q+\frac{1}{r}$ is too great for the denominator, therefore $p+\frac{1}{q+\frac{1}{r}}$ is less than $\frac{a}{b}$, &c.

Ex. To find a fraction which shall nearly express $\frac{314159}{100000}$.

$$\begin{array}{r} 100000)314159(3 \\ \underline{300000} \\ 14159)100000(7 \\ \underline{99113} \\ 887)14159(15 \\ \underline{887} \\ 5289 \\ \underline{4435} \\ 854)887(1 \\ \underline{854} \\ 33 \text{ \&c.} \end{array}$$

Here $p=3$, $q=7$, $r=15$, $s=1$, &c. therefore $\frac{314159}{100000}$

$$=3+\frac{1}{7+\frac{1}{15+\text{\&c.}}}$$

The first approximation is 3, which is too little; the next is $3+\frac{1}{7}=\frac{22}{7}$, too great; the next is $3+\frac{1}{7+\frac{1}{15}}=3+\frac{15}{106}$

$\frac{15}{106}=\frac{333}{106}$, too little; and so on. This fraction expresses, nearly, the circumference of a circle in terms of its diameter; therefore the circumference is greater than 3 diameters, less than $\frac{22}{7}$ diameters, and greater than $\frac{333}{106}$, &c.

To find the value of a continued fraction when the denominators q , r , s , &c. recur in any certain order.

$$\text{EX. 1. Let } \frac{1}{q+\frac{1}{r+\frac{1}{q+\frac{1}{r+\text{\&c.}}}}}=x; \text{ then } \frac{1}{q+\frac{1}{r+x}}$$

$=x$, or $\frac{r+x}{qr+qx+1}=x$; hence $r+x=qrx+qx^2+x$, and $x^2+rx-\frac{r}{q}=0$, from the solution of which quadratic the value of x may be obtained.

$$\text{EX. 2. Let } \sqrt{a+\frac{b}{\sqrt{a+\frac{b}{\sqrt{a+\text{\&c.}}}}}}=x; \text{ by squaring}$$

both sides, $a+\frac{b}{\sqrt{a+\frac{b}{\sqrt{a+\text{\&c.}}}}}=x^2=a+\frac{b}{x}$; and $x^3-ax-b=0$; whence the value of x may be found.

In the same manner may the values of other quantities, which run on *in infinitum*, be found, if the factors recur.

EX. 1. To find the value of $\sqrt{a\sqrt{a\sqrt{a\sqrt{a\text{\&c.}}}}}$ in infinitum.

Let $\sqrt{a\sqrt{a\sqrt{a\sqrt{a\text{\&c.}}}}}=x$; by squaring both sides, $a\sqrt{a\sqrt{a\sqrt{a\text{\&c.}}}}=x^2$, that is, $ax=x^2$, or $x=a$.

EX. 2. Required the value of $\sqrt{a+\sqrt{b+\sqrt{a+\sqrt{b+\text{\&c.}}}}}$ in infinitum.

Let $\sqrt{a+\sqrt{b+\sqrt{a+\sqrt{b+\text{\&c.}}}}}=x$, by squaring both sides, $a+\sqrt{b+\sqrt{a+\sqrt{b+\text{\&c.}}}}=x^2$, and

$$\sqrt{b+\text{\&c.}}$$

$\sqrt{b+\sqrt{a+\sqrt{b+\&c.}}} = x^2 - a$; therefore

$b+\sqrt{a+\sqrt{b+\&c.}} = x^2 - 2ax^2 + a^2$, or $b+x = x^4 - 2ax^2 + a^2$; hence $x^4 - 2ax^2 - x + a^2 - b = 0$; from which equation x may be found.

To find the least common multiple of two quantities; or the least quantity which is divisible by each of them without remainder. The product of the two quantities divided by their greatest common measure is their least common multiple. Let a and b be two quantities, x their greatest common measure, m their least common multiple, and let m contain a , p times, and b , q times, that is, let $m = pa = qb$; then $\frac{a}{b} = \frac{q}{p}$, and since m is the least possible,

p and q are the least possible, therefore $\frac{q}{p}$ is the fraction $\frac{a}{b}$ in its lowest terms, and $q = \frac{a}{x}$; hence $m = qb = \frac{ab}{x}$.

Ex. What is the least common multiple of 18 and 12? Their greatest common measure is 6; therefore their least common multiple is $\frac{12 \times 18}{6} = 36$.

Every other common multiple of a and b is a multiple of m . Let n be any other common multiple of the two quantities; and, if possible, let m be contained in n , r times, with a remainder s , which is less than m ; then $n - rm = s$, and since a and b measure n and rm , they measure $n - rm$ or s , that is, they have a common multiple less than m , which is contrary to the supposition.

To find the least common multiple of three quantities, a , b , and c , take m the least common multiple of a and b , and n the least common multiple of m and c ; then n is the least common multiple sought. For every common multiple of a and b is a multiple of m ; therefore, every common multiple of a , b , and c , is a multiple of m and c ; also, every multiple of m and c is a multiple of a , b , and c ; consequently, the least common multiple of a , b , and c is the least common multiple of m and c .

Three quantities are said to be in *harmonical proportion*, when the first is to the third, as the difference of the first and second is to the difference of the second and third. Any magnitudes, A, B, C, D, E , &c. are said to be in *harmonical progression*, if $A:C::A-B:B-C$; $B:D::B-C:C-D$; $C:E::C-D:D-E$, &c.

The reciprocals of quantities in harmonical progression are in arithmetical progression.

Let A, B, C , &c. be in harmonical progression, then $A:C::A-B:B-C$, therefore $AB-AC=AC-BC$, and dividing both sides by ABC , $\frac{1}{C} - \frac{1}{B} = \frac{1}{B} - \frac{1}{A}$.

Again, $B:D::B-C:C-D$; therefore $BC-BD=BD-DC$, and, dividing by BCD , $\frac{1}{D} - \frac{1}{C} = \frac{1}{C} - \frac{1}{B}$; and $\frac{1}{C} - \frac{1}{B}$ has been proved equal to $\frac{1}{B} - \frac{1}{A}$; therefore the quantities $\frac{1}{A}, \frac{1}{B}, \frac{1}{C}, \frac{1}{D}$, &c. have a common difference, that is, they are in arithmetical progression.

On Binomial Surds.

To extract the root of a binomial, one or both of whose factors are quadratic surds. If the index of the root to be extracted be an even number, the square root may be found by the method before given on *Surds*, when it can be expressed by a binomial of the same description; and, if half the index be an even number, the square root may again be taken, and so on, till the root remaining to be extracted is expressed by an odd number.

Let the cube root of the binomial $a+\sqrt{-b^2}$ be required.

Assume $\sqrt[3]{a+\sqrt{-b^2}} = x+\sqrt{-y^2}$;

Then $\sqrt[3]{a-\sqrt{-b^2}} = x-\sqrt{-y^2}$;

By mult. $\sqrt[3]{a^2+b^2} = x^2+y^2 = m$, by substitution; Therefore, $y^2 = m - x^2$; also from the first equation, $a+\sqrt{-b^2} = x+\sqrt{-y^2}$ $^3 = x^3 + 3x^2\sqrt{-y^2} - 3xy^2 - y^2\sqrt{-y^2}$; therefore $x^3 - 3xy^2 = a$; or substituting for y^2 its value $m - x^2$, $x^3 - 3mx + 3x^3 = a$, that is, $4x^3 - 3mx - a = 0$, a cubic equation whose roots may be found by approximation; hence y , and consequently $x+\sqrt{-y^2}$, the root required, may be determined.

In the same manner it appears, that the c th root may be extracted by the solution of an equation of c dimensions.

Let $A+B$ be the given binomial surd, in which both terms are possible and A greater than B , its c th root, or the c th root of $A+B$, $\sqrt[c]{Q}$, a quantity of the same description, may sometimes be found in the form $a+\sqrt{b}$, or $\sqrt{a}+\sqrt{b}$, where a and b are whole numbers.

Let $\sqrt[c]{A+B} \times \sqrt[c]{Q} = x+y$, where x and y involve the same surds that $A\sqrt[c]{Q}$ and $B\sqrt[c]{Q}$ do, respectively.

Then since $\sqrt[c]{A+B} \times \sqrt[c]{Q} = x+y$

$$\sqrt[c]{A-B} \times \sqrt[c]{Q} = x-y,$$

By mult. $\sqrt[c]{A^2-B^2} \times Q = x^2-y^2$; let Q be so assumed that $A^2-B^2 \times Q$ may be a perfect c th power $=n^c$, then $x^2-y^2=n$; take $r=(x+y)^c \sqrt[c]{A+B} \times \sqrt[c]{Q}$ in the nearest integer number; then $\frac{x^2-y^2}{x+y} = x-y = \frac{n}{r}$, and $x+\frac{n}{r}$

$y=r$; therefore $2x=r+\frac{n}{r}$, or $x=\frac{r+\frac{n}{r}}{2}$; suppose s to

be the surd which $A\sqrt[c]{Q}$ and x involve; also let t be the rational part of x , and such that ts does not differ from $r+\frac{n}{r}$ by $\frac{1}{2}$, then if the root of the binomial be of the form $x+y$, the value of x is ts ; also $x^2-y^2=n$, or $y^2 = x^2 - n = t^2s^2 - n$; therefore $y = \sqrt{t^2s^2 - n}$, and $\sqrt[c]{A+B} \times \sqrt[c]{Q} = ts + \sqrt{t^2s^2 - n}$, or $\sqrt[c]{A+B} = \frac{ts + \sqrt{t^2s^2 - n}}{2^c \sqrt[c]{Q}}$.

By assuming r , the nearest integer to $\sqrt[c]{A+B} \times \sqrt[c]{Q}$, the value of x is accurately determined.

Let $x+y=r+q$ exactly, or $x+y-q=r$; then $\frac{x^2-y^2}{x+y-q} = \frac{n}{r} = x-y + \frac{q \times x-y}{x+y-q}$, and $r+\frac{n}{r} = 2x-q + \frac{q \times x-y}{x+y-q}$, which

differs from $2x$ by $q - \frac{q \times x-y}{x+y-q}$, i. e. by the difference of two fractions, each of which is less than 1, when x and y are positive, x greater than y , and $x+y$ greater than 1; therefore the value of $2x$ does not differ from the truth by 1, nor the value of x or ts by $\frac{1}{2}$; and s is known, consequently, the nearest integer to t , that is, t , which is an integer, is known.

COR. If the c th root of $A-B$ be required; find, by the rule $\frac{x+y}{2^c \sqrt[c]{Q}}$, the c th root of $A+B$; and $\frac{x-y}{2^c \sqrt[c]{Q}}$, is the c th root of $A-B$.

On Logarithms.

If there be a series of magnitudes $a^0, a^1, a^2, a^3, \dots a^x$; $a^{-1}, a^{-2}, a^{-3}, \dots a^{-y}$, the indices, 0, 1, 2, 3, $\dots x$; $-1, -2, -3, \dots -y$, are called the measures of the ratios of those magnitudes to 1, or the *logarithms* of the magnitudes. Thus x , the logarithm of any number c , is such a quantity that $a^x = c$. Here a may be assumed at pleasure; and, for every different value so assumed, a different system of logarithms will be formed. In the common tabular logarithms a is 10, and consequently 0, 1, 2, 3, $\dots x$, are the logarithms of 1, 10, 100, 1000, $\dots 10^x$.

COR. 1. Since the tabular logarithm of 10 is 1, the logarithm of a number between 1 and 10 is less than 1; and, in the same manner, the logarithm of a number between 10 and 100 is between 1 and 2; of a number between 100 and 1000, is between 2 and 3, &c. If x be the logarithm of 5, then $10^x = 5$; let $\frac{2}{3}$ be substituted for x , and $10^{\frac{2}{3}}$ is found to be less than 5, therefore $\frac{2}{3}$ is less than the logarithm of 5; but $10^{\frac{3}{4}}$ is greater than 5, or $\frac{3}{4}$ is greater than the logarithm of 5; the logarithm found in the tables is .69897, and $10^{.69897} = 5$ nearly.

COR. 2. If quantities be in geometrical progression, a^x, a^{2x}, a^{3x} , &c. their logarithms, $x, 2x, 3x$, &c. are in arithmetical progression.

The method of finding the logarithms of the natural numbers, or forming a table, will be explained in the Doctrine of Fluxions.

The sum of the logarithms of two numbers is the logarithm of their product; and the difference of the logarithms is the logarithm of their quotient. Let $x = \log. of c$, and $y = \log. of d$; then $a^x = c$, and $a^y = d$; hence $a^{x+y} = dc$, and $a^{x-y} = \frac{c}{d}$; or $x+y$ is the log. of dc , and $x-y$ the log. of $\frac{c}{d}$.

Ex. 1. Log. of $3 \times 7 = \log. of 3 + \log. of 7$.

Ex. 2. Log. of $pqr = \log. of pq + \log. of r = \log. of p + \log. of q + \log. of r$.

Ex. 3. Log. of $\frac{5}{7} = \log. of 5 - \log. of 7$.

If the logarithm of a number be multiplied by n , the product is the logarithm of that number raised to the n th power. Let d be the number whose log. is x , or $a^x = d$; then $a^{nx} = d^n$, that is, nx is the logarithm of d^n .

Exs. Log. of $\sqrt[3]{13} = \frac{1}{3} \times \log. 13$. Log. $b^z = z \times \log. b$.

If the logarithm of a number be divided by n , the quotient is the logarithm of the n th root of that number. Let $a^x = d$, then $\frac{x}{n} = \log. of \sqrt[n]{d}$, or $\frac{x}{n}$ is the log. of $\sqrt[n]{d}$.

Ex. Log. of $\sqrt[3]{5} = \frac{1}{3} \times \log. of 5$.

The utility of a table of logarithms in arithmetical calculations will from hence be manifest; the multiplication and division of numbers being performed by the addition and subtraction of these artificial representatives; and the involution or evolution of numbers, by multiplying or dividing their logarithms by the indices of the powers or roots required.

Let the value of $\sqrt[5]{7\sqrt{2} \times 3\sqrt{3}}$ be required.

$$\text{Log. of } 7 = .845098$$

$$\frac{1}{2} \log. of 2 = .150515$$

$$\frac{1}{3} \log. of 3 = .1590404$$

$$5) 1.1546534 \text{ sum}$$

.2309306 log. of 1.70188, &c. the value required.

On Interest and Annuities.

Interest is the consideration paid for the use or forbearance of money. The *rate* of interest is the consideration paid for the use of a certain sum for a certain time, as of 11. for one year. When the interest of the *principal* alone, or sum lent, is taken, it is called *simple* interest; but, if the interest, as soon as it becomes due, be considered as principal, and interest charged upon it, it is called *compound* interest. The *amount* is the whole sum due at the end of any time, interest and principal together. *Discount* is the abatement made for the payment of money before it becomes due.

To find the amount of a given sum in any time at simple interest.

Let P be the principal,

r , the interest of one pound for one year,

n , the time for which the interest is to be calculated,

M , the amount.

Then since the interest of a given sum must be proportional to the time, 1 (year) : n (years) :: r : nr the interest of 11. for n years, and the interest of P must be P times as great, or nrP ; therefore the amount $M = P + nrP$.

In this simple equation, any three of the quantities P, n, r, M , being given, the fourth may be found; thus $P = \frac{M}{1 + nr}$.

Ex. What sum must be paid down to receive 600l. at the end of nine months, allowing 5 per cent. discount? Or, which is the same thing, what principal P will in nine months be equivalent, or amount, to 600l. allowing 5 per cent. interest?

In this case $M = 600$, $n = \frac{3}{4}$, or .75, $r = \frac{5}{100} = .05$; hence

$$P = \frac{M}{1 + nr} = \frac{600}{1 + .75 \times .05} = 578.313 \text{ \&c. l.}$$

To find the amount of an annuity or pension left unpaid any number of years, allowing simple interest upon each sum or pension from the time it becomes due. Let A be the annuity; then at the end of the first year A becomes due, and, at the end of the second year, the interest of the first annuity is rA ; at the end of this year the principal becomes $2A$, therefore the interest due at the end of the third year is $2rA$; in the same manner, the interest due at the end of the fourth year is $3rA$, &c. hence the whole interest is

$$rA + 2rA + 3rA + \dots + n-1 \cdot rA = n \cdot \frac{n-1}{2} rA; \text{ and the sum of the annuities is } nA; \text{ therefore the whole amount } M = nA + n \cdot \frac{n-1}{2} rA.$$

Required the present value of an annuity to continue a certain number of years, allowing simple interest for the money. Let P be the present value; then if P and the annuity, at the same rate of interest, amount to the same sum, they are upon the whole of equal value. The amount of P in n years is $P + nrP$, and the amount of the annuity in the same time is $nA + n \cdot \frac{n-1}{2} rA$; therefore,

$$P + nrP = nA + n \cdot \frac{n-1}{2} rA, \text{ and } P = \frac{nA + n \cdot \frac{n-1}{2} rA}{1 + nr}.$$

In this equation, any three of the four quantities, P , A , n , r , being given, the other may be found.

COR. Let n be infinite, then $P = \frac{nA}{2}$ an infinite quantity; therefore, for a finite annuity to continue for ever, an infinite sum ought, according to this calculation, to be paid; a conclusion which shews the necessity of estimating the value of an annuity upon different principles.

To find the amount of a given sum at compound interest. Let $R=1$, together with its interest for a year; then at the end of the first year R becomes the principal or sum due; therefore,

$1 : R :: R : R^2$, the amount in two years;

$1 : R :: R^2 : R^3$, the amount in three years, &c.

in the same manner R^n is the amount in n years, and if P be the principal, the amount must be P times as great, or $PR^n=M$.

COR. 1. From this equation we have $P = \frac{M}{R^n}$.

Ex. What sum must be paid down to receive 600l. at the end of three years, allowing 5 per cent. per ann. compound interest?

In this case $R=1.05$, $n=3$, $M=600$; and consequently $P = \frac{M}{R^n} = \frac{600}{1.05^3} = 518.3021$.

COR. 2. If P , R , and M , be given to find n , we have $\log. P + n \times \log. R = \log. M$, or $n = \frac{\log. M - \log. P}{\log. R}$.

To find the amount of an annuity in any number of years, at compound interest. Let A be the annuity, or sum due at the end of the first year; then $1 : R :: A : RA$, its amount at the end of the second year; therefore $A + RA$ is the sum due at the end of the second year; in the same manner $1 : R :: 1 + R \times A : R + R^2 \times A$, the amount of the two payments at the end of the third year; and $1 + R + R^2 \times A$ is the whole sum due at the end of the third year; in the same manner $1 + R + R^2 + \dots + R^{n-1} \times A$ is the sum due at the end of n years, that is, $\frac{R^n - 1}{R - 1} \times A = M$.

COR. In this equation any three quantities being given, the fourth may be found.

To find the present value of an annuity to be paid for n years, allowing compound interest. Let P be the present value, A the annuity; then since PR^n is the amount of P in n years, and $\frac{R^n - 1}{R - 1} \times A$ the amount of A in the same

time; by the question, $PR^n = \frac{R^n - 1}{R - 1} \times A$, and $P = \frac{1 - \frac{1}{R^n}}{R - 1} \times A$.

COR. 1. Any three of the quantities, P , A , R , n , being given, the fourth may be found.

COR. 2. If the number of years be infinite, R^n is infinite, and $\frac{1}{R^n}$ vanishes, therefore $P = \frac{A}{R - 1}$.

Ex. If the annual rent of a freehold estate be 11. what is its value; allowing 5 per cent. compound interest? In this case $A=11$, $R=1.05$; therefore the present value $P = \frac{11}{.05} = 220$ l. or 20 years purchase.

COR. 3. The present value of an annuity, to commence at the expiration of p years, and to continue q years, is the difference between its present value for $p+q$ years, and its present value for p years.

SCHOLIUM. The method of determining the present value of an annuity at simple interest, as given above, has been decried by several eminent arithmeticians, and in its stead a solution of the question has been proposed upon the

following principle: "If the present value of each payment be determined separately, the sum of these values must be the value of the whole annuity."

Let x be the value or price paid down for the annuity, a the yearly payment, n the number of years for which it is to be paid, r the interest of 1 for one year. The present value of the first payment is $\frac{a}{1+r}$ the present value of

the second payment, or of a l. to be paid at the end of two years, is $\frac{a}{1+2r}$ and so on; therefore $x = \frac{a}{1+r} + \frac{a}{1+2r} + \dots + \frac{a}{1+nr}$.

These different conclusions arise from a circumstance which the opponents seem not to have attended to. According to the former solution, no part of the interest of the price paid down is employed in paying the annuity, till the principal is exhausted. Whatever calculation be adopted, x is the sum out of which the seller can exactly pay the annuities according to the proposed mode of calculation. Let the annuity be always paid out of the principal x ; then x , $x-a$, $x-2a$, $x-3a$, &c. are the sums in hand during the first, second, third, fourth, &c. years, the interest arising from which is rx , $rx-a$, $rx-2a$, $rx-3a$, &c.

that is, the whole interest is $nrx - 1 + 2 + 3 + \dots + n-1 \times ra$, or $nrx - n \cdot \frac{n-1}{2} ra$, which, together with the principal x , is equal to the sum of all the annuities; therefore,

$$\frac{na + n \cdot \frac{n-1}{2} ra}{1 + nr} - x - n \cdot \frac{n-1}{2} ra = na, \text{ and } x = \frac{na + n \cdot \frac{n-1}{2} ra}{1 + nr}.$$

According to the other calculation, part of the interest, as it arises, is employed in paying the annuity, but not the whole. Thus the first payment is made by a part of the principal, and the interest of that part, which together amount to the annuity; and the other payments are made in the same manner; this is, in effect, allowing interest upon that part of the whole interest which is incorporated with the principal. According to either calculation the seller has the advantage, since the whole or a part of the interest will remain at his disposal till the last annuity is paid off.

If the whole interest, as it arises, be incorporated with the principal, and employed in paying the annuity, compound interest is, in effect, allowed upon the whole. Let x be the price paid for the annuity, n the number of years for which it is granted, R , 1l. together with its interest for one year. Then x in one year amounts to Rx , out of which the annuity being paid, $Rx-a$ is the sum in hand at the end of the first year; R^2x-Ra is the amount of this sum at the end of the second year, therefore $R^2x-Ra-a$ is the sum in hand at the end of the second year; in the same manner, $R^3x-R^2a-Ra-a-a \dots -a$ is the sum left after paying the last annuity, which ought to be nothing; therefore $R^n x = R^{n-1}a + R^{n-2}a + \dots + a = \frac{R^n a - a}{R - 1}$, and $x = \frac{R^n a - a}{R^n \times R - 1}$.

On the Summation of Series.

We have before seen the method of determining the sums of quantities in arithmetical and geometrical progression; but when the terms increase or decrease according to other laws, different artifices must be used to obtain general expressions for their sums. The methods chiefly adopted, and which may be considered as belonging to algebra, are, 1. The method of subtraction. 2. The summation of Recurring Series, by the scale of relation. 3. The Differential Method. 4. The Method of Increments. The investigation of series whose sums are known by subtraction.

Ex. 1. Let $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \&c.$ in inf. = S

Then $\frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \&c.$ in inf. = S - 1

By subtraction, $\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \&c.$ in inf. = 1.

Ex. 2. Let $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \&c.$ in inf. = S

Then $\frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6} + \&c.$ in inf. = S - $\frac{3}{2}$

By sub. $\frac{2}{1.3} + \frac{2}{2.4} + \frac{2}{3.5} + \frac{2}{4.6} + \&c.$ in inf. = $\frac{3}{2}$

Or $\frac{1}{1.3} + \frac{1}{2.4} + \frac{1}{3.5} + \frac{1}{4.6} + \&c.$ = $\frac{3}{4}$

Ex. 3. Let $\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \&c.$ = S

Then $\frac{1}{2.3} + \frac{1}{3.4} + \frac{1}{4.5} + \&c.$ = S - $\frac{1}{2}$

By sub. $\frac{2}{1.2.3} + \frac{2}{2.3.4} + \frac{2}{3.4.5} + \&c.$ = $\frac{1}{2}$

And $\frac{1}{1.2.3} + \frac{1}{2.3.4} + \frac{1}{3.4.5} + \&c.$ = $\frac{1}{4}$

Ex. 4. To find the sum of the series $\frac{1}{2.4.6} + \frac{1}{4.6.8} + \frac{1}{6.8.10} + \&c.$ in inf.

Take away the last factor out of each denominator, and assume the resulting series equal to S; that is, Let

$\frac{1}{2.4} + \frac{1}{4.6} + \frac{1}{6.8} + \&c.$ = S

Then $\frac{1}{4.6} + \frac{1}{6.8} + \frac{1}{8.10} + \&c.$ = S - $\frac{1}{8}$

By sub. $\frac{4}{2.4.6} + \frac{4}{4.6.8} + \frac{4}{6.8.10} + \&c.$ = $\frac{1}{8}$

And $\frac{1}{2.4.6} + \frac{1}{4.6.8} + \frac{1}{6.8.10} + \&c.$ = $\frac{1}{32}$

Ex. 5. Let $\frac{1}{m} + \frac{1}{m+r} + \frac{1}{m+2r} + \&c.$ = S

Then $\frac{1}{m+r} + \frac{1}{m+2r} + \frac{1}{m+3r} + \&c.$ = S - $\frac{1}{m}$

By sub. $\frac{r}{m.m+r} + \frac{r}{m+r.m+2r} + \frac{r}{m+2r.m+3r} + \&c.$ = $\frac{1}{m}$

Hence $\frac{1}{m.m+r} + \frac{1}{m+r.m+2r} + \frac{1}{m+2r.m+3r} + \&c.$ = $\frac{1}{rm}$

By Ex. 5, $\frac{1}{m.m+r} + \frac{1}{m+r.m+2r} + \frac{1}{m+2r.m+3r} + \&c.$ = $\frac{1}{mr}$

Or $\frac{1}{m.m+2r} + \frac{1}{m+r.m+3r} + \frac{1}{m+2r.m+4r} + \&c.$ = $\frac{1}{mr}$

By Ex. 6, $\frac{2r}{m.m+r.m+2r} + \frac{2r}{m+r.m+2r.m+3r} + \frac{2r}{m+2r.m+3r.m+4r} + \&c.$ = $\frac{1}{2mr}$

By sub. $\frac{r}{m.m+r.m+2r} + \frac{2r}{m+r.m+2r.m+3r} + \frac{3r}{m+2r.m+3r.m+4r} + \&c.$ = $\frac{1}{2mr}$

Mult. by $\frac{b}{r}$, $\frac{b}{m.m+r.m+2r} + \frac{2b}{m+r.m+2r.m+3r} + \frac{3b}{m+2r.m+3r.m+4r} + \&c.$ = $\frac{b}{2mr^2}$

Also, $\frac{a}{m.m+r.m+2r} + \frac{a}{m+r.m+2r.m+3r} + \frac{a}{m+2r.m+3r.m+4r} + \&c.$ = $\frac{a}{2mr.m+r}$

By add. $\frac{a+b}{m.m+r.m+2r} + \frac{a+2b}{m+r.m+2r.m+3r} + \frac{a+3b}{m+2r.m+3r.m+4r} + \&c.$ = $\frac{1}{2mr} \times \frac{b}{r} + \frac{a}{m+r}$

Let $m=r=1$; then the series becomes $\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \&c.$ in inf. = 1. After n terms the series is $\frac{1}{n+1.n+2}$

$+ \frac{1}{n+2.n+3} + \frac{1}{n+3.n+4} + \&c.$ whose sum in infin. is

$\frac{1}{n+1}$; therefore, $\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \&c.$ to n terms, = $1 - \frac{1}{n+1} = \frac{n}{n+1}$

Ex. 6. Let $\frac{1}{m.m+r} + \frac{1}{m+r.m+2r} + \&c.$ = S

Then $\frac{1}{m+r.m+2r} + \frac{1}{m+2r.m+3r} + \&c.$ = S - $\frac{1}{m.m+r}$

By sub. $\frac{2r}{m.m+r.m+2r} + \frac{2r}{m+r.m+2r.m+3r} + \&c.$ = $\frac{1}{m.m+r}$

Or $\frac{1}{m.m+r.m+2r} + \frac{1}{m+r.m+2r.m+3r} + \&c.$ = $\frac{1}{2rm.m+r}$

Let $m=r=1$; then $\frac{1}{1.2.3} + \frac{1}{2.3.4} + \frac{1}{3.4.5} + \&c.$ in inf. = $\frac{1}{4}$. After n terms the series becomes $\frac{1}{n+1.n+2.n+3}$

$+ \frac{1}{n+2.n+3.n+4} + \&c.$ in infinitum, whose sum is

$\frac{1}{2.n+1.n+2}$; therefore, $\frac{1}{1.2.3} + \frac{1}{2.3.4} + \&c.$ to n terms, = $\frac{1}{4} - \frac{1}{2.n+1.n+2}$

A series of this kind may be summed when there are any number of factors in the denominator.

Ex. 7. To find the sum of the series $\frac{a+b}{m.m+r.m+2r} +$

$\frac{a+2b}{m+r.m+2r.m+3r} + \frac{a+3b}{m+2r.m+3r.m+4r} + \&c.$ in infinity,

by the above examples 5 and 6.

Let $a=3$, $b=m=r=1$; then $\frac{4}{1.2.3} + \frac{5}{2.3.4} + \frac{6}{3.4.5}$
 $+ \&c. = \frac{1}{2} \times 1 + \frac{3}{2} = \frac{5}{2}$.

Let $a=0$, $b=1$, $m=1$, $r=2$; then $\frac{1}{1.3.5} + \frac{2}{3.5.7} + \frac{3}{5.7.9} + \&c. = \frac{1}{8}$. Vid. Philoſophical Tranſactions, vol. lxxii. page 389.

Ex. 8. Let $1 + \frac{a}{b} + \frac{ac}{bd} + \frac{ace}{bdf} + \&c.$ be a deſcending ſeries, and ſuppoſe

$$1 + \frac{a}{b} + \frac{ac}{bd} + \frac{ace}{bdf} + \&c. = S$$

$$\text{Then } \frac{a}{b} + \frac{ac}{bd} + \frac{ace}{bdf} + \frac{aceg}{bdfh} + \&c. = S - 1$$

$$\text{By ſub. } 1 - \frac{a}{b} + \frac{a}{b} \times 1 - \frac{c}{d} + \frac{ac}{bd} \times 1 - \frac{c}{f} + \&c. = 1$$

$$\text{Or } \frac{b-a}{b} + \frac{a}{b} \times \frac{d-c}{d} + \frac{ac}{bd} \times \frac{f-c}{f} + \&c. = 1$$

$$\begin{array}{l} \text{Aſſume } a=n \quad b=m \\ c=n+1 \quad d=m+1 \\ e=n+2 \quad f=m+2 \\ \&c. \quad \&c. \end{array}$$

$$\text{Then } \frac{m-n}{m} + \frac{n}{m} \times \frac{m-n}{m+1} + \frac{n. n+1. m-n}{m. m+1. m+2} + \&c. = 1; \text{ or}$$

$$\frac{1}{m} + \frac{n}{m. m+1} + \frac{n. n+1}{m. m+1. m+2} + \&c. = \frac{1}{m-n}; \text{ if } n=2, \text{ then}$$

$$\frac{1}{m} + \frac{2}{m. m+1} + \frac{2.3}{m. m+1. m+2} + \&c. = \frac{1}{m-2}.$$

Similar to the method of ſubtraction is the following, given by De Moivre, Miſcell. Anal. p. 130. Aſſume a ſeries whoſe terms converge to 0, involving the powers of an indeterminate quantity x ; call the ſum of the ſeries S , and multiply both ſides of the equation by a binomial, trinomial, &c. which involves the powers of x and invariable coefficients; then if x be ſo aſſumed that the binomial, trinomial, &c. may vaniſh, and ſome of the firſt terms be tranſpoſed, the ſum of the remaining ſeries is equal to the terms ſo tranſpoſed.

$$\text{Ex. 1. Let } 1 + \frac{x}{2} + \frac{x^2}{3} + \frac{x^3}{4} + \&c. = S$$

Multiplying both ſides by $x-1$, we have

$$\left. \begin{array}{l} x + \frac{x^2}{2} + \frac{x^3}{3} + \frac{x^4}{4} + \&c. \\ -1 - \frac{x}{2} - \frac{x^2}{3} - \frac{x^3}{4} - \frac{x^4}{5} - \&c. \end{array} \right\} = x-1.S$$

$$\text{Or } -1 + \frac{x}{1.2} + \frac{x^2}{2.3} + \frac{x^3}{3.4} + \&c. = x-1.S; \text{ and if } x=1,$$

$$\text{then } -1 + \frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \&c. = 0; \text{ or } \frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \&c. = 1.$$

Ex. 2. Aſſume $1 + \frac{x}{2} + \frac{x^2}{3} + \frac{x^3}{4} + \&c. = S$, and multiply both ſides by x^2-1 ; then

$$\left. \begin{array}{l} x^2 + \frac{x^3}{2} + \frac{x^4}{3} + \frac{x^5}{4} + \&c. \\ -1 - \frac{x}{2} - \frac{x^2}{3} - \frac{x^3}{4} - \frac{x^4}{5} - \&c. \end{array} \right\} = x^2-1 \times S,$$

$$\text{Or } -1 - \frac{x}{2} + \frac{2x^2}{1.3} + \frac{2x^3}{2.4} + \frac{2x^4}{3.5} + \&c. = x^2-1 \times S.$$

Let $x^2-1=0$, then $x=1$, or -1 ; if $x=1$, then

$$-1 - \frac{1}{2} + \frac{2}{1.3} + \frac{2}{2.4} + \frac{2}{3.5} + \&c. = 0$$

$$\text{That is, } \frac{2}{1.3} + \frac{2}{2.4} + \frac{2}{3.5} + \&c. = \frac{3}{2},$$

$$\text{And } \frac{1}{1.3} + \frac{1}{2.4} + \frac{1}{3.5} + \&c. = \frac{3}{4}$$

If $x=-1$, then

$$-1 + \frac{1}{2} + \frac{2}{1.3} - \frac{2}{2.4} + \frac{2}{3.5} - \&c. = 0,$$

$$\text{And } \frac{1}{1.3} - \frac{1}{2.4} + \frac{1}{3.5} - \&c. = \frac{1}{4}$$

Ex. 3. Let $1 + \frac{x}{2} + \frac{x^2}{3} + \frac{x^3}{4} + \&c. = S$, and multiply both ſides by $2x-1$; then

$$-1 + \frac{3x}{1.2} + \frac{4x^2}{2.3} + \frac{5x^3}{3.4} + \&c. = 2x-1.S; \text{ let } 2x-1=0,$$

or $x=\frac{1}{2}$, and

$$-1 + \frac{3}{1.2.2} + \frac{4}{2.3.2^2} + \frac{5}{3.4.2^3} + \&c. = 0,$$

$$\text{Or } \frac{3}{1.2.2} + \frac{4}{2.3.2^2} + \frac{5}{3.4.2^3} + \&c. = 1.$$

If both ſides of the equation be multiplied by a binomial, each term of the ſeries obtained will have two factors in its denominator; if by a trinomial, each term will have three factors, &c.

$$\text{Ex. 4. Let } 1 + \frac{x}{2} + \frac{x^2}{3} + \frac{x^3}{4} + \&c. = S,$$

Multiply both ſides by $2x-1.x-1$, or $2x^2-3x+1$; then

$$\left. \begin{array}{l} 2x^2 + \frac{2x^3}{2} + \frac{2x^4}{3} + \&c. \\ -3x - \frac{3x^2}{2} - \frac{3x^3}{3} - \frac{3x^4}{4} - \&c. \\ +1 + \frac{x}{2} + \frac{x^2}{3} + \frac{x^3}{4} + \frac{x^4}{5} + \&c. \end{array} \right\} = 2x^2-3x+1.S$$

$$\text{Or } 1 - \frac{5x}{2} + \frac{5x^2}{1.2.3} + \frac{6x^3}{2.3.4} + \frac{7x^4}{3.4.5} + \&c. = 2x^2-3x+1.S$$

$$\text{If } x=1, \text{ then } 1 - \frac{5}{2} + \frac{5}{1.2.3} + \frac{6}{2.3.4} + \&c. = 0,$$

$$\text{And } \frac{5}{1.2.3} + \frac{6}{2.3.4} + \frac{7}{3.4.5} + \&c. = \frac{3}{2}. \text{ If } x=\frac{1}{2}, \text{ then}$$

$$1 - \frac{5}{4} + \frac{5}{1.2.3.2^2} + \frac{6}{2.3.4.2^3} + \frac{7}{3.4.5.2^4} + \&c. = 0, \text{ or}$$

$$\frac{5}{1.2.3.2^2} + \frac{6}{2.3.4.2^3} + \frac{7}{3.4.5.2^4} + \&c. = \frac{1}{4}.$$

$$\text{Ex. 5. Let } \frac{1}{m} + \frac{x}{m+r} + \frac{x^2}{m+2r} + \&c. = S;$$

Multiply both ſides by the binomial $ax-b$; then

$$\left. \begin{array}{l} \frac{ax}{m} + \frac{ax^2}{m+r} + \frac{ax^3}{m+2r} + \&c. \\ -b - \frac{bx}{m+r} - \frac{bx^2}{m+2r} - \frac{bx^3}{m+3r} - \&c. \end{array} \right\} = ax-b.S,$$

$$\text{Or } -\frac{b}{m} + \frac{m+r.a-mb}{m.m+r} \times x + \frac{m+2r.a-m+r.b}{m+r.m+2r} \times x^2 + \&c. = ax-b.S.$$

Let $ax-b=0$, and tranſpoſe $-\frac{b}{m}$; then

$$\frac{m+r.a-mb}{m.m+r} \times x + \frac{m+2r.a-m+r.b}{m+r.m+2r} \times x^2 + \&c. = \frac{b}{m}.$$

If the terms of this series can be made to coincide with the terms of a proposed series, the sum of the latter may be found. Thus, let the sum of the infinite series

$$\frac{2}{1.3} \times \frac{1}{3} + \frac{3}{3.5} \times \frac{1}{3^2} + \frac{4}{5.7} \times \frac{1}{3^3} + \&c. \text{ be required.}$$

In this case $a = \frac{1}{3}$, therefore $\frac{a}{3} - b = 0$, or $a = 3b$; also $m = 1$, $r = 2$, and $m + r.a - mb = 2$, that is, $3a - b$, or $9b - b = 2$; hence $b = \frac{1}{4}$, $a = \frac{3}{4}$; and, if these values be substituted in the succeeding terms, the general series coincides with the proposed one, whose sum is therefore $\frac{b}{m}$, or $\frac{1}{4}$.

After the first n terms the series becomes

$$\frac{n+2}{2n+1.2n+3} \times \frac{1}{3^{n+1}} + \frac{n+3}{2n+3.2n+5} \times \frac{1}{3^{n+2}} + \&c. \text{ or } \frac{1}{3^n} \times \frac{n+2}{2n+1.2n+3} + \frac{n+3}{2n+3.2n+5} \times \frac{1}{3^2} + \&c. \text{ and, by com-}$$

paring this with the general series, we find $x = \frac{1}{3}$, and

$$a = 3b; \text{ also } m = 2n+1, r = 2, m+r.a - mb = n+2, \text{ or } 2n+3.3b - 2n+1.b = n+2; \text{ therefore } 4n+8.b = n+2, \text{ and } b = \frac{1}{4}, a = 3b = \frac{3}{4}; \text{ hence } \frac{n+2}{2n+1.2n+3} \times \frac{1}{3} + \frac{n+3}{2n+3.2n+5} \times \frac{1}{3^2} + \&c. = \frac{b}{m} = \frac{1}{4.2n+1}, \text{ and } \frac{1}{3^n} \times$$

$$\frac{n+2}{2n+1.2n+3} \times \frac{1}{3} + \frac{n+3}{2n+3.2n+5} \times \frac{1}{3^2} + \&c. = \frac{1}{4.2n+1.3^n}, \text{ the sum of the series after the first } n \text{ terms; also the sum of the whole series is } \frac{1}{4}; \text{ therefore the sum of the first } n \text{ terms is } \frac{1}{4} - \frac{1}{4.2n+1.3^n}.$$

COR. Since the sum of the series after the first n terms is $\frac{1}{4.2n+1.3^n}$, if $n=0$, we get the sum of the whole series $= \frac{1}{4.1.3^0} = \frac{1}{4}$.

Ex. 6. To find the sum of $\frac{19}{1.2.3} \times \frac{1}{4} + \frac{28}{2.3.4} \times \frac{1}{8} + \frac{39}{3.4.5} \times \frac{1}{16} + \frac{52}{4.5.6} \times \frac{1}{32} + \&c. \text{ in infinitum.}$
Because the factors in the denominators increase by 1, and begin from 1, assume $1 + \frac{x}{2} + \frac{x^2}{3} + \frac{x^3}{4} + \frac{x^4}{5} + \&c. = S$, and multiply both sides by $ax^2 - bx + c$; then

$$\left. \begin{aligned} & ax^2 + \frac{ax^3}{2} + \frac{ax^4}{3} + \&c. \\ & - bx - \frac{bx^2}{2} - \frac{bx^3}{3} - \frac{bx^4}{4} - \&c. \\ & + c + \frac{cx}{2} + \frac{cx^2}{3} + \frac{cx^3}{4} + \frac{cx^4}{5} + \&c. \end{aligned} \right\} = ax^2 - bx + c \times S,$$

$$\text{Or } c + \frac{c-2b}{1.2} \times x + \frac{6a-3b+2c}{1.2.3} \times x^2 + \frac{12a-8b+6c}{2.3.4} \times x^3 + \frac{20a-15b+12c}{3.4.5} \times x^4 + \&c. = ax^2 - bx + cS; \text{ and since } ax^2 - bx + c = 0, \text{ and one value of } x \text{ must be } \frac{1}{2}, \text{ because the}$$

powers of $\frac{1}{2}$ are involved in the terms of the proposed series, we have $\frac{a}{4} - \frac{b}{2} + c = 0$; also $6a - 3b + 2c = 19$, and

$12a - 8b + 6c = 28$; from which three equations it appears, that $a=6$, $b=7$, $c=2$; and, if these values be substituted in the general series, we have $2 - 3 + \frac{19}{1.2.3} \times \frac{1}{4} + \frac{28}{2.3.4} \times$

$$\frac{1}{8} + \frac{39}{3.4.5} \times \frac{1}{16} + \frac{52}{4.5.6} \times \frac{1}{32} + \&c. = 0, \text{ or } \frac{19}{1.2.3} \times \frac{1}{4} + \frac{28}{2.3.4} \times \frac{1}{8} + \frac{39}{3.4.5} \times \frac{1}{16} + \&c. = 1.$$

On Recurring Series.

If each succeeding term of a decreasing series bear an invariable relation to a certain number of the preceding terms, the sum of the series may be found.

Let $a+bx+cx^2+\&c.$ be the proposed series; call its terms $A, B, C, D, \&c.$ and let $C=fxB+gx^2A$, $D=fxC+gx^3B$, $\&c.$ where $f+g$ is the scale of relation; then, by the supposition,

$$\begin{aligned} A &= A \\ B &= B \\ C &= fxB + gx^2A \\ D &= fxC + gx^3B \\ E &= fxD + gx^4C \\ \&c. & \quad \&c. \end{aligned}$$

and if the whole sum $A+B+C+D+\&c. = S$, we have

$$\begin{aligned} S &= A+B+fx \times S - A+gx^2 \times S, \text{ or} \\ S - fxB - gx^2S &= A+B-fxA; \text{ therefore } S = \frac{A+B-fxA}{1-fx-gx^2}. \end{aligned}$$

In the same manner, if the scale of relation be $f+g+\&c.$ to n factors, the sum of the series is

$$\frac{A+B+C+\dots(n)-fx \times A+B+\dots(n-1)-gx^2 \times A+\dots(n-2) \&c.}{1-fx-gx^2-hx^3-\dots(n+1)}$$

Ex. 1. To find the sum of the infinite series $1+2x+3x^2+4x^3+\&c.$ when x is less than 1.

$$\text{Here } f=2, g=-1, \text{ and the sum } = \frac{1+2x-2x^2}{1-2x+x^2} = \frac{1}{1-x}.$$

If x be equal to or greater than 1, the series is infinite; yet we know that it arises from the division of 1 by $1-x^2$, and the sum of n terms may be accurately determined.

The series after the n first terms becomes $n+1.x^n + n+2.x^{n+1} + n+3.x^{n+2} + \&c.$ in which the scale of relation, as before, is $2-1$; and therefore it arises from the fraction $\frac{n+1.x^n + n+2.x^{n+1} - 2.n+1.x^{n+1}}{1-2x+x^2}$, or $\frac{n+1.x^n - nx^{n+1}}{1-x^2}$;

therefore, $1+2x+3x^2+\&c.$ to n terms, $= \frac{1-n+1.x^n + nx^{n+1}}{1-x^2}$.

Ex. 2. To find the sum of n terms of the series $1+3x+5x^2+7x^3+\&c.$ Suppose $f+g$ the scale of relation; then $3f+g=5$, and $5f+3g=7$; hence $f=2$, and $g=-1$; and by trial it appears that the scale of relation is properly determined; hence $S = \frac{1+3x-2x^2}{1-2x+x^2} = \frac{1+x}{1-x}$. After n

terms the series becomes $\frac{2n+1.x^n + 2n+3.x^{n+1} + 2n+5.x^{n+2} + \&c.}{1-2x+x^2}$ which arises from the fraction $\frac{2n+1.x^n + 2n+3.x^{n+1} - 2.2n+1.x^{n+1}}{1-2x+x^2}$; or $\frac{2n+1.x^n - 2n-1.x^{n+1}}{1-x^2}$; hence $1+3x+5x^2+7x^3+\&c.$

$$\text{to } n \text{ terms, } = \frac{1+x-2n+1.x^n + 2n-1.x^{n+1}}{1-x^2}.$$

Ex. 3. To find the sum of n terms of the series $n-1 \cdot x + n-2 \cdot x^2 + n-3 \cdot x^3 + \&c.$

In the series $n-1 \cdot x + n-2 \cdot x^2 + n-3 \cdot x^3 + \&c.$ the scale of relation is $2-1$; therefore its sum in infinitum is $\frac{n-1 \cdot x + n-2 \cdot x^2 - 2 \cdot n-1 \cdot x^2}{1-x}$, or $\frac{n-1 \cdot x - nx^2}{1-x}$. After n

terms the series becomes $-x^{n+1} - 2x^{n+2} - \&c.$ the sum of which is found in the same manner to be $\frac{-x^{n+1}}{1-x}$; therefore

$$\frac{n-1 \cdot x + n-2 \cdot x^2 + n-3 \cdot x^3 + \&c.}{1-x} = \frac{n-1 \cdot x - nx^2}{1-x} - \frac{x^{n+1}}{1-x}$$

Hence $\frac{n-1 \cdot x}{n} + \frac{n-2 \cdot x^2}{n} + \&c.$ to n terms, $= \frac{n-1 \cdot x - nx^2 + x^{n+1}}{n \cdot 1-x}$.

Ex. 4. To find the sum of n terms of the series $1^2 + 2^2 x + 3^2 x^2 + 4^2 x^3 + \&c.$

Let the scale of relation be $f+g+h$; then

$$\begin{aligned} 9f + 4g + h &= 16 \\ 16f + 9g + 4h &= 25 \\ 25f + 16g + 9h &= 36 \end{aligned}$$

From these equations we obtain $f=3, g=-3, h=1$, which values, when substituted, produce the successive terms of the proposed series; therefore $S = \frac{1+x}{1-3x+3x^2-x^3}$, the sum of the series in inf. when x is less than 1.

After the first n terms the series becomes $\frac{n+1}{1-x} \times x^n + \frac{n+2}{1-x} \times x^{n+1} + \frac{n+3}{1-x} \times x^{n+2} + \&c.$ which arises from the fraction $\frac{n+1}{1-x} \times x^n + \frac{n+2}{1-x} \times x^{n+1} + \frac{n+3}{1-x} \times x^{n+2} + \&c.$

$$\frac{-3 \cdot \frac{n+1}{1-x} x^{n+1} - 3 \cdot \frac{n+2}{1-x} x^{n+2} + 3 \cdot \frac{n+1}{1-x} x^{n+2}}{1-3x^2-x^3}, \text{ or } \frac{-3x^2-x^3}{n+1} \cdot x^n - \frac{2n^2+2n-1}{1-x} \times x^{n+1} + \frac{n^2 x^{n+2}}{1-x}; \text{ and conse-}$$

quently the sum of n terms of the series is $\frac{1+x-n+1}{1-x} x^n + \frac{2n^2+2n-1}{1-x} \times x^{n+1} - \frac{n^2 x^{n+2}}{1-x}$.

On the Differential Method.

In any series of quantities, $a, b, c, d, e, f, \&c.$ if each term be taken from that which follows it, and the differences of these differences be taken, and so on, the following ranks of differences will be obtained:

- 1st Diff. $b-a, c-b, d-c, e-d, f-e, \&c.$
- 2d Diff. $c-2b+a, d-2c+b, e-2d+c, f-2e+d, \&c.$
- 3d Diff. $d-3c+3b-a, e-3d+3c-b, f-3e+3d-c, \&c.$
- 4th Diff. $e-4d+6c-4b+a, f-4e+6d-4c+b, \&c.$
- 5th Diff. $f-5e+10d-10c+5b-a, \&c.$

Hence it appears, that the coefficients of the quantities $a, b, c, d, \&c.$ in the first term of the n th differences are the coefficients of the terms in the binomial raised to the n th power, and that their signs are alternately positive and negative.

Let $d^1, d^{11}, d^{111}, d^{1111}, \&c.$ represent the first terms in the first, second, third, fourth, $\&c.$ orders of differences; then

$$\begin{aligned} d^1 &= b-a \\ d^{11} &= c-2b+a \\ d^{111} &= d-3c+3b-a \\ d^{1111} &= e-4d+6c-4b+a \\ &\&c. \end{aligned}$$

And, by transposition,
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$$\begin{aligned} b &= a + d^1 \\ c &= 2b - a + d^{11} = a + 2d^1 + d^{11} \\ d &= 3c - 3b + a + d^{111} = a + 3d^1 + 3d^{11} + d^{111} \\ e &= 4d - 6c + 4b - a + d^{1111} = a + 4d^1 + 6d^{11} + 4d^{111} + d^{1111} \\ &\&c. \end{aligned}$$

From which it is manifest, that the coefficients of $d, d^1, d^{11}, d^{111}, \&c.$ in the expression for the $n+1$ th term of the series $a, b, c, d, \&c.$ are the coefficients of the terms of a binomial raised to the n th power; that is, the $n+1$ th term of the series is $a + nd^1 + n \cdot \frac{n-1}{2} d^{11} + n \cdot \frac{n-1}{2} \cdot \frac{n-2}{3} d^{111} + \&c.$

COR. 1. The n th term of the series is $a + n-1 d^1 + n-1 \cdot \frac{n-2}{2} d^{11} + n-1 \cdot \frac{n-2}{2} \cdot \frac{n-3}{3} d^{111} + \&c.$

Ex. Required the n th term of the series, 1, 3, 5, 7, $\&c.$

$$\begin{array}{cccc} 1 & 3 & 5 & 7 \\ & 2 & 2 & 2 \\ & & 0 & 0 \end{array}$$

Here $a=1, d^1=2, d^{11}=0$; therefore the n th term is $1 + n-1 \cdot 2 = 2n-1$.

COR. 2. If the differences at length vanish, the n th term of the series will be exactly determined; but, if the differences do not vanish, we can only approximate to it; and the less the differences become when compared with the former differences, and with n , the nearer will the approximation be to the true value of that term.

Let the proposed series be $a, a+b, a+b+c, a+b+c+d, \&c.$ then

- 1st Diff. $a, b, c, d, \&c.$
- 2d Diff. $b-a, c-b, d-c, \&c.$
- 3d Diff. $c-2b+a, d-2c+b, \&c.$
- 4th Diff. $d-3c+3b-a, \&c.$

Let $b-a=d^1, c-2b+a=d^{11}, d-3c+3b-a=d^{111}, \&c.$ then the $n+1$ th term of the series, that is, $a+b+c+d+\&c.$ to n terms, is $na + n \cdot \frac{n-1}{2} d^1 + n \cdot \frac{n-1}{2} \cdot \frac{n-2}{3} d^{11} + \&c.$

If therefore $a, b, c, d, \&c.$ be the terms of any series, whose first, second, third, $\&c.$ differences are represented by $d^1, d^{11}, d^{111}, \&c.$ the sum of n terms of this series is $na + n \cdot \frac{n-1}{2} d^1 + n \cdot \frac{n-1}{2} \cdot \frac{n-2}{3} d^{11} + \&c.$

Ex. 1. Required the sum of n terms of the series $1+3+5+7+\&c.$

$$\begin{array}{cccc} 1 & 3 & 5 & 7 \\ & 2 & 2 & 2 \\ & & 0 & 0 \end{array}$$

In this case $a=1, d^1=2, d^{11}=0$; hence the sum is $n + n \cdot \frac{n-1}{2} = n^2$.

Ex. 2. Required the sum of n terms of the series $1^2+2^2+3^2+\&c.$

$$\begin{array}{cccc} 1 & 4 & 9 & 16 \\ & 3 & 5 & 7 \\ & & 2 & 2 \\ & & & 0 \end{array}$$

Here $a=1, d^1=3, d^{11}=2, d^{111}=0$; therefore the sum $= n + n \cdot \frac{n-1}{2} \times 3 + n \cdot \frac{n-1}{2} \cdot \frac{n-2}{3} \times 2 = \frac{n \cdot 2n^2 + 3n + 1}{1 \cdot 2 \cdot 3} = \frac{n \cdot n + 1 \cdot 2n + 1}{1 \cdot 2 \cdot 3}$.

Ex. 3. To find the sum of the series $1^3+2^3+3^3+\&c.$ to n terms.

$$\begin{array}{ccccccc} 1 & 8 & 27 & 64 & 125 \\ & 7 & 19 & 37 & 61 \\ & & 12 & 18 & 24 \\ & & & 6 & 6 \\ & & & & 0 \end{array}$$

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Here

Here $a=1$, $d^1=7$, $d^{11}=12$, $d^{111}=6$, $d^{1111}=0$; therefore the sum $= n + n \cdot \frac{n-1}{2} \times 7 + n \cdot \frac{n-1}{2} \cdot \frac{n-2}{3} \times 12 + n \cdot \frac{n-1}{2} \cdot \frac{n-2}{3} \cdot \frac{n-3}{4} \times 6 = \frac{n^3 + 2n^2 + n^2}{4} = n \cdot \frac{n+1}{2}$.

Sometimes the sum may be more readily obtained by beginning the series with one or more cyphers; thus, to find the sum of n terms of the series $1^3 + 2^3 + 3^3 + \&c.$ take $n+1$ terms of the series $0 + 1^3 + 2^3 + 3^3 + \&c.$

$$\begin{array}{ccccccc} 0, & 1, & 8, & 27, & 64 \\ & 1, & 7, & 19, & 37 \\ & & 6, & 12, & 18 \\ & & & 6, & 6 \end{array}$$

Here $a=0$, $d^1=1$, $d^{11}=6$, $d^{111}=6$; and the sum of $n+1$ terms is $\frac{n}{2} + \frac{n+1 \cdot n \cdot n-1}{1 \cdot 2 \cdot 3} \times 6 + \frac{n+1 \cdot n \cdot n-1 \cdot n-2}{1 \cdot 2 \cdot 3 \cdot 4} \times 6$

$$\times 6 = \frac{n+1 \cdot n \cdot 2 + n+1 \cdot n \cdot n-1 \cdot 4 + n+1 \cdot n \cdot n-1 \cdot n-2}{4} = \frac{n+1 \cdot n \cdot 2 + 4n^2 - 4n + n^2 - 3n + 2}{4} = \frac{n+1 \cdot n \cdot n^2 + n}{4}$$

$$= \frac{n \cdot n + 1}{2}$$

The differential method may also be applied to the interpolation of series, and the quadrature of curves.

On the Method of Increments.

Any variable quantity is called an *integral*. The magnitude by which it is increased at one step is called the *increment*. Thus $1+2+3 \dots + m = n \cdot \frac{m+1}{2}$, and the magnitude by which it increases at one step is $m+1$, which is called the increment of the integral $n \cdot \frac{m+1}{2}$. When the quantity decreases, the increment becomes negative.

If two quantities begin to increase together, and their corresponding increments be always in the same ratio, their integrals, or the whole quantities generated, will be in that ratio. Let the corresponding increments be $A, B, C, \&c.$ and $a, b, c, \&c.$ and let $A:a::B:b::C:c \&c.::m:n$; then $A+B+C+\&c.::a+b+c+\&c.::m:n$.

COR. When $m=n$, or the increments are equal, the integrals are also equal.

If an integral be represented by the product of quantities in arithmetical progression, as $n \cdot m + r \cdot m + 2r \cdot m + 3r \dots m + n-1 \cdot r$, where r is constant, and m is increased at every step by r , the increment of this integral is $nr \times m + r \cdot m + 2r \cdot m + 3r \dots m + n-1 \cdot r$.

The first value of the integral is $m \cdot m + r \cdot m + 2r \cdot m + 3r \dots m + n-1 \cdot r$, and the succeeding value is $m+r \cdot m + 2r \cdot m + 3r \cdot m + 4r \dots m + nr$, whose difference, that is, the increment of the integral, is $nr \times m + r \cdot m + 2r \cdot m + 3r \dots m + n-1 \cdot r$.

COR. 1. Since an invariable quantity C has no increment, the increment of $m \cdot m + r \cdot m + 2r \cdot m + 3r \dots m + n-1 \cdot r \pm C$ is also $nr \times m + r \cdot m + 2r \cdot m + 3r \dots m + n-1 \cdot r$.

COR. 2. Hence if the increment of an integral be represented by $nr \times m + r \cdot m + 2r \cdot m + 3r \dots m + n-1 \cdot r$, the integral is $m \cdot m + r \cdot m + 2r \cdot m + 3r \dots m + n-1 \cdot r \pm C$; where the invariable quantity C must be determined by the nature of the equation.

COR. 3. If the increment be $A \times m + r \cdot m + 2r \cdot m + 3r \dots m + n-1 \cdot r$, when A is invariable, the integral is $\frac{A}{nr} \times m \cdot m + r \cdot m + 2r \cdot m + 3r \dots m + n-1 \cdot r \pm C$.

If A be the constant increment, and m the number of times it has been taken, the integral is $m \cdot A \pm C$. To find therefore the integral of any increment, let the increment be reduced to the products of arithmetical progressions whose common difference is the quantity by which the variable magnitude is increased at every step, and the integral of each increment will be found by multiplying it by the preceding term in the progression, and dividing it by the number of terms thus increased, and by the common difference.

The constant quantity which is to be added to or subtracted from this result, in order to obtain the correct integral, must be determined by the nature of the question; thus, when x , the integral obtained by the rule, is a , suppose the true integral is known to be b ; then since $x+C$ is in all cases the integral, $a+C=b$, or $C=b-a$; therefore, the correct integral is $x+b-a$.

Ex. 1. To find the sum of n terms of the series $1+2+3+\&c.$

The n th term is n , and the increment of the sum is $n+1$, whose integral according to the rule is $\frac{n \cdot n+1}{2}$. And this is the correct integral, because when $n=1$, the sum is $\frac{1 \cdot 2}{2}=1$, as it ought to be.

Ex. 2. What is the n th term of the series $7, 9, 11, \&c.$

Here the increment is 2 , and the integral $2n+C$, but when $n=1$, the integral is 7 , therefore $2+C=7$, and $C=5$; therefore the correct integral is $2n+5$, the n th term of the proposed series.

Ex. 3. To find the sum of n terms of the series $1^2+2^2+\dots+\&c.$

The increment of this sum is $\frac{n+1}{2} = \frac{n \cdot n+1 + n+1}{2}$, and the integral or sum is $\frac{n-1 \cdot n \cdot n+1}{3} + \frac{n \cdot n+1}{2} = \frac{2n+1 \cdot n \cdot n+1}{2 \cdot 3}$; which needs no correction.

Ex. 4. To find the sum of n terms of the series $1^2+3^2+\dots+\&c.$

The increment of the sum is $\frac{2n+1}{2} = \frac{4n^2+4n+1}{2}$, whose integral is $\frac{4 \cdot n-1 \cdot n \cdot 2n+1}{3} + n$; which needs no correction.

Ex. 5. To find the sum of n terms of the series $1^3+2^3+\dots+\&c.$

The increment of the sum is $\frac{n+1}{4} = \frac{n^3+3n^2+3n+1}{4}$, whose integral is $\frac{n-1 \cdot n \cdot n+1 \cdot n+2}{4} + \frac{n \cdot n+1}{2} = \frac{n \cdot n+1}{2}$; the sum required; which needs no correction.

The following table of figurate numbers is formed by making the n th term of each succeeding rank equal to the sum of n terms of the preceding:

1st Order,	1,	1,	1,	1,	1
2d	1,	2,	3,	4,	5
3d	1,	3,	6,	10,	15
4th	1,	4,	10,	20,	35
5th	1,	5,	15,	35,	70
&c.	&c.	&c.	&c.	&c.	&c.

Ex. 6. To find the sum of n terms of the m th order of figurate numbers.

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The sum of n terms of the first order is n ; therefore $n+1$ is the increment of the sum of n terms of the second order, and its integral $\frac{n+1}{2}$ is the n th term of the third order; consequently, $\frac{n \cdot n+1 \cdot n+2}{2}$ is the $n+1$ th term, or increment of the sum of n terms of the third order, and its integral $\frac{n \cdot n+1 \cdot n+2}{2 \cdot 3}$ is the sum of n terms of the third order, or the n th term of the fourth order, &c.

Thus it appears, that $\frac{n \cdot n+1 \cdot \dots \cdot n+m-1}{1 \cdot 2 \cdot \dots \cdot m}$ is the sum which was to be found; the integrals requiring no correction.

Ex. 7. To find the sum of n terms of the series $1 \cdot 2 + 2 \cdot 3 + 3 \cdot 4 + \&c.$

The $n+1$ th term, or increment of the sum, is $n+1 \cdot n+2$, and consequently the integral, or sum, is $\frac{n \cdot n+1 \cdot n+2}{3}$; which needs no correction.

Ex. 8. To find the sum of the n first terms of a series whose n th term is $an^2 + bn + c + d$; a, b, c, d , being given quantities.

Assume $A \cdot n \cdot n+1 \cdot n+2 + B \cdot n \cdot n+1 + C \cdot n + D = a \cdot n+1^3 + b \cdot n+1^2 + c \cdot n+1 + d$; or

$$\left. \begin{array}{l} An^3 + 3An^2 + 2An + D \\ + Bn^2 + Bn \\ + Cn \end{array} \right\} = \left\{ \begin{array}{l} an^3 + 3an^2 + 3an + a \\ + bn^2 + 2bn + b \\ + cn + c \\ + d \end{array} \right.$$

and, by equating the coefficients, $A=a$; $3A+B=3a+b$, or $3a+B=3a+b$, that is, $B=b$; $2A+B+C=3a+2b+c$, or $2a+b+C=3a+2b+c$, hence $C=a+b+c$; also $D=a+b+c+d$; therefore the increment of the sum is $a \cdot n \cdot n+1 \cdot n+2 + b \cdot n \cdot n+1 + a+b+c \cdot n + a+b+c+d$, and the integral $\frac{a \cdot n \cdot n+1 \cdot n+2}{4} + \frac{b \cdot n \cdot n+1}{3} + \frac{a+b+c \cdot n}{2} + \frac{a+b+c+d \cdot n}{1}$; which requires no correction.

Though in general it is convenient to reduce an increment to the products of arithmetical progressions, in order to obtain its integral; yet, if a quantity of any other form can be found, whose increment coincides with the increment proposed, this quantity, when properly corrected, is the integral.

Ex. 1. To find the sum of n terms of the series $5+6+7+\&c.$

Let $An+Bn^2+Cn^3+\&c.$ be the sum required; its increment is $A \cdot n+1 + B \cdot n+1^2 + C \cdot n+1^3 + \&c.$ $-An-Bn^2-Cn^3-\&c.$ and the increment of the sum is also $n+5$; therefore, $A+2Bn+B+3Cn^2+3Cn+C+\&c. = n+5$; and, by equating the coefficients, $C=0$; $2B=1$, or $B=\frac{1}{2}$;

$A+B=5$, or $A=\frac{9}{2}$; hence the sum required is $\frac{9n+n^2}{2}$; which needs no correction.

Ex. 2. To find the number of shot in a pyramidal pile upon a square base whose side is known.

Let n be the number in one side of the base; then n^2 is the number contained in the first square; also, since one shot in the next square will lie between every two of the former, $n-1$ is the number contained in the side of the second square, and $n-1^2$ the number in that square, &c. therefore the number of shot is $n^2 + n-1 + n-2^2 + \dots + 2^2 + 1^2$, or $1^2 + 2^2 + 3^2 + \dots + n^2$.

Suppose $An+Bn^2+Cn^3$ to be the sum of the series; its increment is $A \cdot n+1 + B \cdot n+1^2 + C \cdot n+1^3 - An-Bn^2-$

Cn^3 ; and the increment of the series is also $n+1^2$; therefore,

$$\left. \begin{array}{l} 3Cn^2 + 3Cn + C \\ + 2Bn + B \\ + A \end{array} \right\} = n^2 + 2n + 1;$$

and, by equating the coefficients, $3C=1$, or $C=\frac{1}{3}$; $3C+2B=2$, or $B=\frac{1}{2}$; $C+B+A=1$, or $\frac{1}{3} + \frac{1}{2} + A=1$, hence $A=\frac{1}{6}$; and the sum of the series is $\frac{n}{6} + \frac{n^2}{2} + \frac{n^3}{3}$; which requires no correction.

If $An+Bn^2+Cn^3+Dn^4+\&c.$ be assumed for the sum of the series, it is evident, from the process, that D and the coefficient of every succeeding term vanishes.

Those who wish to prosecute this subject farther may consult Dr. Waring's Fluxions, Sterling's Summation of Series, and Emerfon's Method of Increments.

On Chances.

If an event may take place in n different ways, and each of these be equally likely to happen, the probability that it will take place in a specified way is properly represented by $\frac{1}{n}$, certainty being represented by unity. Or, which is the same thing, if the value of certainty be unity, the value of the expectation that the event will happen in a specified way is $\frac{1}{n}$. For the sum of all the probabilities is certainty, or unity, because the event must take place in some one of the ways, and the probabilities are equal; therefore each of them is $\frac{1}{n}$.

COR. If the value of certainty be a , the value of the expectation is $\frac{a}{n}$. But in the following articles we will suppose the value of certainty to be unity.

If an event may happen in a ways, and fail in b ways, any of these being equally probable, the chance of its happening is $\frac{a}{a+b}$, and the chance of its failing is $\frac{b}{a+b}$. The chance of its happening must, from the nature of the supposition, be to the chance of its failing, as a to b ; therefore the chance of its happening: chance of its happening, together with the chance of its failing :: $a : a+b$; and the event must either happen or fail, consequently the chance of its happening together with the chance of its failing is certainty; hence the chance of its happening: certainty :: $a : a+b$; and the chance of its happening $= \frac{a}{a+b}$. Also since the chance of its happening together with the chance of its failing is certainty, which is represented by unity, $1 - \frac{a}{a+b}$, that is, $\frac{b}{a+b}$ is the chance of its failing.

Ex. 1. The probability of throwing an ace with a single die in one trial is $\frac{1}{6}$; the probability of not throwing an ace is $\frac{5}{6}$; the probability of throwing either an ace or a deuce is $\frac{2}{6}$, &c.

Ex. 2. If n balls a, b, c, d , &c. be thrown promiscuously into a bag, and a person draw out one of them, the probability that it will be a is $\frac{1}{n}$; the probability that it will be a or b is $\frac{2}{n}$.

Ex. 3. The same supposition being made, if two balls

be drawn out, the probability that these will be a and b is $\frac{2}{n \cdot n-1}$.

From the Bills of Mortality in different places, tables have been constructed which shew how many persons, upon an average, out of a certain number born, are left at the end of each year, to the extremity of life. From such tables, the probability of life, under any proposed circumstances, is known.

Ex. To find the probability that an individual of a given age will live one year. Let A be the number, in the tables, of the given age, B the number left at the end of the year; then $\frac{B}{A}$ is the probability that the individual

will live one year; and $\frac{A-B}{A}$ the probability that he will die in that time. In Dr. Halley's Tables, out of 586 of the age of 22, 579 arrive at the age of 23; hence the probability that an individual aged 22 will live one year is $\frac{579}{586}$ or $\frac{83}{84}$ nearly; and $\frac{7}{586}$, or $\frac{1}{84}$ nearly, is the probability that he will die in that time.

If two events be independent of each other, and the probability that one will happen be $\frac{1}{m}$, and the probability that the other will happen be $\frac{1}{n}$, the probability that they both will happen is $\frac{1}{mn}$. For each of the m ways in which the first can happen or fail, may be combined with each of the n ways in which the other can happen or fail, and thus form mn combinations, and there is only one in which both happen; therefore the probability that this will be the case is $\frac{1}{mn}$.

Required the probability of throwing an ace, with a single die, in two trials. The chance of failing the first time is $\frac{5}{6}$, and the chance of failing the next is $\frac{5}{6}$; therefore the chance of failing twice together is $\frac{25}{36}$, and the chance of not failing both times is $1 - \frac{25}{36}$, or $\frac{11}{36}$.

In how many trials may a person undertake, for an even wager, to throw an ace with a single die? Let x be the number of trials; then, as the chance of failing x times together is $\left(\frac{5}{6}\right)^x$, and this by the question is equal to the

chance of happening, or $\left(\frac{5}{6}\right)^x = \frac{1}{2}$; hence $x \times \log. \frac{5}{6} = \log. \frac{1}{2}$, or $x \times \log. 5 - \log. 6 = \log. 1 - \log. 2$, and $x = \frac{\log. 1 - \log. 2}{\log. 5 - \log. 6} = \frac{\log. 2}{\log. 5 - \log. 6}$ since $\log. 1 = 0$.

RULE. To find the probability that two individuals, P and Q , whose ages are known, will live a year.

Let the probability that P will live a year be $\frac{1}{m}$; and the probability that Q will live a year $\frac{1}{n}$; then the probability that they will both be alive at the end of that time is $\frac{1}{m} \times \frac{1}{n}$, or $\frac{1}{mn}$.

RULE. To find the probability that one of them, at least, will be alive at the end of any number of years.

The probability that P will die in a year is $\frac{m-1}{m}$, and

the probability that Q will die is $\frac{n-1}{n}$; therefore, the pro-

bability that they will both die is $\frac{m-1}{m} \cdot \frac{n-1}{n}$, and the pro-

bability that they will not both die is $1 - \frac{m-1}{m} \cdot \frac{n-1}{n}$, or $\frac{m+n-1}{mn}$.

In the same manner, if $\frac{1}{p}$ be the probability that P will live t years, and $\frac{1}{q}$ the probability that Q will live the same time; the probability that one of them at least will be alive at the end of the time is $1 - \frac{p-1}{p} \cdot \frac{q-1}{q}$, or $\frac{p+q-1}{pq}$.

If the probability of an event's happening in one trial be represented by $\frac{a}{a+b}$, to find the probability of its happening once, twice, three times, &c. exactly, in n trials. The probability of its happening in any one particular trial being $\frac{a}{a+b}$, the probability of its failing in all the other $n-1$ trials is $\frac{b^{n-1}}{(a+b)^{n-1}}$; therefore the probability of its happening in one particular trial and failing in the rest is $\frac{ab^{n-1}}{(a+b)^n}$; and, since there are n trials, the probability that it will happen in some one of these and fail in the rest is n times as great, or $\frac{nab^{n-1}}{(a+b)^n}$. The probability of its happening in any two particular trials and failing in all the rest is $\frac{a^2b^{n-2}}{(a+b)^n}$, and there are $n \cdot \frac{n-1}{2}$ ways in which it may happen twice in n trials and fail in all the rest; therefore the probability that it will happen twice in n trials is $\frac{n \cdot \frac{n-1}{2} a^2b^{n-2}}{(a+b)^n}$. In the same manner, the probability of its

happening exactly three times is $\frac{n \cdot \frac{n-1}{2} \cdot \frac{n-2}{3} a^3b^{n-3}}{(a+b)^n}$; and the probability of its happening exactly t times is $\frac{n \cdot \frac{n-1}{2} \cdot \frac{n-2}{3} \dots \frac{n-t+1}{t} a^t b^{n-t}}{(a+b)^n}$.

COR. 1. The probability of the event's failing exactly t times in n trials is $\frac{n \cdot \frac{n-1}{2} \cdot \frac{n-2}{3} \dots \frac{n-t+1}{t} a^{n-t} b^t}{(a+b)^n}$.

COR. 2. The probability of the event's happening at least t times in n trials is $\frac{a^n + na^{n-1}b + n \cdot \frac{n-1}{2} a^{n-2}b^2 + \dots + n \cdot \frac{n-1}{2} a^{n-t+1}b^t}{(a+b)^n}$.

For if it happen every time, or fail only once, twice, . . . $n-t$ times, it happens t times; therefore the whole probability of its happening at least t times is the sum of the probabilities of its happening every time, of failing only once, twice, . . . $n-t$ times; and the sum of these probabilities

probabilities is

$$a^n + na^{n-1}b + n \cdot \frac{n-1}{2} a^{n-2}b^2 \dots \text{to } n-t+1 \text{ terms}$$

$$\frac{a+b)^n}{a+b)^n}$$

Ex. What is the probability of throwing an ace, twice in three trials, with a single die?

In this case $n=3$, $t=2$, $a=1$, $b=5$; and the probability required is $\frac{1+3 \cdot 5}{6 \cdot 6 \cdot 6} = \frac{16}{216} = \frac{2}{27}$.

SCHOLIUM. Much might be said on a subject so extensive as the doctrine of chances; the learner will however find the principal grounds of calculation in the above rules; and, if he wish for farther information, he must consult De Moivre's work on this subject. It may not be improper to caution him against applying principles which on the first view may appear self-evident, as there is no subject in which he will be so likely to mistake as in the calculation of probabilities. A single instance will shew the danger of forming a hasty judgment even in the most simple cases. The probability of throwing an ace with

one die is $\frac{1}{6}$, and, since there is an equal probability of throwing an ace in the second trial, it might be supposed that the probability of throwing an ace in two trials is $\frac{2}{6}$.

This is not a just conclusion; for, it would follow, by the same mode of reasoning, that in six trials a person could not fail to throw an ace. The error, which is not easily seen, arises from a tacit supposition that there must necessarily be a second trial, which is not the case if an ace be thrown in the first.

On Life Annuities.

To find the present value of an annuity of 1*l.* to be continued during the life of an individual of a given age, allowing compound interest for the money. Let r be the amount of 1*l.* in one year; A the number of persons, in the tables of the given age; B, C, D , &c. the number left at the end of 1, 2, 3, &c. years; then $\frac{B}{A}$ is the value of the life for one year, $\frac{C}{A}$, $\frac{D}{A}$, &c. its value for 2, 3, &c. years; and this series must be continued to the end of the tables. Now the present value of 1*l.* to be paid at the end of one year is $\frac{1}{r}$; but it is only to be paid on condition that the annuitant is alive at the end of the year, of which event the probability is $\frac{B}{A}$; therefore the present value of the conditional annuity is $\frac{B}{Ar}$; in the same manner, the present value of the second year's annuity is $\frac{A}{Cr^2}$, the present value of the third year's annuity is $\frac{D}{Ar^3}$, &c. therefore the whole value required is $\frac{1}{A} \times \frac{B}{r} + \frac{C}{r^2} + \frac{D}{r^3} + \&c.$ to the end of the tables.

De Moivre supposes that out of eighty-six persons born, one dies every year, till they are all extinct. This supposition is sufficiently exact, if our calculations be made for any age above ten, as will appear from an inspection of the tables; and on this supposition the sum of the

series $\frac{1}{A} \times \frac{B}{r} + \frac{C}{r^2} + \frac{D}{r^3} + \&c.$ may be found.

Let n be the number of years which any individual wants of eighty-six; then will n be the number of persons living, of that age, out of which one dies every year;

and $\frac{n-1}{n}$, $\frac{n-2}{n}$, $\frac{n-3}{n}$, &c. will be the probabilities of his living 1, 2, 3, &c. years; hence the present value of an annuity of 1*l.* to be paid during his life is $\frac{n-1}{nr} +$

$\frac{n-2}{nr^2} + \frac{n-3}{nr^3} + \&c.$ continued to n terms. The sum of

the series $\frac{n-1 \cdot x}{n} + \frac{n-2 \cdot x^2}{n} + \frac{n-3 \cdot x^3}{n}$ to n terms is

found to be $\frac{n-1 \cdot x - nx^2 + x^{n+1}}{x \cdot 1 - x^2}$; let $x = \frac{1}{r}$, and the sum

of the series $\frac{n-1}{nr} + \frac{n-2}{nr^2} + \frac{n-3}{nr^3} + \&c.$ to n terms,

is $\frac{n-1 \cdot r - n + \frac{1}{r^{n-1}}}{n \cdot r - 1}$; the present value of the annuity.

COR. 1. This expression for the sum is the same

with $\frac{nr-n}{n \cdot r-1} - \frac{r-n}{n \cdot r-1}$, or $\frac{1}{r-1} - \frac{r}{n} \times \frac{1-r^n}{r-1}$; let P be the present value of an annuity of 1*l.* to continue certain

for n years, then $P = \frac{1-r^n}{r-1}$; and the expression be-

comes $\frac{1-r}{n} P$.

COR. 2. The present value of the annuity to continue for ever, from the death of the proposed individual, is $\frac{rP}{n \cdot r-1}$. For the whole present value of the annuity

to continue for ever, is $\frac{1}{r-1}$; and if from this, its value for the life of the individual be taken, the remainder $\frac{rP}{n \cdot r-1}$ is the present value of the annuity to

continue for ever, from the time of his death.

To find the present value of an annuity of 1*l.* to be paid as long as two specified individuals are both living. Find, by the foregoing rules, the probability that they will both be alive at the end of 1, 2, 3, &c. years, to the end of the tables; call these probabilities a, b, c , &c. and r the amount of 1*l.* in one year; then $\frac{a}{r} + \frac{b}{r^2} + \frac{c}{r^3} + \&c.$ is the present value of the annuity required.

To find the present value of an annuity of 1*l.* to be paid as long as either of two specified individuals is living. Find, as above, the probability that they will not both be extinct in 1, 2, 3, &c. years, to the end of the tables, and call these probabilities A, B, C , &c. then the present value of the annuity is $\frac{A}{r} + \frac{B}{r^2} + \frac{C}{r^3} + \&c.$

COR. If the annuity be M *l.* the present value is M times as great as in the former case, or

$$M \times \frac{A}{r} + \frac{B}{r^2} + \frac{C}{r^3} + \&c.$$

These are the mathematical principles on which the values of annuities for lives are calculated, and the reasoning may easily be applied to every proposed case. But in practice, these calculations, as they require the combination of every year of each life with the corresponding years of every other life concerned in the question, will be found extremely laborious, and other methods must be resorted to when expedition is required.

PART IV.

ON THE APPLICATION OF ALGEBRA TO GEOMETRY.

THE signs made use of in algebraical calculations being general, the conclusions obtained by their assistance are universal, and may with great ease and convenience be transferred from abstract magnitudes to every class of particular quantities; thus the relation of lines, surfaces, or solids, may generally be deduced from the principles of Algebra, and many properties of these quantities discovered which could not be derived from principles purely geometrical.

Simple algebraical quantities, their products, powers, roots, &c. may be represented by lines. Any line AB , may be taken at pleasure to represent one quantity a , but if we have a second quantity b to represent, we must take a line which has to the former the same ratio that b has to a . Instead of saying AB represents a , we may say $AB=a$, supposing AB to contain as many linear units as a contains numeral ones.

When a series of algebraical quantities is to be represented on one line, and each of them measured from the same point, the positive quantities being represented by lines taken in one direction, the negative quantities must be represented by lines taken in the opposite direction. Let a be the greatest of these quantities, then $a-x$ may, by the variation of x , become equal to each of them in succession. Let AB be the given line, and A the point from which the quantities are to be measured; take

$AB=a$; and, since $a-x$ must be measured from A , BD must be taken in the contrary direction $=x$, then $AD=a-x$; and that $a-x$ may successively coincide with each quantity in the series, beginning with the greatest positive quantity, x must increase; therefore BD , which is equal to x , must increase; and when x is greater than a , BD

is greater than AB , and AD which represents the negative quantity $a-x$ lies in the opposite direction from A .

COR. 1. If the algebraical value of a line be found to be negative, the line must be measured in a direction opposite to that which in the investigation was supposed to be positive.

COR. 2. If quantities be measured upon a line from its intersection with another, the positive quantities being taken in one direction, the negative quantities must be taken in the other.

If a fourth proportional to lines representing p , q , r , be taken, it will represent $\frac{qr}{p}$; and if $p=1$, it will represent qr ; if also q and r be equal, it will represent q^2 .

If a mean proportional between lines representing a and b be taken, it will represent $\sqrt{ab}$, which when $a=1$ becomes $\sqrt{b}$. Hence it appears that any possible algebraical quantities may be represented by lines; and conversely, lines may be expressed algebraically; and if the relations of the algebraical quantities be known the relations of the lines are known.

The relations of surfaces to each other may be expressed algebraically. Let the sides AB , AC , of the rectangle AD ,

contain the linear units a , b , respectively; then ab will be the number of superficial units contained in the area. For every unit in AB , or a , has units in the area corresponding to it; consequently there are upon the whole, ab units in the area. Thus ab is a proper representation of the rectangle AD ; and by reducing other surfaces to rectangles, their algebraical values may be found.

COR. Hence the product of the two quantities a and b is often called their *rectangle*; and, when b is equal to a , this product is called the *square* of a .

In the same manner, if a , b , c , represent the linear units in the three sides of a rectangular parallelepiped, abc will be the number of solid units contained in the figure; and consequently solids may be compared by comparing their algebraical values.

If the line PM move parallel to itself upon the indefinite line AP , and at the same time increase or decrease, the point M will trace out a straight line or a curve. AP is called the *abscissa*, and MP the *ordinate*; and the straight line or curve is said to be the locus of the point M . The nature of the curve depends upon the relation of AP to PM ; and this relation, when expressed algebraically, is called the *equation to the curve*.

Having given the nature or construction of the curve, its equation may be found. Let BM be a straight line cutting AP in a given angle at B , the relation of AP to PM is expressed by a simple equation. Suppose $AP=x$, $PM=y$, $AB=a$; and since the angles at B , P , and M , are invariable, BP bears an invariable ratio to PM , let this be the ratio of $b:c$. Then since $BP=AP-AB=x-a$, we have $x-a:y::b:c$, and $by=cx-ca$, or $by-cx+ca=0$.

COR. A simple equation belongs to a straight line; because by altering the values of b , c , and a , and taking x and a , positive or negative, as the case requires, the equation $by-cx+ca=0$ may be made to coincide with any proposed simple equation.

To find the equation to the *Parabola*. Let a point S be

taken without the right line CB , and let the indefinite line SM revolve about the point S in the plane SBC ; also let CM , which is perpendicular to CB , cut SM in M ; then, if SM be always equal to CM , the locus of the point M is a parabola. Through S draw BSP at right angles to CB , and, if SB be bisected in A , the curve will pass through A , as appears by the construction; draw MP perpendicular to BP , and let $AP=x$, $PM=y$, $AS=a$; then $SP^2+PM^2=(SM^2=CM^2)=BP^2$, or $x-a^2+y^2=x+a^2$; that is, $x^2-2ax+a^2+y^2=x^2+2ax+a^2$, or $y^2=4ax$.

To find the equation to the *Ellipse*. Let two indefinite

lines SM , HM , revolve, in a given plane, about the points S , H , and cut each other in M in such a manner that $SM+MH$ may be an invariable quantity; the locus of the point M is an ellipse. Bisect SH in C , and from M draw MP perpendicular to SH , or SH produced; let $CP=x$, $PM=y$, $CS=c$, $SM+MH=2a$. Then $\sqrt{SP^2+PM^2}=SM$, and $\sqrt{HP^2+PM^2}=HM$; therefore $\sqrt{SP^2+PM^2}+\sqrt{HP^2+PM^2}=SM+MH$, or $\sqrt{c-x^2+y^2}+\sqrt{c+x^2+y^2}=2a$; hence $\sqrt{c+x^2+y^2}=2a-\sqrt{c-x^2+y^2}$, and squaring both sides,

sides, $c^2 - 2cx + x^2 + y^2 = 4a^2 - 4a\sqrt{c+x}^2 + y^2 + c^2 + 2cx + x^2 + y^2$; that is, by transposition, $4a^2 + 4cx = 4a\sqrt{c+x}^2 + y^2$, or $a^2 + cx = a\sqrt{c+x}^2 + y^2$; and again, squaring both sides, $a^4 + 2a^2cx + c^2x^2 = a^2c^2 + 2a^2cx + a^2x^2 + a^2y^2$, or $a^2y^2 = a^4 - a^2c^2 - a^2x^2$; let $a^2 - c^2 = b^2$, then $a^2y^2 = a^2b^2 - b^2x^2$, and $y^2 = \frac{b^2}{a^2} \times a^2 - x^2$.

COR. 1. If S and H coincide, $c=0$; hence $a=b$, and $y^2 = a^2 - x^2$, the equation to a circle.

COR. 2. When $x=+a$, or $-a$, then $y=0$; therefore taking $CA=CD=a$, the curve passes through A and D .

COR. 3. If $AP=z$, then $x=a-z$; therefore, $y^2 = \frac{b^2}{a^2} \times a^2 - a^2 + 2az - z^2 = \frac{b^2}{a^2} \times 2az - z^2$; the equation which expresses the relation between AP and PM .

COR. 4. If AS be finite, and $SM+MH$ be increased without limit, the curve at all finite distances from S becomes a parabola. In this case z^2 vanishes when compared with $2az$; therefore the equation becomes $y^2 = \frac{b^2}{a^2} \times 2az$;

also $b^2 = a^2 - c^2 = a+c \times a-c$, and since the difference between a and c is finite, and a is infinite, $a+c=2a$; hence $b^2=2a \times AS$, therefore $y^2 = \frac{2a \times AS}{a^2} \times 2az = 4AS \times z$.

To find the equation to the Hyperbola.

Let two indefinite lines SM , HM , revolve, in a given plane, about the points S , H , and cut each other in M , in such a manner that $HM-SM$ may be a given quantity; the locus of the point M is an hyperbola. Bisection SH in C , and draw MP perpendicular to HS , or HS produced; let $CP=x$, $PM=y$, $SC=c$, $HM-SM=2a$. Then

$\sqrt{x+c}^2 + y^2 - \sqrt{x-c}^2 + y^2 = 2a$, and $a^2y^2 = c^2 - a^2 \cdot x^2 - a^2c^2 - a^4$; in this case $2c$ is greater than $2a$ (Euc. 20. 1.), let therefore $b^2 = c^2 - a^2$, then $a^2y^2 = b^2x^2 - a^2b^2$, or $y^2 = \frac{b^2}{a^2} \times x^2 - a^2$.

COR. 1. The equation to the ellipse $y^2 = \frac{b^2}{a^2} \times a^2 - x^2$, becomes the equation to the hyperbola if b^2 be supposed to be negative.

COR. 2. The equation $y^2 = \frac{b^2}{a^2} \times a^2 - x^2$ may be considered as the equation to any conic section: it is the equation to an ellipse when b^2 is positive, to a parabola when b^2 is infinite, and to an hyperbola when b^2 is negative.

COR. 3. If $SM-HM=2a$, a figure similar and equal to the former will be traced out, which is called the opposite hyperbola.

COR. 4. If $x=\pm a$, then $y=0$; therefore taking $CA=CD=a$, the curve passes through A and D .

COR. 5. If $AP=z$, then CP or $x=z+a$, and $x^2 - a^2 = z^2 + 2az$; hence $y^2 = \frac{b^2}{a^2} \times z^2 + 2az$, the equation which expresses the relation between AP and PM .

COR. 6. In the opposite hyperbola, $x=z-a$; therefore $x^2 - a^2 = z^2 - 2az$, and $y^2 = \frac{b^2}{a^2} \times z^2 - 2az$.

To find the equation to the Cissoïd. Let AB be the dia-

meter of a semicircle ANB , from the points R and P , taken always at equal distances from A and B , draw RN , PM , at right angles to AB , and join AN meeting PM in M ; the point M we trace out a curve called the Cissoïd of Diocles. From the nature of the circle $AR \times RB = RN^2$, and by the construction $AR \times RB = PB \times AP$; also from the similar triangles APM , ARN , $AP:PM::AR:RN$, or $AP:PM::PB:RN = \frac{PB \times PM}{AP}$; and $RN^2 = \frac{PB^2 \times PM^2}{AP^2} = PB \times AP$; therefore, $PB \times PM^2 = AP^3$. Let $AB=b$, $AP=x$, $PM=y$ then $b-x \times y^2 = x^3$, the equation required.

To find the equation to the Conchoid. Let AB be a line

given in position, and about any point C , taken without it, let the indefinite line CM revolve, and cut AB in E ; then, if EM be taken always of the same length, the point M will trace out a curve C which is called the Conchoid of Nicomedes. Draw ADC and MP at right angles to AB , and MF parallel to it; let $CA=a$, $AD=EM=b$, $AP=x$, $PM=y$. Then from the similar triangles CFM , MPE , $CF(a+y):FM(x)::MP(y):PE = \frac{xy}{a+y}$; and $EM^2 = EP^2 + PM^2$, i. e. $b^2 = \frac{x^2y^2}{(a+y)^2} + y^2$;

therefore, $(a+y)^2 \times b^2 = x^2y^2 + (a+y)^2 \times y^2$, or $(a+y)^2 \times b^2 - y^2 = x^2y^2$, the equation to the curve.

To find the equation to the Logarithmic Curve. If in the indefinite line AE , we take AB , BC , CD , &c. always equal to each other, and ordinates AF , BG , CH , DI , &c. be drawn in right angles to AE , and in geometrical progression, the curve $FGHI$, which passes through their extremities, is called the Logarithmic Curve. From the nature of logarithms, any abscissa AC is the logarithm of the corresponding ordinate CH , in a system which depends upon the magnitude of AF and BG , supposing AB given; in the same system, let 1 be the logarithm of a , also let $AC=x$, $CH=y$; then $x = \log. y$, and $1 = \log. a$, or $x = x \times \log. a$; therefore $\log. y = x \times \log. a = \log. a^x$; hence $y = a^x$, the equation to the curve.

Having given the relation between one abscissa CP , and ordinate PM , in a curve, to find the relation between the abscissa SQ , which is measured from a given point S in a given direction, and the ordinate QM , which is inclined to PM at a given angle.

Suppose PM perpendicular to CP ; produce MQ and DPC till they meet in G , draw SB , SD , SF , respectively parallel to MG , MP , DC ; and let $S. \angle KSE = p$, $S. \angle KSE$, or $MKQ = m$, $S. \angle KMQ = q$, $S. \angle MQK = n$, $S. \angle MFE$, or $MGP = s$, to rad. 1; $SB=FG=d$, $DC=f$, $CP=x$, $PM=y$, $SQ=z$, $QM=v$.

Then,

y are impossible. But if $2bc-4ae$ be also $=0$, then $y = \frac{-b+cx \pm \sqrt{b^2-4ad}}{2a}$; therefore the curve becomes a right line. 3. If c^2-4af be negative, the curve has no infinite arc, for, when $\pm x$ is infinite, the values of y are impossible; hence the curve is an ellipse. 4. If c^2-4af be negative, $2bc-4ae=0$, b^2-4ad be also 0, or negative, all the values of y are impossible; in this case the ellipse wholly vanishes.

On the Construction of Equations.

The relation between the abscissa and ordinate of a conic section is expressed by a quadratic, in which for every different value of the abscissa, there are two corresponding values of the ordinate; and if the abscissa be so drawn and the conic section so constructed, that its equation may coincide with a proposed quadratic, the two ordinates will be the roots of that quadratic, which may be determined to a tolerable degree of accuracy by actual measurement.

Let MCM be a circle, (a figure more easily described

than any other conic section,) whose centre is A , and radius AM ; take AP an abscissa, PM an ordinate, meeting

the circle in M and M' ; join AM , and draw MB at right angles to AP ; let

$AP=x$, $PM=y$, $AM=r$, and the cosine of the angle APM (to the radius r) $=c$; then $r:c::PM:PB=c \times PM=cy$, and $AM^2=AP^2+PM^2-2AP \times BP$, or $r^2=x^2+y^2-2cxy$, i. e. $y^2-2cxy+x^2-r^2=0$; which equation may be made to coincide with any proposed quadratic.

Ex. Let the roots of the equation $y^2-2cy+q=0$ be required. Here $2cx=p$, and $x^2-r^2=q$, and any one of the quantities c , x , or r , may be taken at pleasure. Suppose

$a=1$, then $x=\frac{p}{2}$, $r^2=x^2-q=\frac{p^2}{4}-q$, and $r=\sqrt{\frac{p^2}{4}-q}$; and, since the cosine of the $\angle APM$ =radius, PM coincides with PAD ; let, therefore, a circle be described with the radius $\sqrt{\frac{p^2}{4}-q}$, cutting the line DAP in D and C ; take $AP=\frac{p}{2}$, and the roots of the equation are PC and PD .

The interfections of two conic sections may be determined by a biquadratic equation, and, if the figures be so drawn that this biquadratic coincides with a proposed equation, the roots of the latter equation may be found by measuring the ordinates which determine the points of intersection.

Let MAM be a parabola whose axis is AP , $M'MM'$ a circle whose centre is C , and radius CM , cutting the parabola in the

points M, M', M'', M''' ; from these points draw the ordinates to the axis, $MP, M'P, M''P, M'''P$, and from C draw CD perpendicular to the axis, and CN parallel to it, meeting PM in N . Let $AD=a$, $DC=b$, $CM=n$, the parameter of the parabola $=p$, $AP=x$, $PM=y$; then $px=y^2$; also $CM^2=CN^2+$

NM^2 , or $n^2=x-a^2+y-b^2$, i. e. $x^2-2ax+a^2+y^2-2by+b^2=n^2$; and, by substituting x for its value $\frac{y^2}{p}$, and

arranging the terms according to the dimensions of y , we obtain $y^4-2pa-p^2 \cdot y^2-2bp^2y+p^2 \times a^2+b^2-n^2=0$, a biquadratic equation whose roots are $PM, P'M, P''M, P'''M$, and which may be made to coincide with any proposed biquadratic wanting the second term.

Ex. Let the roots of the equation $y^4-qy^2+ry-s=0$ be required. Assume $p=1$, $2a-1=q$, or $a=\frac{q+1}{2}$; $-2b=r$,

or $b=\frac{-r}{2}$; $a^2+b^2-n^2=-s$, or $n^2=a^2+b^2+s$, and consequently $n=\sqrt{a^2+b^2+s}$; describe a parabola whose pa-

rameter is 1 , and in the axis take $AD=\frac{q+1}{2}$; draw DC at

right angles to it, and $=\frac{-r}{2}$; from the centre C , with the

radius $\sqrt{a^2+b^2+s}$, describe the circle $M'MM'$, cutting the

parabola in the points M, M', M'', M''' , then the ordinates to

the axis $PM, P'M, P''M, P'''M$, are the roots sought.

When DC represents a negative quantity, the ordinates on the same side of the axis with C represent the negative roots of the equation; and the contrary.

COR. 1. If the circle touch the parabola, two roots of the equation are equal; if it cut it only in two points, or touch it in one, two roots are impossible; and, if the circle fall wholly within or without the parabola, all the roots are impossible.

COR. 2. If $a^2+b^2=n^2$, or the circle pass through the point A , the last term of the equation $p^2 \times a^2+b^2-n^2=0$; therefore $y^4-2pa-p^2 \cdot y^2-2bp^2y=0$, or $y^3-2pa-p^2 \cdot y-2bp^2=0$, a cubic equation, which may be made to coincide with any proposed cubic wanting the second term, and the ordinates $PM, P'M, P''M$, are its roots.

COR. 3. If $a^2+b^2-n^2=0$, and also $b=0$, the equation becomes $y^2-2pa-p^2=0$; by means of which any quadratic wanting the second term may be solved. In this case the circle passes through the vertex of the parabola, and its centre falls in the axis. These solutions may be obtained, and nearly in the same manner, by means of any two of the conic sections.

If the roots of a cubic equation $x^3-qx+r=0$ be possible, they may be found by means of a table of cosines.

Let DAC be an angle whose cosine, to the radius m , is x ; in AD take $AB=m$, from B as a centre, with the radius BA , describe a circle cutting AM in C , and from C , with the same radius, describe a circle cutting AD in D ; join BC, CD , and draw BK, DM , at right angles to AM , and CL at right angles to AD . Then, the triangles BAC and BCD being isosceles, the angles BAC and BCA are equal, as also CBD and CDB ; and the perpendiculars BK, CL , bisect the bases AC, BD . Also $\angle DBC=\angle BAC+\angle BCA=2\angle BAC$, and $\angle DCM=\angle CAD+\angle CDA=\angle CAD+\angle CBD=\angle CAD+2\angle CAD=3\angle CAD$. Let CM , the cosine of $\angle DCM$ to the radius m , be called c ; then, from the similar triangles

$ABK, ACL, AB:AK::AC:AL$, or $m:x::2x:\frac{2x^2}{m}=AL$,

and $AL-AB=\frac{2x^2}{m}-m=BL$; hence AD , or $AL+BL=$

$\frac{4x^2}{m}-m$; again, $AB:AK::AD:AM$, or $m:x::\frac{4x^2}{m}-m:$

4N

$\frac{4x^3}{m^2}$

$\frac{4x^3}{m^2} - x = AM$, and $AM - AC = CM = \frac{4x^3}{m^2} - 3x = c$, therefore $4x^3 - 3m^2x = m^2c$, or $4x^3 - 3m^2x - m^2c = 0$.

Let the equation $4x^3 - 3m^2x - m^2c = 0$, or $x^3 - \frac{3m^2}{4}x - \frac{m^2c}{4} = 0$, be made to coincide with the equation $x^3 - qx + r = 0$; that is, let $\frac{3m^2}{4} = q$, and $\frac{m^2c}{4} = -r$, or $m = \sqrt{\frac{4q}{3}}$, and $c = -\frac{3r}{q}$; then, from a table of cofines, find the angle whose

cofine is $-\frac{3r}{q}$, to the radius $\sqrt{\frac{4q}{3}}$, and the cofine of one third of this angle, to the same radius, is one value of x .

COR. 1. If A be the arc whose cofine is c , and P the whole circumference, c is also the cofine of $A + P$, or $A + 2P$; therefore, the cofines of $\frac{A+P}{3}$, and $\frac{A+2P}{3}$, are also values of x .

COR. 2. Since the radius is greater than the cofine, $\sqrt{\frac{4q}{3}}$ is greater than $-\frac{3r}{q}$, or $\frac{4q}{3}$ is greater than $\frac{9r^2}{q^2}$, that is, $\frac{q^2}{27}$ is greater than $\frac{r^2}{4}$; therefore this solution can only be applied when the roots of the cubic are possible.

General Properties of Curve Lines.

A curve is said to be of n dimensions when the equation belonging to it rises to n dimensions.

Let $y^n - ax + b \cdot y^{n-1} + cx^2 + dx + e \cdot y^{n-2} - \&c. \dots + gx^n + hx^{n-1} + lx^{n-2} + \&c. = 0$, a general equation of n dimensions, expresses the relation between the abscissa and ordinate of a curve, then for every different value of x , there are n values of y ; therefore the ordinate will cut the curve in n , or in $n-2, n-4, \&c.$ points, according as the equation has n , or $n-2, n-4, \&c.$ possible roots.

COR. 1. Hence, if the equation be of an odd number of dimensions, the curve will have, at least, one infinite arc; for whatever be the value of x , there is at least one possible value of y corresponding to it.

COR. 2. $ax + b$ is the sum of the ordinates, $cx^2 + dx + e$ the sum of the products of any two, $\&c.$ and $gx^n + hx^{n-1} + lx^{n-2} + \&c.$ is the product of all the ordinates.

If two parallel lines, MM', NN' , be drawn in a curve, and cut by AQ , in such a manner that in each case, the sum of the ordinates on one side of AQ is equal to the sum of the ordinates on the other; all lines drawn in the curve, parallel to these, will be cut by AQ in the same manner.

Let $y^n - ax + b \cdot y^{n-1} + cx^2 + dx + e \cdot y^{n-2} - \&c. = 0$, be the equation to the curve, reckoning the abscissa from A ; also, let $AP = q$, $AQ = r$; then the equation in the two cases be-

comes $y^n - aq + b \cdot y^{n-1} + \&c. = 0$, and $y^n - ar + b \cdot y^{n-1} + \&c. = 0$; and since, in each case, the sum of the positive ordinates is equal to the sum of the negative, $aq + b = 0$, and $ar + b = 0$, and by subtraction $a \times r - q = 0$, or $a = 0$, hence $b = 0$; therefore whatever be the value of x , $ax + b = 0$, or the sum of the ordinates on one side of AQ is equal to the sum of the ordinates on the other. The line AQ is called a *diameter* of the curve.

If the abscissa APE , and ordinate NPQ cut a curve in as many points as it has dimensions, the rectangle under the

segments of the abscissa, $PB \times PC \times PD \times PE$, will be to the rectangle under the ordinates, $PM \times PN \times PO \times PQ$, in an invariable ratio. Let $y^n - ax + b \cdot y^{n-1} + \&c. \dots + gx^n + hx^{n-1} + lx^{n-2} + \&c. = 0$ be the equation to the curve; then $gx^n + hx^{n-1} + lx^{n-2} + \&c. = PM \times PN \times PO \times PQ$; also the values of x , when $y = 0$, are AB, AC, AD, AE , that is, the roots of the equation $gx^n + hx^{n-1} + lx^{n-2} + \&c. = 0$, or $x^n + \frac{hx^{n-1}}{g} + \frac{lx^{n-2}}{g} + \&c. = 0$, are AB, AC, AD, AE , and consequently the quantity $x^n + \frac{hx^{n-1}}{g} + \frac{lx^{n-2}}{g} + \&c. = AP - AB \times AP - AC \times AP - AD \times AP - AE = PB \times PC \times PD \times PE$; and $gx^n + hx^{n-1} + lx^{n-2} + \&c. = g \times PB \times PC \times PD \times PE = PM \times PN \times PO \times PQ$; therefore, $PB \times PC \times PD \times PE : PM \times PN \times PO \times PQ :: 1 : g$.

COR. If $n=2$ the curve is a conic section; and, if the abscissa be a diameter, or the ordinates on each side of it, PM, PO , equal to each other, the rectangle under the segments of the abscissa is to the square of the ordinate in an invariable ratio.

If there be n right lines, $BM', CM', DM', \&c.$ and $PM,$

PM', PM'' , be ordinates to the abscissa AP , the relation between the abscissa and ordinates will be expressed by an equation of the form

of the form $y^n - Ax + B \cdot y^{n-1} + Cx^2 + Dx + E \cdot y^{n-2} - \&c. = 0$.

For if $AP = x$, then $PM = ax + b$, $PM' = cx + d$,

$PM'' = ex + f$, $\&c.$ where a, b, c, d, e, f , are invariable; that is, the values of y are $ax + b, cx + d, ex + f, \&c.$ therefore $y^n - a + c + e \dots \times x + b + d + f \dots \times y^{n-1} + \&c. = 0$, and if $A = a + c + e \dots$, $B = b + d + f \dots$, $\&c.$ $y^n - Ax + B \cdot y^{n-1} + \&c. = 0$.

If a curve have as many asymptotes as it has dimensions, and a line be drawn which cuts them all, the parts of the line measured from the asymptotes to the curve will together be equal to the parts measured, in the same direction, from the curve to the asymptotes.

Let $y^n - ax + b \cdot y^{n-1} + \&c. = 0$ be the equation to the curve, and $y^n - Ax + B \cdot y^{n-1} + \&c. = 0$ the equation to the asymptotes; when x is infinite, the former equation becomes $y^n - axy^{n-1} + \&c. = 0$, and the latter $y^n - Axy^{n-1} + \&c. = 0$, and these equations coincide; therefore $A = a$; also $ax + b$ is the sum of the ordinates to the curve, and $Ax + B$, or $ax + B$, is the sum of the ordinates to the asymptotes, in all cases; hence the difference of these, $b - B$, is an invariable quantity, whatever be the value of x ; and at an infinite distance this difference is nothing; therefore it is always nothing, or $b = B$; consequently, $ax + b = Ax + B$; that is, the sum of the ordinates to the curve is equal to the sum of the ordinates to the asymptotes.

Let

Let $QONM$ be the curve, AP the abscissa, PQ an ordinate, meeting the curve in the points M, N, O, Q , and the

asymptotes in a, b, c, d , then $PM+PN+PO+PQ=Pa+Pb+Pc+Pd$, and by transposition $PM-Pa+PO-Pc=Pb-PN+Pd-PQ$, or $aM+cO=Nb+Qd$.

COR. In the common hyperbola MCN whose centre is O , and asymptotes Oa, Ob , if any line $aMNb$ be drawn

cutting the curve in M, N , and the asymptotes in a, b , then aM is equal to Nb .

If a straight line DCM be made to revolve about C , and cut the curve MMM' in as many points as it has dimensions; and, if $\frac{1}{CD}$ be always taken equal to $\frac{1}{CM} + \frac{1}{CM'} - \frac{1}{CM''} - \&c.$ the locus of the point D will be a straight line EDF .

Let ABP be an abscissa, and from M and D draw MP and DB at right angles to ABP , and let $y^n = ax + b \cdot y^{n-1} + \dots + px^{n-1} + qx^{n-2} + \&c. y + Px^n + Qx^{n-1} + \&c. = 0$ be the equation which represents the relation of AP to

PM . Also, let $AC=z, CM=v, CB=w, BD=u; S. \angle MCP = s, S. \angle CMP = c$, to radius 1. Then $1:s::v:sv=y$; and $1:c::v:cv=CP$, hence $x=AP=z+cv$. If these values of x and y be substituted in the equation to the curve, the relation of AC to CM will be known; and the coefficient of the last term but one of the transformed equation, divided by the last term, will be the sum of the

reciprocals of its roots, or $\frac{1}{CM} + \frac{1}{CM'} - \frac{1}{CM''} - \&c.$

Now, since $x=z+cv$,

$$x^n = z^n + nz^{n-1}cv + n \cdot \frac{n-1}{2} z^{n-2}c^2v^2 + \&c.$$

$$x^{n-1} = z^{n-1} + n-1 \cdot z^{n-2}cv + n-1 \cdot \frac{n-2}{2} z^{n-3}c^2v^2 + \&c.$$

$$x^{n-2} = z^{n-2} + n-2 \cdot z^{n-3}cv + n-2 \cdot \frac{n-3}{2} z^{n-4}c^2v^2 + \&c.$$

&c. &c.

and, substituting these values for x and its powers, and sv for y , in the terms of the original equation, we have the two last terms of the transformed equation, $pz^{n-1} + qz^{n-2} + \&c. \times sv + nPz^{n-1} + n-1 \cdot Qz^{n-2} + \&c. \times cv$, and $Pz^n + Qz^{n-1} + \&c.$ all the other terms involving the square or some higher power of v ; hence

$$\frac{s \times pz^{n-1} + qz^{n-2} + \&c. + c \times nPz^{n-1} + n-1 \cdot Qz^{n-2} + \&c.}{Pz^n + Qz^{n-1} + \&c.}$$

$$= \frac{1}{CM} + \frac{1}{CM'} - \frac{1}{CM''} - \&c. = \frac{1}{CD} = \frac{1}{\sqrt{w^2 + u^2}}, \text{ and}$$

$$\frac{s \times pz^{n-1} + qz^{n-2} + \&c. + c \times nPz^{n-1} + n-1 \cdot Qz^{n-2} + \&c.}{\sqrt{w^2 + u^2} \times Pz^n + Qz^{n-1} + \&c.}$$

Also, from the similar triangles MCP, BCD ,

$$\sqrt{w^2 + u^2} : u :: 1 : s = \frac{u}{\sqrt{w^2 + u^2}}$$

$$\sqrt{w^2 + u^2} : w :: 1 : c = \frac{w}{\sqrt{w^2 + u^2}};$$

$$\text{Therefore } \frac{u}{\sqrt{w^2 + u^2}} \times \frac{pz^{n-1} + qz^{n-2} + \&c. + \frac{w}{\sqrt{w^2 + u^2}}}{\sqrt{w^2 + u^2}}$$

$$\times nPz^{n-1} + n-1 \cdot Qz^{n-2} + \&c. = \frac{1}{\sqrt{w^2 + u^2}} \times$$

$$\frac{Pz^n + Qz^{n-1} + \&c. \text{ or } u \times pz^{n-1} + qz^{n-2} + \&c. + w \times}{n-1 \cdot Qz^{n-2} + \&c. = Pz^n + Qz^{n-1} + \&c. \text{ and,}}$$

since the point C is fixed, AC or z is invariable; therefore the relation between w and u , or CB and BD , is expressed by a simple equation, and the locus of the point D is a straight line.

In the general equation $y^n = a + bx \cdot y^{n-1} + \&c. = 0$, if x be so assumed that two roots are impossible, two values of the ordinate belonging to this abscissa are impossible, that is, there are no lines which represent them. Hence it is evident, that in deducing the properties of the ordinates from the equation to the curve, we must suppose all the roots of this equation possible; because, though the sums, powers, products, &c. of such impossible quantities may become possible, and their relations, discovered by an algebraical process, may be expressed by possible quantities, yet the reasoning does not extend to curves, in which the original quantities cannot be represented.

On the subject of Algebraical Curves the reader may consult Dr. Waring's *Proprietates Algebraicarum Curvarum*.

ALGEBRA'IC, or **ALGEBRA'ICAL**, *adj.* [from *algebra*.] Relating to algebra; as, An *algebraical* treatise. Containing operations of algebra; as, An *algebraical* computation.

ALGEBRA'IST, *f.* A person that understands or practices the science of algebra.

ALGEDO, *f.* the running of a gonorrhœa stopping suddenly after it appears. When it thus stops, a pain reaches to the anus, or to the testicles, without their being swelled; and sometimes this pain reaches to the bladder; in which case there is an urging to discharge the urine, which is with difficulty passed, and in very small quantities at a time. The pain is continued to the bladder by the urethra; to the anus, by the acceleratory muscles of the penis; and to the testicles, by the vasa deferentia and vesiculæ feminales. In this case, calomel repeated so as to purge brings back the running, and then all difficulty from this symptom ceases.

AL'GEMA, *f.* [*αλγημα*, Gr.] A pain, a sad troublesome sensation, impressed upon the brain from a smart vexatious irritation of the nerves.

AL'GENEB, *f.* a fixed star, of the second magnitude, in Perseus's right side. Its longitude is $27^{\circ} 46' 12''$ of Taurus, and its latitude $30^{\circ} 05' 28''$ north, according to Flamsteed's catalogue.

ALGEZIRA, a town of Andalusia, in Spain, with a port on the coast of the straits of Gibraltar. By this city the Moors entered Spain in 713; and it was taken from them in 1344, after a very long siege, remarkable for being the first in which cannon were made use of. It was called Old Gibraltar, and is about four leagues from the New. Lat. $36^{\circ} 0. N.$ lon. $5. 2. W.$

ALGHIER', or **ALGE'RI**, a town in Sardinia, with a bishop's see, upon the western coast of the island, between Safferi and Bofa. Though it is not large, it is well peopled, and has a commodious port. The coral fished for on this coast is in the highest esteem of any in the Mediterranean. Lat. $36. 0. N.$ lon. $4. 2. W.$

ALGIABARII, *f.* a Mahometan sect of predestinarians, who attribute all the actions of men, good or evil, to the agency or influence of God. The Algiabarii stand opposed to the ALCADARII.

AL'GID, *adj.* [*algidus*, Lat.] Cold; chill.

ALGI'DITY, or **AL'GIDNESS**, *f.* Chilliness; cold.

ALGIFIC, *adj.* [from *algor*, Lat.] That which produces cold.

ALGI'ERS, a kingdom of Africa, now one of the states of Barbary. According to Dr. Shaw who resided twelve years at Algiers, in quality of chaplain to the British factory, and has corrected many errors of ancient and modern geographers respecting the states of Barbary, this country extends 480 miles along the coast of the Mediterranean, and is from forty to 100 miles in breadth.

It lies between lon. $0. 16.$ and $9. 16. W.$ and extends from lat. $36. 55.$ to $44. 50. N.$ It is bounded on the north by the Mediterranean; on the east by the river Zaine, the ancient Tufca, which divides it from Tunis; on the west by the Mulvya, and the mountains of Trava, which separate it from Morocco; and on the south by mount Atlas and the Numidian desert.

The climate of Algiers is in most places so mild, that they enjoy a constant verdure; the leaves of the trees being neither parched up by heat in summer nor nipped by the winter's cold. They begin to bud in February; in April the fruit appears in its full bigness, and is commonly ripe in May. The soil, however, is excessively various; some places being very hot, dry, and barren, on which account they are generally suffered to lie uncultivated by the inhabitants, who are very negligent. These barren places, especially such as lie on the southern side, and are at a great distance from the sea, harbour vast numbers of wild creatures, as, lions, tigers, buffaloes, wild boars, stags, porcupines, monkeys, ostriches, &c.

The Algerine kingdom made formerly a considerable part of the Mauritania Tingitana, which was reduced to

a Roman province by Julius Cæsar, and from him also called *Mauritania Cæsariensis*. In the general account of Africa it has been noticed, that the Romans were driven out of that continent by the Vandals; these by Belisarius, the Greek emperor Justinian's general; and the Greeks in their turn by the Saracens. This last revolution happened about the middle of the seventh century; and the Arabs continued masters of the country, divided into a great number of petty kingdoms or states, under chiefs of their own choosing, till the year 1031, when Abubekeren-Omar, or, as the Spanish authors call him, *Abu Texefien*, an Arab of the Zinhagian tribe, being provoked at the tyranny of those despots, gathered a most powerful army of malcontents, in the southern provinces of Numidia and Libya. His followers were nicknamed *Marabites*, or *Morabites*; by the Spaniards *Almoravides*; probably from their being assembled principally by the faints, who were also called Morabites. The khalif of Kayem's forces were at this time taken up with quelling other revolts in Syria, Mesopotamia, &c. and the Arabs in Spain engaged in the most bloody wars; so that Texefien, having nothing to fear from them, had all the success he could wish against the Arabian cheyks or petty tyrants, whom he defeated in many battles, and at last drove them not only out of Numidia and Libya, but out of all the western parts, reducing the whole province of Tingitania under his dominion.

Texefien was succeeded by his son Yusef, or Joseph, a brave and warlike prince. In the beginning of his reign, he laid the foundation of the city of Morocco, which he designed to make the capital of his empire. While that city was building, he sent some of his marabouts ambassadors to Tremecen (now a province of Algiers), at that time inhabited by a powerful and insolent sect of Mahometans called *Zeneti*. The design of this embassy was to bring them back to what he called the *true faith*; but the Zeneti, despising his offers, assembled at Amaf, or Amfa, their capital, murdered the ambassadors, and invaded Joseph's dominions with an army of 50,000 men.

The king hearing of their infamous proceedings, speedily mustered his army, and led it by long marches into their country, destroying all with fire and sword; while the Zeneti, instead of opposing his progress, retired as fast as possible towards Fez, in hopes of receiving assistance from thence; but the Fezzans marched out against them in a hostile manner; and coming up with the unhappy Zeneti, encumbered with their families and baggage, and ready to expire with hunger and fatigue, they cut them all to pieces, except a small number who were mostly drowned in attempting to swim across a river, and some others who in their flight perished by falling from the adjacent rocks. In the mean time Joseph reduced their country to a mere desert: which was, however, soon peopled by a numerous colony of Fezzans, who settled there under the protection of the reigning kings. In this war it is computed that near a million of the Zeneti, men, women, and children, lost their lives.

The restless and ambitious temper of Joseph did not let him remain long at peace. He quickly declared war against the Fezzans, reduced them to become his tributaries, and extended his conquests all along the Mediterranean. He next attacked some Arabian cheyks who had not yet submitted to his jurisdiction; and pursued them with such fury, that neither the Libyan deserts, nor ridges of the most craggy rocks, could shelter them from his arms. He attacked them in such of their retreats, castles, and fortresses, as were till then deemed impregnable; and at last subdued them, to the great grief of the other African nations, who were greatly annoyed by the ravages committed by his numerous forces.

Thus was founded the empire of the Morabites; which, however, was of no long duration; that race being in the 12th century driven out by Mohavedin, a marabout. This race of priests was expelled by Abdulac, governor of Fez; and he, in the 13th century, stripped of his new conquests

by the Sharifs of Hafeen, the descendants of those Arabian princes whom Abu-Texefien had formerly expelled.

The better to secure their new dominions, the Sharifs divided them into several little kingdoms or provinces; and among the rest the present kingdom of Algiers was divided into four, namely, *Tremecen*, *Tenez*, *Algiers Proper*, and *Bujeya*. The four first monarchs laid so good a foundation for a lasting balance of power between their little kingdoms, that they continued for some centuries in mutual peace and amity; but at length the king of Tremecen having ventured to violate some of their articles, Abul-Farez, king of Tenez, declared war against him, and obliged him to become his tributary. This king dying soon after, and having divided his kingdom among his three sons, new discords arose; which the king of Spain taking advantage of, a powerful fleet and army were sent against Barbary, under the count of Navarre, in 1505. This commander soon made himself master of the important cities of Oran, Bujeyah, and some others; which so alarmed the Algerines, that they put themselves under the protection of Selim Eutemi, a noble and warlike Arabian prince. He came to their assistance with a great number of his bravest subjects, bringing with him his wife Saphira, and a son then about twelve years old. This, however, was not sufficient to prevent the Spaniards from landing a number of forces near Algiers that same year, and obliging that metropolis to become tributary to Spain. Nor could Selim prevent them from building a strong fort on a small island opposite to the city, which terrified their corsairs from sailing in or out of the harbour. To this galling yoke the Algerines were obliged to submit till the year 1516; when, hearing of the death of Ferdinand king of Spain, they sent an embassy to the famous corsair Barbarossa, who, with his brother, was invited thither to defend them from the Spanish yoke, for which they agreed to pay a gratuity answerable to so great a service. These two brothers, named Horuc and Hayradin, were the sons of a porter in the isle of Lesbos. The elder obtained the additional name of Barbarossa, from the red colour of his beard; and it afterwards became the common surname of both. The strong bent of their natural disposition led them, when youths, to associate with pirates, among whom they became distinguished by their undaunted courage and spirit of enterprise. After acting with these free-booters for some time, their superior talents raised them to the command of a vessel, with which they proved so successful, that Horuc Barbarossa became the admiral of a considerable fleet of corsairs, and his brother Hayradin bore the second command. With this force they enriched themselves and their followers with the spoils, which they procured on the Mediterranean Sea, and in the Levant.

On Barbarossa's approach to Algiers, he was met by prince Eutemi, attended by all the people of that metropolis, who looked for deliverance from this free-booter, whom they accounted invincible. He was conducted into the city amidst the acclamations of the people; and lodged in one of the noblest apartments of Eutemi's palace, where he was treated with the greatest marks of distinction. Elated beyond measure with this kind reception, Barbarossa formed a design of becoming king of Algiers: and fearing some opposition from the inhabitants, on account of the excesses he suffered his soldiers to commit, murdered Eutemi, and caused himself to be proclaimed king; his Turks and Moors crying out as he rode along the streets, "Long live King Horuc Barbarossa, the invincible king of Algiers, the *chosen of God* to deliver the people from the oppression of the Christians; and destruction to all that shall oppose, or refuse to own him as their lawful sovereign." These last threatening words so intimidated the inhabitants, already apprehensive of a general massacre, that he was immediately acknowledged king. The unhappy princess Saphira, it is said, poisoned herself, to avoid ravishment by this new king, whom she unsuccessfully endeavoured to stab with a dagger.

Barbarossa was no sooner seated on the throne, than he treated his subjects with such cruelty, that they used to shut up their houses and hide themselves when he appeared in public. In consequence of this, a plot was soon formed against him; but, being discovered, he caused twenty of the principal conspirators to be beheaded, their bodies to be buried in a dunghill, and laid a heavy fine on those who survived. This so terrified the Algerines, that they never afterwards durst attempt any thing against either Barbarossa or his successors.

In the mean time, the son of Eutemi having fled to Oran, and put himself under the protection of the marquis of Gomarez, laid before that nobleman a plan for putting the city of Algiers into the hands of the king of Spain. Upon this, young Selim Eutemi was sent to Spain to lay his plan before cardinal Ximenes; who, having approved of it, sent a fleet with 10,000 land forces, under the command of Don Francisco, or, as others call him, *Don Diego de Vera*, to drive out the Turks, and restore the young prince. But the fleet was no sooner come within sight of land, than it was dispersed by a storm, and the greatest part of the ships dashed against the rocks. Most of the Spaniards were drowned; and the few who escaped to shore were either killed by the Turks or made slaves.

Though Barbarossa had nothing to boast on this occasion, his pride and insolence were now swelled to such a degree, that he imagined himself invincible, and that the very elements conspired to make him so. The Arabians were so much alarmed at his success, that they implored the assistance of Hamidel Abdes, king of Tenez, to drive the Turks out of Algiers. That prince readily undertook to do what was in his power for this purpose, provided they agreed to settle the kingdom on himself and his descendants. This proposal being accepted, he immediately set out at the head of 10,000 Moors; and, upon his entering the Algerine dominions, was joined by all the Arabians in the country. Barbarossa engaged him only with 1000 Turkish musqueteers and 500 Granada Moors; totally defeated his numerous army; pursued him to the very gates of his capital, which he easily made himself master of; and, having given it up to be plundered by his Turks, obliged the inhabitants to acknowledge him as their sovereign. This victory, however, was chiefly owing to the advantage which his troops had from their fire-arms; the enemy having no other weapons than arrows and javelins.

No sooner was Barbarossa become master of the kingdom of Tenez, than he received an embassy from the inhabitants of Tremecen; inviting him to come to their assistance against their then reigning prince, with whom they were dissatisfied on account of his having dethroned his nephew, and forced him to fly to Oran; offering him even the sovereignty in case he accepted of their proposal. The king of Tremecen, not suspecting the treachery of his subjects, met the tyrant with an army of 6000 horse and 3000 foot: but Barbarossa's artillery gave him such an advantage, that the king was at length forced to retire to his capital; which he had no sooner entered, than his head was cut off by his own people, and sent to Barbarossa, with a fresh invitation to come and take possession of the kingdom. On his approach, he was met by the inhabitants, whom he received with great complaisance, and many fair promises; but, beginning to tyrannize as usual, his new subjects soon convinced him that they were not so passive as the inhabitants of Algiers. Apprehending, therefore, that his reign might prove uneasy and precarious, he entered into an alliance with the king of Fez; after which, he took care to secure the rest of the cities in his new kingdom, by garrisoning them with his own troops. Some of these, however, revolted soon after; upon which he sent one of his corsairs, named *Efcander*, a man no less cruel than himself, to reduce them. The Tremecenians now began to repent of having invited such a tyrant to their assistance; and held consultations

on the most proper means of driving them away, and bringing back their lawful prince Abuchen Men; but, their cabals being discovered, a great number of the conspirators were massacred in the most cruel manner. The prince had the good luck to escape to Oran, and was taken under the protection of the Marquis of Gomarez, who sent immediate advice of it to Charles V. then lately arrived in Spain, with a powerful fleet and army. That monarch immediately ordered the young king a succour of 10,000 men, under the command of the governor of Oran; who, under the guidance of Abuchen Men, began his march towards Tremecen; and in their way they were joined by prince Selim, with a great number of Arabs and Moors. The first thing they resolved upon was, to attack the important fortrefs of Calau, situated between Tremecen and Algiers, and commanded by the corsair Escander at the head of about 300 Turks. They invested it closely on all sides, in hopes Barbarossa would come out of Tremecen to its relief, which would give the Tremeceni-ans an opportunity of keeping him out. The tyrant, however, kept close in his capital, being embarrassed by his fears of a revolt, and the politic delays of the king of Fez, who had not sent the auxiliaries he promised. The garrison of Calau, in the mean time, made a brave defence; and, in a sally they made at night, cut off near 300 Spaniards. This encouraged them to venture a second time; but they were now repulsed with great loss, and Escander himself wounded; soon after which they surrendered; but were all massacred by the Arabians, except sixteen, who clung close to the stirrups of the king, and of the Spanish general.

Barbarossa being now informed that Abuchen Men, with his Arabs, accompanied by the Spaniards, were in full march to lay siege to Tremecen, thought proper to march out, at the head of 1500 Turks and 5000 Moorish horse, in order to break his way through the enemy; but he had not proceeded far from the city, before his council advised him to return and fortify himself in it. This advice was now too late; the inhabitants having resolved to keep him out, and open their gates to their own lawful prince as soon as he appeared. In this distress Barbarossa saw no way left but to retire to the citadel, and there defend himself till he could find an opportunity of stealing out with his men and all his treasure. Here he defended himself vigorously; but, his provisions failing him, he took advantage of a subterraneous way, which he had caused to be digged for that purpose, and, taking his immense treasure with him, stole away as secretly as he could. His flight, however, was soon discovered; and he was so closely pursued, that to amuse, as he hoped, the enemy, he caused a great deal of his money, plate, jewels, &c. to be scattered along the road, thinking they would not fail to stop their pursuit to gather it up. This stratagem, however, failed, through the vigilance of the Spanish commander, who, being himself at the head of the pursuers, obliged them to march on, till he was come up close to him on the banks of the Huexda, about eight leagues from Tremecen. Barbarossa had just crossed the river with his vanguard, when the Spaniards came up with his rear on the other side, and cut them all off; and then, crossing the water, overtook him at a small distance from it. Here a bloody engagement ensued, in which the Turks fought like lions; but, being overpowered by numbers, they were all cut to pieces, and Barbarossa slain, in the forty-fourth year of his age, and four years after he had raised himself to the royal title of *Jigel*; two years after he had acquired the sovereignty of Algiers, and scarce a twelvemonth after the reduction of Tremecen. His head was carried to Tremecen on the point of a spear; and Abuchen Men proclaimed king, to the joy of all the inhabitants.

The news of Barbarossa's death spread the utmost consternation among the Turks at Algiers; however, they caused his brother Hayradin to be immediately proclaimed king. The Spanish commander now sent back the em-

peror's forces, without making any attempt upon Algiers; by which he lost the opportunity of driving the Turks out of that country; while Hayradin, justly dreading the consequences of the tyranny of his officers, sought the protection of the Grand Signior. This was readily granted, and himself appointed bashaw or viceroy of Algiers; by which means he received such considerable reinforcements, that the unhappy Algerines durst not make the least complaint: and such numbers of Turks resorted to him, that he was not only capable of keeping the Moors and Arabs in subjection at home, but of annoying the Christians at sea. His first step was to take the Spanish fort abovementioned, which was a great nuisance to his metropolis. The Spaniards held out to the last extremity; but, being all slain or wounded, Hayradin easily became master of the place.

Hayradin now set about building a strong mole for the safety of his ships. In this he employed 30,000 Christian slaves, whom he obliged to work without intermission for three years; in which time the work was completed. He then caused the fort he had taken from the Spaniards to be repaired, and placed a strong garrison in it, to prevent foreign vessels from entering the harbour without giving an account of themselves. By these two important works, Hayradin soon became dreaded not only by the Arabs and Moors, but also by the maritime Christian powers, especially the Spaniards. The viceroy failed not to acquaint the Grand Signior with his success, and obtained from him a fresh supply of money, by which he was enabled to build a stronger fort, and to erect batteries on all places likely to be invaded by an enemy.

In the mean time the Sultan raised Hayradin to the dignity of bashaw of the empire, and appointed Hassan Aga, a Sardinian renegado, an intrepid warrior, and an experienced officer, to succeed him as bashaw of Algiers. Hassan had no sooner taken possession of his new government, than he began to pursue his ravages on the Spanish coast with greater fury than ever, extending them to the ecclesiastical state, and other parts of Italy. But pope Paul III. being alarmed at this, exhorted the emperor Charles V. to send a powerful fleet to suppress those frequent and cruel piracies; and, that nothing might be wanting to render the enterprise successful, a bull was published by his holiness, wherein a plenary absolution of sins, and the crown of martyrdom, was promised to all those who either fell in battle or were made slaves; the emperor on his part needed no spur; and therefore set sail with a powerful fleet, consisting of one hundred and twenty ships and twenty galleys, having on-board 30,000 chosen troops, an immense quantity of money, arms, ammunition, &c. In this expedition several young nobility and gentry attended as volunteers, and among these many knights of Malta so remarkable for their valour against the enemies of Christianity. Even ladies of birth and character attended Charles in his expedition, and the wives and daughters of the officers and soldiers followed them with a design to settle in Barbary after the conquest was finished.

By this prodigious armament, the Algerines were thrown into the utmost consternation. The whole garrison consisted of 800 Turks and 6000 Moors, without fire-arms, and poorly disciplined and accoutred; the rest of their forces being dispersed in the other provinces of the kingdom, to levy the usual tribute on the Arabs and Moors. The Spaniards landed without opposition, and immediately built a fort, under the cannon of which they encamped, and diverted the course of a spring which supplied the city with water. Being thus reduced to the utmost distress, Hassan received a summons to surrender at discretion, on pain of being put to the sword with all the garrison. The herald was ordered to extol the vast power of the emperor both by sea and land, and to exhort him to return to the Christian religion. But to this Hassan only replied, that he must be a madman who would pretend to advise an enemy, and that the advised must still act more madly who would

would take counsel of such an adviser. He was, however, on the point of surrendering the city, when advice was brought him that the forces belonging to the western government were in full march towards the place; upon which it was resolved to defend it to the utmost. Charles, in the mean time, resolving upon a general assault, kept a constant firing upon the town; which, from the weak defence made by the garrison, he looked upon as already in his hands. But while the *douwan*, or Algerine senate, were deliberating on the most proper means of obtaining an honourable capitulation, a mad prophet, attended by a multitude of people, entered the assembly, and foretold the speedy destruction of the Spaniards before the end of the moon, exhorting the inhabitants to hold out till that time. This prediction was soon accomplished in a very surprising and unexpected manner: for, on the 28th of October, 1541, a dreadful storm of wind, rain, and hail, arose from the north, accompanied with violent shocks of earthquakes, and a dismal and universal darkness both by sea and land; so that the sun, moon, and elements, seemed to combine together for the destruction of the Spaniards. In that one night, some say in less than half an hour, eighty-six ships and fifteen galleys were destroyed, with all their crews and military stores; by which the army on shore was deprived of all means of subsisting in these parts. Their camp also, which spread itself along the plain under the fort, was laid quite under water by the torrents which descended from the neighbouring hills. Many of the troops, by trying to remove into some better situation, were cut in pieces by the Moors and Arabs; while several galleys, and other vessels, endeavouring to gain some neighbouring creeks along the coasts, were immediately plundered, and their crews massacred by the inhabitants.

The next morning Charles beheld the sea covered with the fragments of so many ships, and the bodies of men, horses, and cattle, swimming on the waves; at which he was so disheartened, that, abandoning his tents, artillery, and all his heavy baggage, to the enemy, he marched at the head of his army, though in no small disorder, towards cape Malabux, in order to reembark in those few vessels which had outweathered the storm. But Hassan, who had caused his motions to be watched, allowed him just time to get to the shore, when he sallied out and attacked the Spaniards in the midst of their hurry and confusion to get into their ships, killing great numbers, and bringing away a still greater number of captives; after which he returned in triumph to Algiers, where he celebrated with great rejoicings his happy deliverance from such distress and danger.

The unhappy Spaniards had scarce reached their ships, when they were attacked by a fresh storm, in which several more of them perished; one ship in particular, containing 700 soldiers, besides sailors, sunk in the emperor's sight, without a possibility of saving a single man. At length, with much labour, they reached the port of Bujayah, at that time possessed by the Spaniards. Here the emperor dismissed the few remains of the Maltese knights and their forces, who embarked in three shattered galleys, and with much difficulty and danger reached their own country. Charles himself staid no longer than till the 16th of November, when he set sail for Carthage, and reached it on the 25th of the same month, severely instructed in the vanity of human greatness. In this unfortunate expedition upwards of 120 ships and galleys were lost, 300 colonels and other land and sea officers, 8000 soldiers and marines, besides those destroyed by the enemy on the reembarkation, or drowned in the last storm. The number of prisoners was so great, that the Algerines sold some of them, by way of contempt, for an onion per head.

Hassan, elated with this victory, undertook an expedition against the king of Tremecen, who, being now deprived of the assistance of the Spaniards, was forced to procure a peace by paying a vast sum of money, and becoming tributary to him. The bashaw returned to Algiers, laden

with riches; and soon after died of a fever, in the sixty-sixth year of his age.

From this time the Spaniards were never able to annoy the Algerines in any considerable degree. In 1555, they lost the city of Bujayah, which was taken by Salha Rais, Hassan's successor; who next year set out on a new expedition, which he kept a secret, but was suspected to be intended against Oran: but he was scarcely got four leagues from Algiers, when the plague, which at that time raged violently in the city, broke out in his groin, and carried him off in twenty-four hours.

Immediately after his death the Algerine soldiery chose a Corsican renegade, Hassan Corfo, in his room, till they should receive farther orders from the Porte. He did not accept of the bashawship without a good deal of difficulty; but immediately prosecuted the intended expedition against Oran, dispatching a messenger to acquaint the Porte with what had happened. They had hardly begun their hostilities against the place, when orders came from the Porte, expressly forbidding Hassan Corfo to begin the siege, or, if he had begun it, enjoining him to raise it immediately. This news was received with great grief by the whole fleet and army, as they thought themselves sure of success, the garrison being at that time very weak. Nevertheless, as they dared not disobey, the siege was immediately raised.

Corfo had hardly enjoyed his dignity four months, before news came, that eight galleys were bringing a new bashaw to succeed him; one Tekelli, a principal Turk of the Grand Signior's court: upon which the Algerines unanimously resolved not to admit him. By the treachery of the Levantine soldiers, however, he was admitted at last, and the unfortunate Corfo thrown over a wall in which a number of iron hooks were fixed; one of which catching the ribs of his right side, he hung three days in the most exquisite torture before he expired.

Tekelli was no sooner entered upon his new government, than he behaved with such cruelty and rapaciousness, that he was assassinated under the very dome of a saint, by Yusuf Calabres, the favourite renegade of Hassan Corfo; who for this service was unanimously chosen bashaw, but died of the plague six days after his election.

Yusef was succeeded by Hassan the son of Hayradin, who had been formerly recalled from his bashawship, when he was succeeded by Selha Rais; and now had the good fortune to get himself reinstated in his employment. Immediately on his arrival, he engaged in a war with the Arabs, by whom he was defeated with great loss. The next year, the Spaniards undertook an expedition against Mostagan, under the command of the count d'Alcandela; but they were utterly defeated, the commander himself killed, and 12,000 taken prisoners. This disaster was owing to the inconsiderate rashness, or rather madness, of the commander; which was so great, that, after finding it impossible to rally his scattered forces, he rushed, sword in hand, into the thickest of the enemy's ranks, at the head of a small number of men, crying out, "St. Jago! St. Jago! the victory is ours, the enemy is defeated;" soon after which he was thrown from his horse, and trampled to death.

The next enterprise in which Hassan engaged, was the siege of Marfalquiver, situated near the city Oran, which he designed to invest immediately after. The army employed in this siege consisted of 26,000 foot and 10,000 horse, besides which he had a fleet consisting of thirty-two galleys and galliots, together with three French vessels laden with biscuit, oil, and other provisions. The city was defended by Don Martin de Cordova, brother of the count d'Alcandela, who had been taken prisoner in the battle where that nobleman was killed, but had obtained his liberty from the Algerines with immense sums, and now made a most gallant defence against the Turks. The city was attacked with the utmost fury by sea and land, so that several breaches were made in the walls. The Turkish standards were several times planted on the walls,

walls, and as often dislodged; but the place must have in the end submitted, had not Hassan been obliged to raise the siege in haste, on the news that the famed Genoese admiral Doria was approaching with considerable succours from Italy. The fleet accordingly arrived soon after; but, missing the Algerine galleys, bore away for Pennon de Valez, where they were shamefully-repulsed by a handful of Turks who garrisoned that place; which, however, was taken the following year.

In 1567, Hassan was again recalled to Constantinople, where he died three years after. He was succeeded by Mahomet, who gained the love of the Algerines by several public-spirited actions. He incorporated the Janisaries and Levantine Turks together, and by that means put an end to their dissensions, which laid the foundation of the Algerine independency on the Porte. He likewise added some considerable fortifications to the city and castle, which he designed to render impregnable. But, while he was thus studying the interest of Algiers, one Gascon, a bold Spanish adventurer, formed a design of surprising the whole piratic navy in the bay, and setting them on fire in the night-time, when they lay defenceless, and in their first sleep. For this he had not only the permission of Philip II. but was furnished by him with proper vessels, mariners, and fire-works, for the execution of his plot. With these he set sail for Algiers in the most proper season, viz. the beginning of October, when most, if not all, the ships lay at anchor there; and easily sailed near enough, unsuspected, to view their manner of riding, in order to catch them napping, at a time when the greater part of their crew were dispersed in their quarters. He came accordingly, unperceived by any, to the very mole-gate, and dispersed his men with their fire-works; but, to their great surprise, they found them so ill mixed, that they could not with all their art make them take fire. In the mean time, Gascon took it into his head, by way of bravado, to go to the mole-gate, and give three loud knocks with the pommel of his dagger, and to leave it fixed in the gate by its point, that the Algerines might have cause to remember him. This he had the good fortune to do without meeting with any disturbance or opposition; but it was not so with his men; for no sooner did they find their endeavours unsuccessful, than they made such a bustle as quickly alarmed the guard posted on the adjacent bastion, from which the uproar quickly spread itself through the whole garrison. Gascon, now finding himself in the utmost danger, sailed away with all possible haste: but he was pursued, overtaken, and brought back a prisoner to Mahomet; who no sooner got him into his power, than he immediately caused a gibbet of considerable height to be erected on the spot where Gascon had landed, ordering him to be hoisted up, and hung by the feet to a hook, that he might die in exquisite torture; and, to shew his resentment and contempt of the king his master, he ordered his commission to be tied to his toes. He had not, however, hung long in that state, when the captain who took him, accompanied by a number of other corsairs, interceded so strongly in his behalf, that he was taken down and put under the care of some Christian surgeons; but two days after, some Moors reporting that it was the common talk and belief in Spain, that the Algerines durst not hurt a hair of Gascon's head, the unfortunate Spaniard was hoisted up by a pulley to the top of the execution-wall, and let down again upon the hook, which in his fall caught him by the belly, and gave him such a wound that he expired without a groan. Thus ended the expedition of John Gascon, which has procured him a place among the Spanish martyrs; while, on the other hand, the Algerines look upon his disappointment to have been miraculous, and owing to the efficacious protection of the powerful saint, whose prayers had before raised such a terrible storm against the Spanish fleet.

Mahomet, being soon after recalled, was succeeded by the famous renegade Ochali, who reduced the kingdom of Tunis; which, however, remained subject to the vice-

roy of Algiers only till the year 1586, when a bashaw of Tunis was appointed by the Porte.

The kingdom of Algiers continued to be governed, till the beginning of the seventeenth century, by viceroys or bashaws appointed by the Porte; concerning whom we find nothing very remarkable, farther than that their avarice and tyranny was intolerable both to the Algerines and the Turks themselves. At last the Turkish Janisaries and militia becoming powerful enough to suppress the tyrannical sway of these bashaws, and the people being almost exhausted by the heavy taxes laid upon them, the former resolved to depose these petty tyrants, and set up some officers of their own at the head of the realm. The better to succeed in this attempt, the militia sent a deputation to the Porte, to complain of the avarice and oppression of these bashaws, who sunk both the revenue of the state, and the money remitted to it from Constantinople, into their own coffers, which should have been employed in keeping up and paying the soldiery. They represented how much more honourable it would be for the Grand Signior to permit them to choose their own dey or governor from among themselves, whose interest it would then be to see that the revenue of the kingdom was rightly applied in keeping up its forces complete, and in supplying all other exigencies of the state, without any farther charge or trouble to the Porte than that of allowing them its protection. On their part, they engaged always to acknowledge the Grand Signiors as their sovereigns, and to pay them their usual allegiance and tribute, to respect their bashaws, and even to lodge and maintain them and their retinue, in a manner suitable to their dignity, at their own charge. The bashaws, however, were, for the future, to be excluded from assisting at any but general douwans, unless invited to it; and from having the liberty of voting in them, unless when their advice was asked, or the interest of the Porte was likely to suffer by their silence. All other concerns, which related to the government of Algiers, were to be wholly left under the direction of the dey and his douwan. These proposals having been accepted by the Porte, the deputies returned highly satisfied; and, having notified their new privileges, the great douwan immediately proceeded to the election of a dey from among themselves. They compiled a new set of laws, and made several regulations for the better support and maintenance of this new form of government, to the observation of which they obliged all their subjects to swear; and the militia, navy, commerce, &c. were all settled pretty nearly on the footing upon which they now stand; though the subsequent altercations that frequently happened between the bashaws and deys, the one endeavouring to recover their former power, and the other to curtail it, caused such frequent complaints and discontents at the Ottoman court, as made them frequently repent their compliance.

In the year 1601, the Spaniards, under the command of Doria the Genoese admiral, made another attempt upon Algiers, in which they were more fortunate than usual, their fleet being only driven back by contrary winds, so that they came off without loss. In 1609, the Moors, being expelled from Spain, flocked in great numbers to Algiers; and, as many of them were very able sailors, they undoubtedly contributed to make the Algerine fleet so formidable. In 1616, their fleet consisted of forty sail of ships between 300 and 400 tons, their admiral 500 tons. It was divided into two squadrons, one of eighteen sail, before the port of Malaga; and the other at the Cape of Santa Maria, between Lisbon and Seville; both of which fell upon all Christian ships with whom they pretended to be in friendship, as well as upon the Spaniards and Portuguese, with whom they were at war.

The Algerines were thus become very formidable to the European powers. The Spaniards, who were most in danger, and least able to cope with them, solicited the assistance of England, the pope, and other states. The French, however, were the first to shew their resentment

of the perfidious behaviour of these miscreants; and, in 1617, M. Beaulieu was sent against them with a fleet of fifty men of war, who defeated their fleet, took two of their vessels, while their admiral sunk his own ship and crew, rather than fall into his enemies' hands.

In 1623, the Algerines and other states of Barbary threw off their dependence on the Porte altogether, and set up for themselves. What gave occasion to this was the twenty-five years truce which sultan Amurath IV. was obliged to make with the emperor Ferdinand II. to prevent his being overmatched by carrying on a war against him and the sophi of Persia at the same time. As this put a stop to the piratical trade of the Algerines, they proceeded on a new plan, and resolved, that whoever desired to be at peace with them, must, distinctly and separately, apply to their government. No sooner was this resolution taken, than the Algerines began to make prizes of several merchants ships belonging to powers at peace with the Porte. Nay, having seized a Dutch ship and polacre at Scanderoon, they ventured on shore; and, finding the town abandoned by the Turkish aga and inhabitants, they plundered all the magazines and warehouses, and set them on fire.—About this time Louis XIII. undertook to build a fort on their coasts, instead of one formerly built by the Marsilians, and which they had demolished. This, after some difficulty, he accomplished; and it was called the *Bastion of France*; but the situation being afterwards found inconvenient, the French purchased the port of La Calle, and obtained liberty to trade with the Arabians and Moors. The Ottoman court, in the mean time, was so much embarrassed with the Persian war, that there was no leisure to check the Algerine piracies. This gave an opportunity to the vizir and other courtiers to compound matters with the Algerines, and to get a share of their prizes, which were very considerable. However, for form's sake, a severe reprimand, accompanied with threats, was sent them; to which they replied, that “these depredations deserved to be indulged to them, seeing they were the only bulwark against the Christian powers, especially against the Spaniards, the sworn enemies of the Moslem name;” adding, that “if they should pay a punctilious regard to all that could purchase peace, or liberty to trade with the Ottoman empire, they should have nothing to do but set fire to all their shipping, and turn camel-drivers for a livelihood.”

The Algerines, therefore, prosecuted their piracies with impunity, to the terror and disgrace of the Europeans, till the year 1652; when, a French fleet being accidentally driven to Algiers, the admiral took it into his head to demand a release of all the captives of his nation, without exception. This being refused, the Frenchman without ceremony carried off the Turkish viceroy, and his cadî or judge, who were just arrived from the Porte, with all their equipage and retinue. The Algerines, by way of reprisal, surprised the Bastion of France above-mentioned, and carried off the inhabitants to the number of 600, with all their effects; which so provoked the admiral, that he sent them word he would pay them another visit the next year with his whole fleet.

The Algerines, undismayed by these threats, fitted out a fleet of sixteen galleys and galliots, excellently manned and equipped, under the command of admiral Hali Pinchinin. The chief design of this armament was against the treasure of Loretto; which, however, they were prevented by contrary winds from obtaining. Upon this they made a descent on Puglia in the kingdom of Naples; where they ravaged the whole territory of Necotra, carrying off a vast number of captives, and among them some nuns. From thence steering towards Dalmatia, they secured the Adriatic; and, loading themselves with immense plunder, left those coasts in the utmost consternation and resentment.

At last the Venetians, alarmed at such terrible depredations, equipped a fleet of twenty-eight sail, under the command of admiral Capello, with express orders to burn, sink, or take, all the Barbary corsairs he met with, either

on the open seas, or even in the Grand Signior's harbours, pursuant to a late treaty of peace with the Porte. On the other hand, the captain-bashaw, who had been sent out with the Turkish fleet to chase the Florentine and Maltese cruisers out of the Archipelago, understanding that the Algerine squadron was so near, sent express orders to the admiral to come to his assistance. Pinchinin readily agreed; but, having first resolved on a descent upon the island of Lissa, or Lisina, belonging to the Venetians, he was overtaken by Capello, from whom he retired to Valona, a sea-port belonging to the Grand Signior, whither the Venetian admiral pursued him; but, the Turkish governor refusing to eject the pirates according to the articles of the peace between the Ottoman court and Venice, Capello was obliged to content himself with watching them for some time. Pinchinin was soon weary of restraint, and ventured out; when an engagement immediately ensued, in which the Algerines were defeated, and five of their vessels disabled; with the loss of 1500 men, Turks and Christian slaves, besides 1600 galley-slaves who regained their liberty. Pinchinin, after this defeat, returned to Valona, where he was again watched by Capello; but the latter had not lain long at his old anchorage before he received a letter from the senate, desiring him to make no farther attempt on the pirates at that time, for fear of a rupture with the Porte. This was followed by a letter from the governor of Valona, desiring him to take care lest he incurred the sultan's displeasure by such insults. The brave Venetian was forced to comply; but, resolving to take such a leave of the Algerines as should be remembered by them, he observed how they had reared their tents, and drawn their booty and equipage along the shore. He then kept firing among their tents, while some well-manned galliots and brigantines were ordered among their shipping, who attacked them with such bravery, that, without any great loss, they towed out their sixteen galleys, with all their cannon, stores, &c. In this last engagement, a ball from one of the Venetian galleys happening to hit a Turkish mosque, the whole action was considered as an insult upon the Grand Signior. To conceal this, Capello was ordered to sink all the Algerine ships he had taken, except the admiral; which was to be conducted to Venice, and laid up as a trophy. Capello came off with a severe reprimand; but the Venetians were obliged to buy, with 500,000 ducats, a peace from the Porte.

In the year 1681, Louis XIV. provoked by the grievous outrages committed by the Algerines on the coasts of Provence and Languedoc, ordered a considerable fleet to be fitted out against them, under the marquis Du Quesne, vice-admiral of France. His first expedition was against a number of Tripolitan corsairs; who had the good fortune to outrow him, and shelter themselves in the island of Scio, belonging to the Turks. This did not, however, prevent him from pursuing them thither, and making such a terrible fire upon them as quickly destroyed fourteen of their vessels, besides battering the walls of the castle. This severity seemed only to be designed as a check to the piracies of the Algerines; but, finding they still continued their outrages, he sailed to Algiers in August 1682, cannonading and bombarding it so furiously, that the whole town was in flames in a very little time. The great mosque was battered down, and most of the houses laid in ruins; inasmuch that the inhabitants were on the point of abandoning the place; when on a sudden the wind turned about, and obliged Du Quesne to return to Toulon. The Algerines immediately made reprisals, by sending a number of galleys and galliots to the coast of Provence, where they committed the most dreadful ravages, and brought away a vast number of captives: upon which a new armament was ordered to be got ready at Toulon and Marseilles against the next year; and the Algerines, having received timely notice, put themselves into as good a state of defence as possible.

In May 1683, Du Quesne with his squadron cast anchor before Algiers; where being joined by the marquis D'Af-
fraville,

franville, at the head of five stout vessels, upwards of 100 bombs were thrown into the town the first day, which did terrible execution; while the besieged made some hundred discharges of their cannon against them without doing any considerable damage. The following night the bombs were again thrown into the town in such numbers, that the dey's palace and other great edifices were almost destroyed; some of their batteries were dismounted, and several vessels sunk in the port. The dey and Turkish bashaw, as well as the whole soldiery, alarmed at this dreadful havoc, immediately sued for peace. As a preliminary, the immediate surrender was insisted on of all Christian captives who had been taken fighting under the French flag; which being granted, 142 of them were immediately delivered up, with a promise of sending him the remainder as soon as they could be got from the different parts of the country. Accordingly Du Quesne sent his commissary-general and one of his engineers into the town; but with express orders to insist upon the delivery of all the French captives without exception, together with the effects they had taken from the French; and that Mezomorto their then admiral, and Hali Rais one of their captains, should be given as hostages.

This last demand having embarrassed the dey, he assembled the douwan, and acquainted them with it: when Mezomorto, in a violent rage, told the assembly, that the cowardice of those who sat at the helm had occasioned the ruin of Algiers; but that, for his part, he would never consent to deliver up any thing that had been taken from the French. He immediately acquainted the soldiery with what had passed; which so exasperated them, that they murdered the dey, and chose Mezomorto in his place. This was no sooner done, than he cancelled all the articles of peace which had been made, and hostilities were renewed with greater fury than ever.

The French admiral now kept pouring in such volleys of bombs, that in less than three days the greatest part of the city was reduced to ashes; and the fire burnt with such vehemence, that the sea was enlightened with it for more than two leagues round. Mezomorto, unmoved at all these disasters, and the vast number of the slain, whose blood ran in rivulets along the streets; or rather, grown furious and desperate, sought only how to wreak his revenge on the enemy; and, not content with causing all the French in the city to be cruelly murdered, ordered their consul to be tied hand and foot, and fastened alive to the mouth of a mortar, from whence he was shot away against their navy. By this piece of inhumanity Du Quesne was so exasperated, that he did not leave Algiers till he had utterly destroyed all their fortifications, shipping, almost all the lower part, and above two-thirds of the upper part, of the city, by which means it became little else than a heap of ruins.

The Algerines have also at different periods received several hostile visits from the English. About the year 1620 Sir Robert Mansel was sent out from England with six men of war and twelve stout ships hired from the merchants. He arrived at Algiers, but neither negotiation nor force procured any substantial redress. Two other fleets were afterwards sent against them, one under lord Willoughby, the other under lord Denbigh, both of which did so little, that very few of our historians take any notice of them. The renowned Blake, in the year 1655, being in the Mediterranean, proceeded to Algiers, to demand satisfaction for the piracies committed on the English, and the release of all captives belonging to his nation. The dey expressed the most friendly disposition, and promised every redress in his power. It is not to be supposed, however, that the natural perfidy of these pirates would long suffer them to abide by any treaty; for, notwithstanding these promises, they lost no opportunity of making prizes of English ships, whenever they could conveniently come at them; so that, in the year 1661, the earl of Sandwich was sent to Algiers to menace the dey for his infraction of the treaty which he had entered into with

Blake. Not being able to obtain any concessions, he made an ineffectual attempt to set fire to the ships in the harbour; but, leaving Sir John Lawton with a strong squadron to cruise off the port, so many of their ships were taken, that they were at last compelled to enter again into a treaty; which, however, like the former one, was not long observed. In the year 1669, a squadron commanded by Sir Thomas Allen, in conjunction with one from the states of Holland commanded by Van Ghent, sunk and destroyed many ships belonging to these pirates, and rescued a considerable number of Christian slaves. The next year Sir Edw. Spragge was sent with a larger force on the same service, when he so effectually annoyed their shipping, that a peace was concluded to the satisfaction of the English, which they observed better than the former ones. In the year 1749, the Prince Frederic packet-boat, bound from Lisbon to Falmouth, was taken by four Algerine cruisers, carried into Algiers, and plundered of effects to the amount of 25,000 pounds; and after being detained twenty-three days was suffered to depart. This outrage occasioned commodore Keppel (late lord Keppel) to be sent out with seven ships of war. He took on-board certain presents for the dey, the forwarding of which had been neglected, and which that prince having been long accustomed to receive, laid claim to by prescription. Mr. Keppel arrived there in August, and had an audience of the dey, but could not obtain a restitution of the property.

In 1775, the king of Spain caused another formidable armament to be prepared, in order to chastise the Algerines for the depredations which their corsairs still committed on his subjects. The fleet destined for this expedition was fitted out at the ports of Carthagena, Cadiz, and Barcelona; at the former of which the whole force assembled, and thence, after being detained a month by contrary winds, sailed against Algiers, arriving in the bay the latter end of June. The fleet consisted of seven ships of the line of 74 guns each, eight ships of 40 guns, thirty-two frigates from 20 to 36 guns, and about twenty smaller armed vessels of different constructions, with 400 transports, having 19,000 seamen and marines: on-board the transports were 22,000 foot, and 4,000 horse, consisting of the best troops in Spain, an artillery of 400 pieces of cannon, with 2,000 men to work the guns. This large fleet and army were provided with vast quantities of stores and provisions. The marine was under the command of Don Pedro Castegon, and the land forces under count O'Reilly, a native of Ireland, who had been long in the service of Spain, and enjoyed the particular favour of the sovereign. Such a force seemed to menace the reduction of all the piratical states of Barbary. Eight days elapsed before the troops were landed, and the attack was then made in a desultory and injudicious manner; no regular design or plan of operations appeared to have been settled between the general and admiral, but great dissension and animosity prevailed. The deeply-rooted antipathy which subsists between the Spaniards and Moors caused each to be eager for action; but the first attack was made upon very unequal terms: whilst the Spaniards advanced thro' a close country, exposed to the full effect of the enemy's fire, the Moors lay protected behind trees and enclosures, from which no efforts could dislodge them. This destructive conflict was maintained for thirteen hours: at length the Spaniards became dispirited, and a precipitate retreat ensued. Great number of wounded were left on the field of battle to satiate the vengeance of their barbarous enemies, who put all to death without mercy that fell into their hands. As soon as it was dark, the Spanish army re-embarked in such confusion, that, had they been opposed by a skilful enemy, very few would have regained the ships, and the most entire defeat would have ensued: but the unskilfulness of the Algerines in military operations prevented them from improving the opportunity. The disgrace and loss which had befallen the Spanish arms in this attack, had effectually cooled their military ardour; and

and all thoughts of any farther attempts to retrieve the honour of the nation, and effectuate the purposes of the expedition, were laid aside. In four days after, a great part of the fleet, with all the land-forces, sailed back to Spain. The misconduct and disgrace attending this expedition was generally imputed to the count O'Reilly; and the loss sustained in it, as given by authority, amounted to twenty-seven officers killed, 191 wounded; 501 men killed, 2088 wounded; but private computations estimated the loss at about 5000.

In the year 1784 another expedition was set on foot, by the court of Madrid, against this state; the chief command of which was entrusted to admiral Don Antonio Barcelo. Eight successive attacks were made, with great spirit and bravery, on the forts which defend the entrance of the harbour; but they were repelled with equal intrepidity by the Algerines. Some parts of the city were set on fire, but the injuries which the Spanish fleet sustained were much greater than the annoyance which it gave the enemy; and the attempt to destroy Algiers was in the result given up as impracticable.

The dey is now absolute monarch; and pays no other revenue to the Porte than that of a certain number of fine boys or youths, and some other presents which are sent thither yearly. His own income probably rises and falls according to the opportunities that occur of fleecing both natives and foreigners; whence it is variously computed by different authors. Dr. Shaw computes the taxes of the whole kingdom to bring into the treasury no more than 300,000 dollars; but supposes that the eighth part of the prizes, the effects of those persons who die without children, joined to the yearly contributions raised by the government, presents from foreigners, fines, and oppressions, may bring in about as much more. Both the dey and officers under him enrich themselves by the same laudable methods of rapine and fraud; which it is no wonder to find the common people practising upon one another, and especially upon strangers, seeing they themselves are impoverished by heavy taxes, and the injustice of those who are in authority.

It has been already observed, that the first deys were elected by the militia, who were then called the *douwan* or common-council. This elective body was at first composed of 800 militia-officers, without whose consent the dey could do nothing; and upon some urgent occasions all the officers residing in Algiers, amounting to above 1500, were summoned to assist. But, since the deys have become more powerful, the *douwan* is principally composed of thirty *chiahs*-beshaws or colonels, with now and then the mufti and *cadi* upon some emergencies; and, on the election of a dey, the whole soldiery are allowed to come and give their votes. All the regulations of state ought to be determined by that assembly, before they pass into a law, or the dey hath not power to put them in execution: but, for many years back, the *douwan* is of so little account, that it is only convened out of formality, and to give assent to what the dey and his chief favourites have concerted beforehand.

In this country it is not to be expected that justice will be administered with any degree of impartiality. The Mahometan soldiery, in particular, are so much favoured, that they are seldom put to death for any crime except rebellion; in which case they are either strangled with a bow-string or hanged to an iron hook. In smaller offences, they are fined, or their pay stopped; and, if officers, they are reduced to the station of common soldiers, from whence they may gradually raise themselves to their former dignity. Women guilty of adultery, have a halter tied about their necks, with the other end fastened to a pole, by which they are held under water till they are suffocated. The bastinado is likewise inflicted for small offences; and is given either upon the belly, back, or soles of the feet, according to the pleasure of the *cadi*; who also appoints the number of strokes. These sometimes amount to 200 or 300; according to the indulgence the offender can ob-

tain either by bribery or friends; and hence he often dies under this punishment for want of money or advocates. But the most terrible punishments are those inflicted upon Jews or Christians who speak against Mahomet or his religion; in which case, they must either turn Mahometans or be impaled alive. If they afterwards apostatize, they are burned or roasted alive, or else thrown down from the top of the city walls, upon iron hooks, where they are caught by different parts of their body, according as they happen to fall, and expire in the greatest torments. This terrible punishment, however, begins to be disused.

The officer next in power to the dey is the *aga* of the janizaries, who is one of the oldest officers in the army. Next to the *aga* in dignity is the secretary of state, who registers all the public acts; and after him are the thirty *chiahs* or colonels, who sit next to the *aga* in the *douwan*, and in the same gallery with him. Out of this class are generally chosen those who go ambassadors to foreign courts, or who disperse the dey's orders throughout the realm. Next to them are 800 *bolluck*-beshaws, or eldest captains, who are promoted to that of *chiahs*-beshaws according to their seniority. The *oldack*-beshaws or lieutenants are next; who amount to 400, and are regularly raised to the rank of captains in their turn, and to other employments in the state, according to their abilities.

Other military officers of note are the *vekelards* or purveyors of the army; the *peys*, who are the four oldest soldiers, and consequently the nearest to preferment; the *foulacs*, who are next in seniority to them, and are part of the dey's body-guard, always marching before him when he takes the field, and distinguished by their carbines and gilt scymitars, with a brass gun on their caps; the *kayts* or Turkish soldiers, each band of whom have the government of one or more *adawars* or itinerant villages, and collect their taxes for the dey; and the *fagiards* or Turkish lancemen, an hundred of whom always attend the army, and watch over the water appointed for it. To these we may add the *beys*, or governors of the three great provinces of the realm. All the above-mentioned officers ought to compose the great *douwan* or council above-mentioned; but only the thirty *chiahs*-beshaws have a right to sit in the gallery next after the dey. The rest are obliged to stand on the floor of the hall or council-chamber, with their arms across, and as much as possible without motion; neither are they permitted to enter with their swords on, for fear of a tumult. As for those who have any matters to transact with the *douwan*, they must stand without, let the weather be ever so bad; and there they are commonly presented with coffee by some of the inferior officers, till they are dismissed.

The kingdom of Algiers is at present divided into three provinces or districts, viz. the eastern, western, and southern. The eastern or Levantine government, which is by far the most considerable, and is also called *Beylick*, contains the towns of Bona, Constantina, Gigeri, Bujeyah, Steffa, Tebef, Zamoura, Biscara, and Necanz, in all which the Turks have their garrisons; besides which, it includes the two ancient kingdoms of Cuco and Labez, though independent of the Algerine government, to whose forces their country is inaccessible; so that they still live under their own cheyks, chosen by each of their *adawars* or hords. The western government hath the towns of Oran, Tremecen, Mostagan, Tenez, and Secrelly, with its castle and garrison. The southern government hath neither town, village, nor even a house, the inhabitants leading a wandering life, and living in tents.

The most considerable rivers of Algiers are the Zha or Zis, which runs across the province of Tremecen and the desert of Anguid, falling into the Mediterranean near the town of Tabecrita, where it has the name of *Sirat*. 2. The Haregol, supposed the *Sign* of Ptolemy, comes down from mount Atlas, crosses the desert of Anguid, and falls into the sea about five leagues from Oran. 3. The Mina, supposed the *Chylematis* of Ptolemy, a large river, which runs through the plains of Bathala, and falls into the sea near

near the town of Arzew. This river hath lately received the name of *Cena*, who rebuilt the town of Bathalaw after it had been destroyed. 4. The Shelliff, or Zilif, descending from mount Guanexeris, runs through some great deserts, the lake Titteri, the frontiers of Tremecen and Tenez, falling into the sea a little above the city of Mostagan. 5. The Celef, supposed to be the *Carthana* of the ancients, falls into the sea about three leagues west of Algiers, after a short course of eighteen or twenty leagues. 6. The Hued-alquiver, supposed to be the *Nalabata*, or *Nasaba* of the ancients, and called by the Europeans *Zingani*, runs down with a swift course through the high mountains of Cuco, and falls into the sea near Bujeyah. 7. Suf-Gemar, or Suf-Gimmar al Rumniel, supposed to be the *Ampfaga* of Ptolemy, hath its source on mount Aurus; thence runs through the fruitful plains of Constantina, where its stream is greatly increased; and, running northward, it falls into the sea a little east of Gigeri. 8. The Ladag, or Ludeg, runs down from mount Atlas through part of Constantina, and falls into the sea a little eastward of Bona. 9. Guadi, or Guadel Barbel, springs from the head of Orbus, or Urbs, in Tripoli, runs through Bujeyah, and falls into the sea near Tabarea.

The inhabitants along the coasts are a mixture of different nations; but chiefly Moors and Morefcos driven out of Catalonia, Arragon, and other parts of Spain. Here are also great numbers of Turks, who come from the Levant to seek their fortune; as well as multitudes of Jews and Christians taken at sea, who are brought hither to be sold for slaves. The Berebers are some of the most ancient inhabitants of the country; and are supposed to be descended from the ancient Sabeans, who came hither from Arabia Felix under the conduct of one of their princes. Others believe them to be some of the Canaanites driven out of Palestine by Joshua. These are dispersed all over Barbary, and divided into a multitude of tribes under their respective chiefs: most of them inhabit the mountainous parts; some range from place to place, and live in tents, or portable huts; others in scattered villages: they have, nevertheless, kept themselves for the most part from intermixing with other nations. The Berebers are reckoned the richest of all, go better clothed, and carry on a much larger traffic of cattle, hides, wax, honey, iron, and other commodities. They have also some artificers in iron, and some manufacturers in the weaving branch. The name of *Berber* is supposed to have been originally given them on account of their being first settled in some desert place. Upon their increasing in process of time, they divided themselves into five tribes, probably on account of religious differences, called the *Zinhagians*, *Musamedins*, *Zeneti*, *Hoares*, and *Gomeres*; and these, having produced 600 families, subdivided themselves into a great number of petty tribes. To these we may add the *Zuowahs*, by European authors called *Azuagues*, or *Affagues*, who are likewise dispersed over most parts of Barbary and Numidia. Great numbers of these inhabit the mountainous parts of Cuco, Labez, &c. leading a wandering pastoral life. But the most numerous inhabitants are the Moors and Arabians. The former are very stout and warlike, and skilful horsemen; but so addicted to robbing, that one cannot safely travel along the country at a distance from the towns without a guard, or at least a marabout or saint for a safeguard. For as they look upon themselves to be the original proprietors of the country, and not only as dispossessed by the rest of the inhabitants, but reduced by them to the lowest state of poverty, they make no scruple to plunder all they meet by way of reprisal. The inhabitants in general have a pretty fair complexion; they are robust and well proportioned. People of distinction wear their beard; they have rich clothes made of silk, embroidered with flowers of gold, and turbans enriched with jewels. The Turks, who compose the military force, have great privileges, pay no taxes, are never publicly punished, and rarely in private. The lowest foldier domineers over the most distinguished

Moors at pleasure. If he finds them better mounted than himself, he exchanges horses without ceremony. The Turks alone have the privilege of carrying fire-arms. Many good qualities, however, distinguish them in spite of this excess of despotism. They never game for money; nor even for trifles; and they never profane the name of the Deity. They soon forget their private quarrels; and, after the first paroxysm of resentment is over, it is infamy for a Turk to keep in remembrance the injuries he has received. In this respect certainly they are less barbarous than other nations that boast of their civilization.

The corsairs or pirates form each a small republic, of which the rais or captain is the supreme bashaw; who, with the officers under him, form a kind of douwan, in which every matter relating to the vessel is decided in an arbitrary way. These corsairs are chiefly instrumental in importing whatever commodities are brought into the kingdom, either by way of merchandize or prizes. These consist chiefly of gold and silver stuffs, daniaks, cloths, spices, tin, iron, plated brass, lead, quicksilver, cordage, sail-cloth, bullets, cochineal, linen, tartar, alum, rice, sugar, soap, cotton raw and spun, copperas, aloes, brazil, logwood, vermilion, &c. Very few commodities, however, are exported from this part of the world: the oil, wax, hides, pulse, and corn, produced, being but barely sufficient to supply the country; though, before the loss of Oran, the merchants have been known to ship off from Barbary several thousand tons of corn. The consumption of oil, though in great abundance, is so considerable, that it is seldom permitted to be shipped off for Europe. The other exports consist chiefly in ostriches feathers, copper, rugs, silk fishes, embroidered handkerchiefs, dates, and Christian slaves. Some manufactures in silk, cotton, wool, leather, &c. are carried on in this country, but mostly by the Spaniards settled here, especially about the metropolis. Carpets are also a manufacture of the country; which, though much inferior to those of Turkey both in beauty and fineness, are preferred by the people to lie upon, on account of their being both cheaper and softer. There are also at Algiers looms for velvet, taffaties, and other wrought silks; and a coarse sort of linen is likewise made in most parts of the kingdom. The country furnishes no materials for ship-building: they have neither ropes, tar, sails, anchors, nor even iron. When they can procure enough of new wood to form the main timbers of a ship, they supply the rest from the materials of prizes which they go out to seize; and thus find the secret of producing new and swift-sailing vessels from the ruins of the old. Of all the states on the coast of Barbary, the Algerines are the strongest at sea, and furnish the greatest number of corsairs, and of course commit the greatest depredations on the seas.

The commerce of the American states hath lately suffered very considerably from the captures made by these corsairs, particularly those ships which visit the Mediterranean. They have in general vouchsafed to be at peace with the English and Dutch; but seem to have sworn eternal war against Spain, Italy, France, &c. whom they look upon to be the greatest enemies to the Mahometan name. "It is remarkable that these pirates," says the Abbé Raynal, "have in turn reduced the greatest powers of Europe to the disgrace of making them annual presents; which, under whatever name they are disguised, are in fact a tribute. They have sometimes, indeed, been punished and humbled, but their rapines have never been totally suppressed. To what people is reserved the glory of breaking those fetters which Africa is thus insensibly preparing for us, and of removing those terrors which are so formidable to navigation? No nation can attempt it alone; perhaps, if it did, the jealousy of the rest would throw secret obstacles in its way. This must therefore be the work of a general combination. All the maritime powers ought to concur in the execution of a design in which all are equally interested. These states, which every thing invites to mutual alliance, good-will, and defence,

fence, ought to be weary of the calamities which they reciprocally bring upon each other. After having so frequently formed leagues for their mutual destruction, let them at length take up arms for their general security: war would then, for once at least, become beneficial and just; and one may venture to assert that such a war would be of no long continuance, if it were conducted with skill and unanimity. Perhaps this most noble and the greatest of enterprises would cost Europe less blood and treasure than the most trivial of those quarrels with which it is continually agitated. The jealousy of the great maritime powers, who have constantly rejected all expedients for securing the navigation of Europe from the depredations of freebooters, hath been the chief cause of its continuance. The hope of checking the industry of every weak state, hath accustomed them to wish, that these piracies should continue, and hath even induced them to abet the plunderers. This is an enormity, the ignominy of which they would never have incurred if their discernment had been equal to their rapacity. All Christendom would certainly profit by this happy change, but the greatest advantages must infallibly accrue to the maritime states, in proportion to their power. Their situation, the safety of their navigation, the greatness of their capitals, and various other advantages which they possess, would secure them such superiority. However, if the reduction and subjection of these states would not become a source of happiness to those people as well as to ourselves; if we must keep up and perpetuate slavery and poverty amongst them; if fanaticism can still renew those detestable cruades, which philosophy, too late, has consigned to the indignation of all ages; if Africa must at length become the scene of our cruelties, as Asia and America have been, and still are, may the project which humanity hath dictated be buried in perpetual oblivion! It is indifferent whether they be Christians or Mussulmans who suffer: man is the only object worthy to interest man." *Hist. Pol. liv. xi.*

ALGIERS, the capital of the above kingdom, is probably the ancient *Icosium*: by the Arabians called *Algezair*, or rather *Al-Jezier*, or *Al-Jezerah*, i. e. *the island*, because there was an island before the city, to which it hath been since joined by a mole. It is built on the declivity of a hill by the sea-side, in the form of an amphitheatre. The tops of the houses are quite flat and white; and one house rises above another in such a manner, that they do not hinder each other's prospect. The streets are so narrow, that they will scarcely admit three persons to walk abreast, and the middle part is lower than the sides. When any loaded beasts, such as camels, horses, mules, or asses, pass along, you are forced to stand up close to the wall to let them pass by. There is but one broad street, which runs through the city from east to west, in which are the shops of the principal merchants, and the market for corn and other commodities. The lower part of the walls of the city are of hewn stone, and the upper part of brick; they are thirty feet high on the land side, and forty towards the sea; the fosses or ditches are twenty feet broad and seven deep. There is no sweet water in the city; and, though there is a tank or cistern in every house, yet they often want water, because it rains but seldom: the chief supply is from a spring on a hill, the water of which is conveyed by pipes to above a hundred fountains, at which a bowl is fastened for the use of passengers. The common reservoir is at the end of the mole, where the ships take in their water. Every one takes his turn at these places, except the Turks, who are first, and the Jews last. There are five gates, which are open from sun-rising till sun-setting; and seven forts or castles without the walls, the greatest of which is on the mole without the gate, all of which are well supplied with cannon. There are 107 mosques, three colleges or public schools, and a great number of petty ones for children. The houses, of which there are about 15,000, are square, and built of stone and brick, with a square court in the middle, and galleries all round. There are said to be about 120,000 inhabitants

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in the city, comprehending 5000 Jewish families, besides Christians. There are four fundics or public inns, such as are in Turkey; and, six cazernes or barracks, for the unmarried Turkish soldiers, which will hold 600 each. There are no inns for Christians to lodge at; but only a few tipping huts kept by slaves, for the accommodation of Greeks and the poorer sort of travellers, where any thing may be had for money. Here are bagnios or public baths, in the same manner as in Turkey, at a very moderate rate. The women have baths of their own, where the men dare not come. Without the city there are a great number of sepulchres, as also cells or chapels, dedicated to marabouts or reputed saints, which the women go to visit every Friday. The Turkish soldiers are great tyrants; for, they not only turn others out of the way in the streets, but will go to the farm-houses in the country for twenty days together, living on free quarters, and making use of every thing, not excepting the women. The Algerines eat, as in Turkey, sitting cross-legged round a table about four inches high, and use neither knives nor forks. Before they begin, every one says *Be isme Allah*, "In the name of God." When they have done, a slave pours water on all their hands as they sit, and then they wash their mouths. Their drink is water, sherbet, and coffee. Wine is not allowed, though drunk immoderately by some. The prospect of the country and sea from Algiers is very beautiful; but the city, though for several ages it has braved some of the greatest powers in Christendom, it is said, could make but a faint defence against a regular siege. The mole of the harbour is 500 paces in length, extending from the continent to a small island where there is a castle and large battery. Lat. 36. 40. N. lon. 3. 30. E.

AL'GOL, *f.* a fixed star of the third magnitude, called *Medusa's Head*, in the constellation Perseus; its longitude is $21^{\circ} 50' 42''$ of Taurus, and its latitude $23^{\circ} 23' 47''$ north; according to Flamsteed's catalogue.

ALGON'QUINS, a nation in North America, who formerly possessed great tracts of land along the north shore of the river St. Lawrence. For a long time they were in alliance with the Iroquois; but, in consequence of some disputes about the right of hunting, the Iroquois attacked the Algonquins with such diabolical fury, as shewed they could be satisfied with nothing less than the extermination of the whole race; which, had it not been for the interposition of the French, they would have accomplished. The few Algonquin nations that are now to be seen, seem entirely ignorant of agriculture, and subsist by fishing and hunting. They allow themselves a plurality of wives; notwithstanding which, they daily decrease in populousness, few or none of their nations containing above 6000 souls, and many of them not 2000. Their language is one of the three radical ones in North America, being understood from the river St. Lawrence to that of the Mississippi.

AL'GOR, *f.* [Lat.] with physicians, an unusual coldness in any part of the body. It is also used for extreme cold; chiliness.

ALGORAB, *f.* a fixed star of the third magnitude, in the right wing of the constellation Corvus.

AL'GORISM, or AL'GORITHM, *f.* [Arab.] is similar to LOGISTICS, signifying the art of computing in any particular way, or about some particular subject; or the common rules of computing in any art. As the *algorithm* of numbers, of algebra, of integers, of fractions, of surds, &c. meaning the common rules for performing the operations of arithmetic, or algebra, or fractions, &c.

ALGO'SE, *adj.* [from *algor*, Lat.] Extremely cold; chill.

ALGUAZIL, *f.* in the Spanish polity, an officer whose business it is to see the decrees of a judge executed.

ALHA'GI, *f.* in botany, the trivial name of a species of hedyarum. See HEDYSARUM.

ALHA'MA, a pleasant town of the kingdom of Granada, in Spain, situated in the midst of some craggy mountains,

tains, about twenty-five miles south-west of Granada, on the banks of the Rio Frio, in lat. 36. 59. N. lon. 1. 10. W. and is famous for its warm baths. It was taken from the Moors in 1481. The inhabitants, though surprised, and the town without a garrison, made a gallant defence: but, being at length forced to submit, the place was abandoned to the pillage of the Christian soldiers; who, not satisfied with an immense quantity of gold and jewels, made slaves of upwards of 3000 of the inhabitants.

ALHAMBRA, the ancient fortress and residence of the Moorish monarchs of Grenada. It derives its name from the red colour of the materials with which it was originally built, Alhambra signifying a red house. It appears to a traveller a huge heap of irregular buildings, all huddled together, seemingly without the least intention of forming one habitation. The walls are entirely unornamented, of gravel and pebbles, daubed over with plaster by a very coarse hand: yet this is the palace of the Moorish kings of Granada, indisputably the most curious place internally, that exists in Spain, perhaps in the world.

"On my first visit," says Mr. Swinburne, "I confess I was struck with amazement, as I stepped over the threshold, to find myself on a sudden transported into a species of fairy land. The first place you enter is the court called the *communa* or *del mesucar*, that is, the *common baths*; an oblong square, with a deep basin of clear water in the middle; two flights of marble steps leading down to the bottom; on each side a parterre of flowers, and a row of orange-trees. Round the court runs a peristyle paved with marble; the arches bear upon very light pillars, in proportions and style different from all the regular orders of architecture. The ceilings and walls are incrustated with fret-work in stucco, so minute and intricate, that the most patient draughtsman would find it difficult to follow it, unless he made himself master of the general plan. In every division are Arabic sentences of different lengths, most of them expressive of the following meanings: "There is no conqueror but God;" or, "Obedience and honour to our Lord Abouabdoulah." The ceilings are gilt or painted, and time has caused but little diminution in the freshness of their colours, though constantly exposed to the air. The lower part of the walls is mosaic, disposed in fantastic knots and festoons. The porches at the ends are more like grotto-work than any thing else to which they can be compared. That on the right hand opens into an octagon vault, and forms a perfect whispering gallery, meant to be a communication between the offices of the houses.

"Opposite to the door of the *communa* through which you enter, is another leading into the *quarto de los leones*, or, apartment of the lions; which is an oblong court, 100 feet in length and fifty in breadth, environed with a colonnade seven feet broad on the sides and ten at the end. Two porticos or cabinets about fifteen feet square, project into the court at the two extremities. The square is paved with coloured tiles; the colonnade with white marble. The walls are covered five feet up from the ground with blue and yellow tiles, disposed chequerwise. Above and below is a border of small escutcheons, enamelled blue and gold, with an Arabic motto on a bend, signifying, "No conqueror but God." The columns that support the roof and gallery are of white marble, very slender, and fantastically adorned. They are nine feet high, including base and capital, and eight inches and a half diameter. They are very irregularly placed; sometimes singly, at others in groups of three, but more frequently two together. The width of the horse-shoe arches above them is four feet two inches for the large ones, and three for the smaller. The ceiling of the portico is finished in a much finer and more complicated manner than that of the *communa*, and the stucco laid on the walls with inimitable delicacy; in the ceiling it is so artfully frosted and handled as to exceed belief. The capitals are of various designs, though each design is repeated several times

in the circumference of the court, but not the least attention has been paid to placing them regularly or opposite to each other. Not the smallest representation of animal life can be discovered amidst the varieties of foliage, grotesques, and strange ornaments. About each arch is a large square of arabesques, surrounded with a rim of characters, that are generally quotations from the Koran. Over the pillars is another square of delightful filligree work. Higher up is a wooden rim, or kind of cornice, as much enriched with carving as the stucco that covers the part underneath. Over this projects a roof of red tiles, the only thing that disfigures this beautiful square. This ugly covering is modern, put on by order of Mr. Wall, the late prime minister, who a few years ago gave the Alhambra a thorough repair. In Moorish times, the building was covered with large painted and glazed tiles, of which some few are still to be seen. In the centre of the court are twelve ill-made lions muzzled, their fore parts smooth, their hind parts rough, which bear upon their backs an enormous basin, out of which a lesser rises. While the pipes were kept in good order, a great volume of water was thrown up, that, falling down into the basins, passed through the basins, and issued out of their mouths into a large reservoir, where it communicated by channels with the jet d'eau in the apartments. This fountain is of white marble, embellished with many festoons and Arabic distichs, thus translated:

"Seest thou not how the water flows copiously like the Nile?"

"This resembles a sea washing over its shores, threatening shipwreck to the mariner."

"This water runs abundantly to give drink to the lions."

"Terrible as the lion is our king in the day of battle."

"The Nile gives glory to the king, and the lofty mountains proclaim it."

"This garden is fertile in delights: God takes care that no noxious animal shall approach it."

"The fair princess that walks in this garden, covered with pearls, augments its beauty so much, that thou may'st doubt whether it be a fountain that flows, or the tears of her admirers."

"Passing along the colonnade, and keeping on the south side, you come to a circular room used by the men as a place for drinking coffee and sorbets in. A fountain in the middle refreshed the apartment in summer. The form of this hall, the elegance of its cupola, the cheerful distribution of light from above, and the exquisite manner in which the stucco is designed, painted, and finished, exceed all powers of description. Every thing in it inspires the most pleasing, voluptuous, ideas; yet in this sweet retreat they pretend that Abouabdoulah assembled the Abencerrages, and caused their heads to be struck off into the fountain. Continuing your walk round, you are next brought to a couple of rooms at the head of the court, which are supposed to have been tribunals or audience-chambers.

"Opposite to the *Sala de los Abencerrages* is the entrance into the *Torre de las dos hermanas*, or the tower of the two sisters; so named from two very beautiful pieces of marble laid in the pavement. This gate exceeds all the rest in profusion of ornaments, and in beauty of prospect which it affords through a range of apartments, where a multitude of arches terminate in a large window open to the country. In a gleam of sunshine, the variety of tints and lights thrown upon this enfleade are uncommonly rich. The first hall is the concert-room, where the women sat; the musicians played above in four balconies. In the middle is a jet d'eau. The marble pavement is equal to the finest existing, for the size of the slabs and evenness of the colour. The two sisters, which give name to the room, are slabs that measure fifteen feet by seven and a half, without flaw or stain. The walls, up to a certain height, are mosaic, and above are divided into very neat compartments of stucco, all of one design, which is also followed

lowed in many of the adjacent halls and galleries. The ceiling is a fretted cove. To preserve this vaulted roof, as well as some of the other principal cupolas, the outward walls of the towers are raised ten feet above the top of the dome, and support another roof over all, by which means no damage can ever be caused by wet weather or excessive heat and cold. From this hall you pass round the little myrtle-garden of Lindaraxa, into an additional building made to the east end by Charles V. The rooms are small and low. His dear motto, *Plus outré*, appears on every beam. This leads to a little tower, projecting from the line of the north wall, called *El tocador*, or the dressing-room of the sultana. It is a small square cabinet, in the middle of an open gallery, from which it receives light by a door and three windows. The look-out is charming. In one corner is a large marble slab, drilled full of holes, through which the smoke of perfumes ascended from furnaces below; and here, it is presumed, the Moorish queen was wont to sit to fumigate and sweeten her person. The emperor caused this pretty room to be painted with representations of his wars, and a great variety of grotesques, which appear to be copies, or at least imitations, of those in the loggie of the Vatican. From hence you go through a long passage to the hall of ambassadors, which is magnificently decorated with innumerable varieties of mosaics, and the mottoes of all the kings of Granada. This long narrow antichamber opens into the communica on the left hand, and on the right into the great audience-hall in the tower of Comares; a noble apartment, thirty-six feet square, thirty-six high up to the cornice, and eighteen from thence to the centre of the cupola. The walls on three sides are fifteen feet thick, on the other nine; the lower range of windows thirteen feet high. The whole wall is inlaid with mosaic of many colours, disposed in intricate knots, stars, and other figures. In every part various Arabic sentences are repeated.

"The most remarkable room below is the king's bed-chamber, which communicated, by means of a gallery, with the upper story. The beds were placed in two alcoves, upon a raised pavement of blue and white tiles; but as it was repaired by Philip V. who passed some time here, it cannot be said how it may have been in former times. A fountain played in the middle, to refresh the apartment in hot weather. Behind the alcoves are small doors, that conduct you to the royal baths. These consist of one small closet with marble cisterns for washing children, two rooms for grown-up persons, and vaults for boilers and furnaces that supplied the baths with water and the stoves with vapours. The troughs are formed of large slabs of white marble; the walls are beautified with party-coloured earthen-ware; light is admitted by holes in the coved-ceiling. Adjoining is a whispering gallery, and a kind of labyrinth, said to have been made for the diversion of the women and children. One of the passages of communication is fenced off with a strong iron grate, and called "the prison of the sultana;" but it seems more probable that it was put up to prevent any body from climbing into the women's apartments.

"Under the council-room is a long slip called "the king's study;" and adjoining to it are several vaults, said to be the place of burial of the royal family. In the year 1574, four sepulchres were opened; but, as they contained nothing but bones and ashes, were immediately closed again.

"This description of the Alhambra may be finished by observing how admirably every thing was planned and calculated for rendering this palace the most voluptuous of all retirements; what plentiful supplies of water were brought to refresh it in the hot months of summer; what a free circulation of air was contrived, by the judicious disposition of doors and windows; what shady gardens of aromatic trees; what noble views over the beautiful hills and fertile plains! No wonder the Moors regretted Granada; no wonder they still offer up prayers to God every Friday for the recovery of this city, which they esteem a terrestrial paradise." See GRANADA.

ALHA'ZEN, ALLA'ZEN, or ABDI'LAZUM, was a learned Arabian, who lived in Spain about the year 1100. He wrote upon Astrology; and his work upon Optics was printed, in Latin, at Basil, in 1572, under the title of *Optice Theaurus*, by Risner. Alhazen was the first who shewed the importance of refractions in astronomy, so little known to the ancients. He is also the first author who has treated on the twilight, in which he also speaks of the height of the clouds.

ALHEN'NA, *f.* in botany. See LAWSONIA.

ALI gives the denomination to a sect among the Mahometans, who adhere to the right of succession of Ali the fourth khalif or successor of Mahomet, and to the reform of Mussulmanism introduced by him. The sectaries of Ali are more particularly called *Schites*, and stand opposed to *Sunnites*, or sect of Omar, who adhere to the law as left by Mahomet, Abubeker, and Omar. Ali was cousin of Mahomet, and son-in-law of that prophet, having married his daughter Fatimah. After Mahomet's death, great disputes arose about the succession. Many stood for Ali; but Abubeker was preferred, and elected the first khalif. Ali took his turn, after the death of Othman. The Persians are the chief adherents to the sect of Ali, whom they hold to have been the legitimate successor of Mahomet, and Abubeker an usurper. On the contrary, the Turks are of the sect of Omar; and hold Ali in execration, having raised a furious civil war among the Mussulmans. The distinguishing badge of the followers of Ali is a red turban, which is worn by the Persians, who are hence called in derision, by the Turks, *Kiflachi*, *q:d.* "red heads." Ali is reputed the author of several works, particularly a *Centiloquium*, in great esteem among the Arabs and Persians, part of which has been published in English by Mr. Ockley.

ALI (Hyder). See HYDER ALI.

ALI BEY was born in Natolia, in 1728, and received at his birth the name of Joseph. His father was a Greek priest, of a distinguished family, who educated him with great care. At thirteen years of age, Joseph being hunting in a neighbouring forest, he was fallen upon by robbers, and carried off to Grand Cairo: here he was sold to Ibrahim, a lieutenant of the janissaries, who had him circumcised, clothed him in the dress of the Mamalouks, and called him Ali: he gave him masters in the Turkish and Arabic languages, and in horsemanship; and, by kind treatment, made him satisfied with his new station. In a course of years, he succeeded in these languages, shewed wonderful dexterity in the use of arms, and became so dear to his master, that he raised him rapidly in his household, and created him a *cachev*, or governor, at the age of twenty-two. In this station, he manifested his equity and good administration of justice, improved the discipline of the Mamalouks, and laid the foundation of his future greatness. But, a false accusation having been made against him to the Grand Signior, he was proscribed, and his head was ordered to be sent to Constantinople. Being fortunately apprised of the design, he seized and put to death the messenger who brought the order, and was soon enabled to put himself at the head of an army. Taking advantage of the distressful and dangerous situation to which the Turkish empire was reduced, in consequence of the war with Russia, he boldly mounted the throne of the ancient sultans of Egypt. But, not content with the kingdom of Egypt, he also laid claim to Syria, Palestine, and that part of Arabia which had belonged to the ancient sultans. He marched at the head of his troops to support these pretensions, and actually subdued some of the neighbouring provinces both of Arabia and Syria. At the same time that he was engaged in these great enterprizes, he was not less attentive to the establishing of a regular form of government, and introducing order into a country that had been long the seat of anarchy and confusion. His views were equally extended to commerce; for which purpose he gave great encouragement to the Christian traders, and took off some shameful restraints and indignities

ties to which they were subjected in that barbarous country. He also wrote a letter to the republic of Venice, with the greatest assurances of his friendship, and that their merchants should meet with every degree of protection and safety. His great design was said to be, to make himself master of the Red Sea; to open the port of Suez to all nations, but particularly to the Europeans, and to render Egypt once more the great centre of commerce. The conduct and views of Ali Bey shewed an extent of thought and ability that indicated nothing of the barbarian, and bespoke a mind equal to the founding of an empire: but he was not finally successful. He was, however, for some time extremely fortunate; he assumed the titles and state of the ancient sultans of Egypt, and was ably supported by Sheick Daher, and some other Arabian princes, who warmly espoused his interests. He also succeeded in almost all his enterprises against the neighbouring Asiatic governors and bashaws, whom he repeatedly defeated; but he was afterwards deprived of the kingdom of Egypt by the base and ungrateful conduct of his brother-in-law, Mahomed Bey Aboudaah, his troops being totally defeated on the 7th of March, 1773, and himself wounded and taken prisoner. He died of his wounds, in the forty-fifth year of his age, and was buried at Grand Cairo.

ALJAMEIA, a name which the Moriscoes in Spain give to the language of the Spaniards. Among other articles agreed on by the junto, which was appointed by the emperor Charles V. in 1526, this was one, That the Moriscoes should no longer speak *Algavareia*, i. e. "Moorish or Arabic;" but should all speak *Aljameia*, i. e. "Spanish," as it was called by the Moors, and all their writings and contracts should be in that language.

A'LIAS, *adv.* A Latin word signifying *otherwise*.—In law, it is a second or further writ, after a former writ has been sued out without effect: "We command you as we formerly have commanded you," *sicut alias præcipimus*.

ALIAS DICTUS is used in the description of a defendant, where his true name is not certainly known.

A'LIBI, *adv.* [Lat.] In law, denotes the absence of the accused from the place where he is charged with having committed a crime; or his being *elsewhere*, as the word imports, at the time specified.

A'LIBLE, *adj.* [*alibilis*, Lat.] Nutritive; nourishing; or that which may be nourished.

A'LICANT, a large sea-port town in the province of Valencia and territory of Segura. It is seated between the mountains and the sea, and the port is defended by three bastions furnished with artillery. To prevent the visits of the Algerine pirates, watch-towers were built to give notice of the approach of an enemy's ship. It was taken by the English in 1706, and held out a siege of two years before it was retaken by the French and Spaniards.

It was garrisoned by only two regiments, under the command of major-general Richards. The city held out for a considerable time against a large train of heavy artillery, which was well served, but at length the garrison was compelled to retire into the castle, which had been deemed impregnable, until the bravery of English sailors mastered it in the year 1706. Here they sunk three cisterns, and then, with incredible labour, filled them with water. The French carried on the siege with vigour, but found it impossible to make any impression on a place which both art and nature had joined in securing. Still however determined not to relinquish their design, they resolved to attempt mining through the solid rock, in order at once to blow up the castle and garrison into the air. The besieged were not at all alarmed at this undertaking, which they considered as utterly impracticable. It even supplied them with fresh hopes, as they believed it would retard the operations of the siege until a British fleet should arrive to their succour. Encouraged by these prospects, they bestirred themselves in annoying the workmen, and retarding their progress. The besiegers however wrought incessantly, and in three months such a fissure was made in the rock as their most experienced en-

gineers pronounced equal to the tremendous purpose for which it had been hewn. One thousand five hundred barrels of powder were deposited therein, together with beams, iron bars, and crows, which, by stopping the expansion of the powder when fired, might render the concussion more violent. On the 20th of March, 1709, the garrison was summoned to surrender, and the most solemn assurances given them of being safely escorted to Barcelona, and their baggage and effects secured to them, if they surrendered in three days; the ruin that awaited them in case of an obstinate rejection of the terms proposed was likewise represented in all its force.

A general council of war was now called, to deliberate on the proper step to be taken at this crisis of their fate; and they unanimously resolved to commit themselves to the providence of God, and defend the place. This resolution was communicated to the French commander, who two nights after again sent a flag, and endeavoured to divert the English from their desperate purpose, offering the same honourable terms of capitulation as had been before tendered: but all in vain. The third night approached, when the French sent their third and last summons, and with it an assurance, that their mine was primed, and should be sprung by six o'clock the next morning. They remonstrated against the fatal obstinacy which caused them wilfully to seek their own destruction; still offering them the former terms of surrender: but nothing could shake the steady purpose of these determined men. At five o'clock the next morning, as a prelude to this direful stroke, all the inhabitants of that quarter were ordered to quit their habitations. The besieged during the night had kept a general guard, and employed the time in religious exercises. Major-general Richards, colonel Sibourg, and lieutenant-colonel Thornicroft of Sir Charles Hotham's regiment, sat together in the governor's usual lodging-room; other officers cantoned themselves as their tempers inclined, to pass the dreary and prefiging night.

At length, day appearing, the inhabitants were seen flying in crowds to the westernmost part of the town. The general, attended by the principal officers, went to the west battery, to gain fuller information. After he had remained there about a quarter of an hour, lieutenant-colonel Thornicroft desired him to remove from so dangerous a spot; but he and colonel Sibourg both answered, that no danger was to be apprehended there, more than in any other place; and that there they would wait the event. The lieutenant-colonel, resolving to share the fate of his superiors, continued with them, as did other officers from the same motive: but the hour of five being now considerably past, the corporal's guard cried out, that the train was fired, observing some smoke from the lighted matches, and other combustible matter near it, from whence the flame ascended to the centinels above. The general and field officers were then urged to retreat, but refused. The mine at last blew up; the rock opened and shut; the whole mountain felt the convulsion; the general and field officers with their company, ten guns, and two mortars, were buried in the abyss; the walls of the castle shook, part of the great cistern fell, another cistern almost closed, and the rock shut a man to his neck in its cleft, who lived many hours in that agonizing posture. About thirty-six centinels, and women, were swallowed up in different quarters, whose dying groans were heard, some of them four days after the melancholy catastrophe. Many houses of the town were overwhelmed in their ruins, and the castle suffered greatly; but was saved from total destruction by the vent which the explosion forced through the veins of the rock. After the loss of major-general Richards, the command devolved on lieutenant-colonel Dalbecaume, of Sibourg's regiment, who drew out a detachment of the whole garrison, and with it made a desperate sally, to shew that they were not appalled by this convulsive shock. The bombs from the castle played on the town more violently, and the shot galled every corner of their streets;

streets; this vigorous defence was maintained till the arrival of the British fleet, a month afterwards, under the command of Sir George Byng; his ships were, the *Defiance*, *Northumberland*, *Essex*, *York*, and *Dunkirk*. The last went within the line in three fathoms and a half, as drawing less water than the others; then, laying her broadside to the east part of the town, began to cannonade; but, the wind being fresh, and a great swell rolling in from the eastward, the large ships were obliged to weigh their anchors, and get out of cannon-shot. The *Dunkirk*, having much of her rigging damaged, and her small bow-er cut, lay exposed for some time to the shot, bombs, and carcasses, of the enemy; but at length got off. The weather continuing very bad, and general Stanhope, who was on-board the fleet, finding the enemy increase considerably in strength, and supposing the garrison by this time to be driven to great extremities, sent a flag of truce to chevalier d'Asfeldt, the Spanish commander, with proposals for surrendering the castle, which were agreed to, and the garrison, marching out with the honours of war, embarked on-board the fleet. No troops ever displayed a more inflexible firmness, and, although the event was fatal to the principal officers, yet the garrison in general, after enduring all these perils, instead of surrendering prisoners of war, only evacuated the place.

A great trade is carried on at *Alicant*, in wine and fruit. It is seated in the Mediterranean, on a bay of the same name, thirty-seven miles north-east of *Murcia*, and seventy-five south of *Valencia*. Lat. 38. 24. N. lon. 0. 36. W.

ALICA'TA, a mountain of Sicily, near the valleys *Mazara* and *Noto*, upon which was situated, as is generally thought, the famous *Dædalion*, where the tyrant *Phalaris* kept his brazen bull.

ALICATA, a town of Sicily, remarkable for corn and wine. It was plundered by the Turks in 1543, and is seated on a fort of peninsula near the sea, twenty-two miles S. E. of *Girgenti*. Lat. 37. 11. N. lon. 15. 20. E.

ALICATA CHLAMYS, was a sort of vest with sleeves, worn by the Roman boys till the age of thirteen, at which time they put on the *prætexta*.

AL'ICE, [*adeliza*, Lat. of *adel*, Teut. of *æthel*, Sax. noble.] A proper name of women. This name in Teutonic is *Adelheit*, which last syllable is the termination of many substantives, where the English use *ess* or *ness*; thus, *Adelheit* signifies nobleness.

AL'IDADE, *f.* an Arabic name for the label, index, or ruler, which is moveable about the centre of an astrolabe, quadrant, &c. and carrying the sights or telescope, and by which are shewn the degrees cut off the limb or arch of the instrument.

A'LIEN, *f.* [*alienus*, Lat.] In law, is one that is born out of the dominions of the crown of England. 1 *Blackst.* 366. But children of the king's ambassadors born abroad have always been held to be natural subjects. *Id.* 373. An alien born may purchase lands or other estates, but not for his own use; for the king, upon such purchase, is entitled to them. *Id.* 371.

But an alien may acquire a property in goods, money, and other personal estate, or may hire a house for his habitation.

Also aliens may trade as freely as other people; only they are subject to certain higher duties at the custom-house; which is what is now called the alien's duty; to be exempted from which, is one principal cause of the frequent applications to parliament for acts of naturalization. *Id.* 316. An alien may bring an action concerning personal property, and may make a will and dispose of his personal estate. *Id.* 372.

By several acts of parliament, all children born out of the king's allegiance, whose fathers (or grandfathers by the father's side) were natural born subjects, are now deemed to be natural born subjects themselves to all intents and purposes; unless such ancestors were attainted, or banished beyond sea for high treason; yet so as that the grand-

children of such ancestors shall not be privileged in respect of the alien's duty, except they be Protestants, and actually reside within the realm; nor shall be able to claim any interest, unless the claim be made within five years after the same shall accrue. *Id.* 373. If an Englishman living beyond sea marries a wife there, and has a child by her, and dies; this child is born a denizen, and shall be heir to him, notwithstanding that the wife was an alien. *Cro. Cha.* 601.

Aliens can have no heirs, because they have not in them any inheritable blood. 2 *Blackst.* 249. If an alien be made a denizen by the king's letters patent, and then purchases lands, his son, born before his denization, shall not inherit those lands; but a son born afterwards may, even tho' his elder brother be living; for the father, before denization, had no inheritable blood to communicate to his eldest son; but by denization it acquires an hereditary quality, which will be transmitted to his subsequent posterity. Yet, if he had been naturalized by act of parliament, such eldest son might then have inherited; for that cancels all defects, and is allowed to have a retrospective energy, which simple denization hath not. *Ibid.* The necessity of trade, however, has mollified the too rigorous rules of the old law, in the restraint and discouragement of aliens. A Jew may bring an action, though heretofore he could not; but commerce has taught the world more humanity. And therefore it is held, that an alien enemy commorant here, by licence of the king, and under his protection, may maintain an action of debt upon a bond, even though he did not come with a safe conduct. *L. Raym.* 282. 1 *Atk.* 43.

On a bill in chancery, brought for an account against the representatives of an East-India governor, who pleaded that the plaintiff was an alien born, and an alien infidel, and therefore could have no suit here; lord Hardwicke said, as the plaintiff's was a mere personal demand, it was extremely clear that he might bring a bill in this court, and over-ruled the defendant's plea, without hearing counsel of either side. 1 *Atk.* 51.

An alien enemy, who was the captain of a French privateer, took an English ship, upon the high seas, in time of open war; and ranfomed the ship and cargo; and had the mate given to him as an hostage; which hostage died in prison. The ransom bill was signed by both captains; and by the hostage; and by it the captain obliges himself and his owners to pay to the French captain the ransom money within two months. By the court: An action is maintainable by the French captain against the English captain upon this ransom bill; notwithstanding the death of the hostage, and notwithstanding the plaintiff's being an alien enemy. And the like law prevailed both in France and Holland. *Burr. Mansf.* 1741.

An alien whose sovereign is in amity with the crown of England, residing here, and receiving the protection of the law, owes a local allegiance to the crown during the time of his residence; and if, during that time, he commits an offence, he shall be liable to be punished for the same, even as a natural born subject. For his person and personal estate are as much under the protection of the law as the natural born subject's; and, if he is injured in either, he has the same remedy at law for such injury. *Foss.* 185. So also, an alien whose sovereign is at enmity with us, living here under the king's protection, committing offences, may be proceeded against in like manner; for he oweth a temporary local allegiance. *Id.*

ALIEN-DUTY, an impost laid on all goods imported by aliens, over and above the customs paid for such goods imported by British, and on British bottoms.

ALIENS-DUTY, is otherwise called *petty customs*, and *navigation-duty*. Fish dried or salted, and cod-fish or herring not caught in British vessels and cured by British, pay a double aliens-duty. See *DUTY*.

ALIEN-PRIORIES, a kind of inferior monasteries, formerly very numerous in England, and so called from their belonging to foreign abbeys.

To ALIEN, *v. a.* [*aliener*, Fr. *alieno*, Lat.] To make any thing the property of another. To estrange; to turn the mind or affection; to make averfe: with *from*.—The king was disquieted, when he found that the prince was totally aliened from all thoughts of marriage. *Clarendon*.

A'L IENABLE, *adj.* That of which the property may be transferred.—Land is *alienable*, and treasure is transitory, and both must pass from him, by his own voluntary act, or by the violence of others, or at least by fate. *Dennis*.

To A'L IENATE, *v. a.* [*aliener*, Fr. *alieno*, Lat.] To transfer the property of any thing to another.—The countries of the Turks were once Christian, and members of the church, and where the golden candlesticks did stand, though now they be utterly alienated, and no Christians left. *Bacon*.—To withdraw the heart or affections: with the particle *from*, where the first possessor is mentioned.—The manner of men's writing must not alienate our hearts from the truth. *Hooker*.

ALIENATE, *adj.* [*alienatus*, Lat.] Withdrawn from; stranger to: with the particle *from*.—The whigs are damnable wicked; impatient for the death of the queen; ready to gratify their ambition and revenge by all desperate methods; wholly alienate from truth, law, religion, mercy, conscience, or honour. *Swift*.

ALIENATION, *f.* [*alienatio*, Lat.] The state of being alienated; as, The state was wasted during its alienation. Change of affection. Applied to the mind, it means disorder of the faculties.—Some things are done by man, though not through outward force and impulsion, though not against, yet without, their wills: as in alienation of mind, or any like inevitable utter absence of wit and judgment. *Hooker*.

ALIENATION, in law, is a transferring the property of any thing from one man to another. It chiefly relates to lands and tenements; as to aliene land in fee, is to sell the fee-simple thereof; to aliene in mortmain, is to make over lands or tenements to a charitable use. All persons who have a right to lands may, generally, aliene them to others. But some alienations are prohibited; as alienation by tenant for life, tenant for years, tenant in dower: if these aliene for a greater estate than they have in the lands, it is a forfeiture of their estate. 1 *Inst.* 251. Conditions in deeds that the purchaser shall not aliene, are void. But one may grant an estate in fee, on condition that the grantee shall not aliene to a particular person. Also estates in tail, for life, or years, where the whole interest is not parted with, may be made with condition not to aliene to others, for preservation of the reversion. *Lit.* 361. By the 12th Car. II. c. 24. all fines for alienation are taken away, except fines due by the customs of particular manors.

ALIENATION-OFFICE, is an office to which all writs of covenants and entry, upon which fines are levied, and recoveries suffered, are carried, to have fines for alienation set and paid thereon.

ALIENILOQUY, *f.* [*alieniloquium*, of *alienus*, foreign, and *loquor*, Lat. to speak.] A talking wide from the purpose, or not to the matter in hand.

ALIFEROUS, *adj.* [*alifer*, Lat. of *ala*, a wing, and *fero*, to bear.] Bearing or having wings.

ALIGEROUS, *adj.* [*aliger*, Lat. of *ala*, a wing, and *gero*, to carry.] Bearing, carrying, or having, wings.

To ALIGGE, *f.* [from *a*, and *lig*, to lie down.] To lay; to allay; to throw down; to subdue. An old word even in the time of Spencer, now wholly forgotten.

To ALIGHT, *v. n.* [*alightan*, Sax. *af-lichten*, Du.] To come down, and stop. The word implies the idea of descending; as, of a bird from the wing; a traveller from his horse or carriage; and generally of resting or stopping. It is used also of any thing thrown or falling; to fall upon:

But storms of stones from the proud temple's height
Four down, and on our batter'd helms alight. *Dryden*.

ALIKE, *adv.* [from *a* and *like*.] With resemblance; without difference; in the same manner; in the same form. In some expressions it has the appearance of an adjective,

but is always an adverb.—The darkness hideth not from thee; but the night shineth as the day: the darkness and the light are both alike to thee. *Psalms*, cxxxix. 12.

Riches cannot rescue from the grave,
Which claims alike the monarch and the slave. *Dryden*.

A'L IMA, *f.* [of *a*, and *limos*, Gr. hunger.] Medicines which either prevent or assuage hunger.

A'L IMENT, *f.* [*alimentum*, Lat.] Nourishment; that which nourishes; nutriment; food.—All bodies which, by the animal faculties, can be changed into the fluids and solids of our bodies, are called *aliments*. In the largest sense, by *aliment*, I understand every thing which a human creature takes in common diet; as meat, drink; and seasoning, as salt, spice, vinegar. *Arbuthnot*.

By the process of digestion is prepared a very mild, sweet, and whitish, liquor, resembling milk, and distinguished by the name of *chyle*; which being absorbed by the lacteal veins, by them conveyed into the circulation, and there assimilated into the nature of blood, affords that supply of nutrition, which the continual waste of the body is found to require. Next to air, food is the most necessary thing for the preservation of our bodies: and, as on the choice thereof our health greatly depends, it is of great importance to understand, in general, what is the properest for our nourishment; and, in particular deviations from health, what is the best adapted to restore us. Our blood and juices naturally incline to become putrid and acrimonious: fresh chyle, duly received, prevents this destructive tendency, and preserves in them that mild state which alone consists with health. An animal diet affords the most of this bland nutritious mucilage; watery fluids dilute the too gross parts, and carry off what is become unfit for use. It is only the small portion of jelly which is separated from the farinaceous parts of vegetables, that, after being much elaborated, is converted into the animal nature; yet the use of vegetables prevents both repletion and a too great tendency to a putrescent acrimony of the blood. In hot climates, as well as against the constitutional heat of particular persons, vegetables are demanded in the largest portion; animal substances afford the highest relish while our appetite continues; but will sate the appetite before the stomach is duly filled. Vegetables may be eaten after either flesh or fish: few herbs or fruits satiate so much as that the stomach may not be filled with them, when it is already satisfied with flesh or fish; whence it may be observed, that no diet which is very nourishing can be eaten to fulness, because its nutritious parts are oily and satiating. Health depends almost wholly on a proper crisis of the blood; and, to preserve this, a mixture of vegetables in some degree is always required, for a loathing is soon the consequence of animal food alone: hot acrid habits, too, receive from milk and vegetables the needful for correcting their excesses; but in cold, pituitous, and nervous, habits, who want most nourishment from least digestion, and from the smallest quantity of food, animal diet is to be used more freely.

Thus much being obvious with respect to the matter and quality of our aliment, the valetudinarian may easily regulate his diet with some advantage to himself by an attention to the few ensuing particulars. In winter, eat freely, but drink sparingly: roast meat is to be preferred, and what is drunk should be stronger than at other seasons. In summer, let thirst determine the quantity to be drunk; cold stomachs never require much: boiled meats and vegetables, if not otherwise contradicted, may now be more freely used. Lax habits require the winter's diet to be continued all the year, and rigid ones should be confined to that of summer. Fat people should fast at times, but the lean should never do so. Those who are troubled with eruptions occasioned by their food should drink but little, and use some unaccustomed exercise. The thirsty should drink freely, but eat sparingly. In general, let moderation be observed; and, though no dinner hath been had, a light supper is at all times to be preferred. After very high-

high-seasoned meats, a glass of water acidulated with the acid elixir of vitriol, or in very weak stomachs the sweet elixir of vitriol, is far more assiduous to the work of digestion than the common method of taking brandy. See **FOOD** and **DRINK**.

ALIMENTAL, *adj.* That which has the quality of aliment; that which nourishes; that which feeds.

ALIMENTALLY, *adv.* So as to serve for nourishment.—The substance of gold is invincible by the power-fullest heat, and that not only *alimentally* in a substantial mutation, but also mendicamentally in any corporeal conversion. *Brown*.

ALIMENTARINESS, *f.* The quality of being alimentary, or of affording nourishment.

ALIMENTARY, *adj.* That which belongs or relates to aliment. That which has the quality of aliment, or the power of nourishing.—I do not think that water supplies animals, or even plants, with nourishment, but serves for a vehicle to the *alimentary* particles, to convey and distribute them to the several parts of the body. *Ray*.—Of *alimentary* roots, some are pulpy and very nutritious; as, turnips and carrots. These have a fattening quality. *Arbutnot*.

ALIMENTA'RII PUERI, &c. were certain children maintained and educated by the munificence of the emperors, in a sort of public places not unlike our hospitals.—Trajan was the first that brought up any of these alimentary boys. He was imitated by Adrian. Antonius Pius did the same for a number of maids, at the solicitation of Faustina; and hence, in some medals of that empress, we read *PELLAE FAUSTINIANAE*.—Alexander Severus did the like at the request of Mammæa; and the maids thus educated were called *Mammæanae*.

ALIMENTARY DUCT or **CANAL**, is a name given by Dr. Tyson, and some others, to that part of the body through which the food passes from its reception into the mouth to its exit at the anus; including the gula, stomach, and intestines. See **ANATOMY**.

This duct has been said to be the true characteristic of an animal, or (in the jargon of the schools) *in proprium quarto modo*: there being no animal without it, and whatever has it being properly enough ranged under the class of animals. Plants receive their nourishment by the numerous fibres of their roots, but have no common receptacle for digesting the food received, or for carrying off the recrements. But in all, even the lowest degree of animal life, we may observe a stomach and intestines, even where we cannot perceive the least formation of any organ of the senses, unless that common one of feeling, as in oysters. *Phil. Trans. No. 269, p. 776, et seq.*

Dr. Wallis brings an argument from the structure of the alimentary tube in man, to prove that he is not naturally carnivorous; to which Dr. Tyson makes some objections. *V. Phil. Trans. No. 269, p. 777.*

ALIMENTARY LAW, [*lex alimentaria*, Lat.] was an old law among the Romans, whereby children were obliged to find sustenance for their parents.

ALIMENTATION, *f.* The power of affording aliment; the quality of nourishing. The state of being nourished by assimilation of matter received.—Plants do nourish; inanimate bodies do not: they have an accretion, but no *alimentation*. *Bacon*.

ALIMONIOUS, *adj.* That which nourishes: a word very little in use.—The plethora renders us lean, by suppressing our spirits, whereby they are incapacitated of digesting the *alimonious* humours into flesh. *Harvey*.

A'LIMONY, *f.* [*alimonia*, Lat.] in law, is that maintenance, which, after a divorce of husband and wife, *a mensa et thora*, the ecclesiastical judge allows to the woman out of her husband's estate. But in case of elopement, and living with an adulterer, the law allows her no alimony; for, as that amounts to a forfeiture of her dower after his death, it is also a sufficient reason why she should not be a partaker of his estate when living. *3 Black. 94.*

A'LINGRAHS, or **A'LINGSAHS**, an inland town of

West Gothland, in Sweden, where are silk, woollen, tobacco, and pipe, manufactories. Lat. 50. 20. N. lon. 13. 20. E.

A'LIPÉDE, [*alipes*, Lat. of *ales*, a bird, and *pes*, a foot.] Nimble, swift of foot.

ALIPILA'RIOUS, or **ALIPIL'US**, in Roman antiquity, a servant belonging to the baths, whose business it was, by means of waxen plasters, and an instrument called *vol-fella*, to take off the hairs from the arm-pits, arms, legs, &c. this being deemed a point of cleanliness.

ALIP'TERY, *f.* [*alipterium*, Lat. of *αλεπτέριον*, Gr.] A place belonging to, or an apartment in, baths, where persons were anointed.

A'LlQUANT, *adj.* [*aliquantus*, Lat.] *Aliquant Part*, is that part which will not exactly measure or divide the whole, without leaving some remainder. Or the *aliquant part* is such, as, being taken or repeated any number of times, does not make up the whole exactly, but is either greater or less than it. Thus 4 is an *aliquant part* of 10; for 4 twice taken makes 8, which is less than 10; and three times taken makes 12, which is greater than 10.

A'LlQUOT, *adj.* [*aliquot*, Lat.] *Aliquot Part*, is such a part of any whole, as will exactly measure it without any remainder. Or the *aliquot part* is such, as being taken or repeated a certain number of times, exactly makes up, or is equal to, the whole. So 1 is an *aliquot part* of 6, or of any other whole number; 2 is also an *aliquot part* of 6, being contained just 3 times in 6; and 3 is also an *aliquot part* of 6, being contained just 2 times: so that all the *aliquot parts* of 6 are 1, 2, 3. All the *aliquot parts* of any number may be thus found:—Divide the given number by its least divisor; then divide the quotient also by its least divisor; and so on, always dividing the last quotient by its least divisor, till the quotient 1 is obtained; and all the divisors, thus taken, are the prime *aliquot parts* of the given number. Then multiply continually these prime divisors, viz. every two of them, every three of them, every four of them, &c. and the products will be the other or compound *aliquot parts* of the given number. So if the *aliquot parts* of 60 be required; first divide it by 2, and the quotient is 30: then 30 divided by 2 also, gives 15, and 15 divided by 3 gives 5, and 5 divided by 5 gives 1: so that all the prime divisors or *aliquot parts* are 1, 2, 3, 5. Then the compound ones, by multiplying every two, are 4, 6, 10, 15; and every three, 10, 20, 30. So that all the *aliquot parts* of the given number 60, are 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30.—In like manner it will be found that all the *aliquot parts* of 360 are 1, 2, 3, 4, 5, 6, 8, 9, 10, 12, 15, 18, 20, 24, 30, 36, 40, 45, 60, 72, 180.

ALISA'NUS, *f.* in botany. See **RHEXIA**.

A'LISH, *adj.* [from *ale*.] Refembling ale; having qualities of ale.—Stirring it and beating down the yeast, gives it the sweet *alish* taste. *Mortimer*.

ALP'SMA, *f.* [*αλς*, Gr. the sea.] In botany, a genus of the hexandria polygynia class, ranking in the natural order of tripetaloidæ. The generic characters are—Calyx: perianthium three-leaved; leaflets ovate, concave, permanent. Corolla: three-petalled; petals roundish, large, flat, very spreading. Stamina: filaments awl-shaped, shorter than the corolla; antheræ roundish. Pistillum: germs more than five: styles simple; stigmas obtuse. Pericarpium: compressed capsules. Seeds: solitary, small.—*Essential Character*. Calyx, three-leaved; petals, three; seeds, several.

Species. x. *Alisma plantago*, or great water plantain: leaves ovate, acute; capsules obtusely triangular. Great water plantain is easily known by its smooth entire leaves on very long petioles; and by its purplish flowers, growing in a kind of umbel, at the end of a long scape. Root roundish and white. Height from two to three feet. Stems and branches with three blunt corners. Petioles longer than the leaves, broader at the base. Leaves with seven or eight ribs, two of them near each edge. The flowers are fully expanded about four in the afternoon. It grows in watery places, on the banks of pools, lakes, and rivers, and flowers in July and August. There is a variety of this with narrower leaves.

2. *Alisma flava*; leaves ovate, acute, peduncles umbellate, capsules globose. It grows in Jamaica, Barbadoes, and several other places in the warm parts of America, in stagnant waters and swampy places; it would be difficult to preserve this plant in England, since it will not live in the open air, and requires a bog to make it thrive; but, as it has no great beauty, or use, it is not worth the trouble of cultivating in this country.

3. *Alisma damasonium*, or star-headed water plantain: leaves cordate-oblong, flowers six-pointed, capsules awl-shaped. It is a native of France, England, and Siberia; and is found in standing waters, which are not very deep; but is by no means so common as the first sort. If it is wanted as a medicine, it must be gathered in its natural place of growth, since it is never cultivated in gardens.

4. *Alisma cordifolia*: leaves heart-shaped, obtuse, flowers twelve-stamened, capsules hook-pointed. This species is the connecting link between this genus and that of *Sagittaria*. It is found both in South and North America.

5. *Alisma natans*, or creeping water plantain: leaves ovate, obtuse; peduncles solitary. The leaves which swim on the surface are ovate, but those which are under water are linear: this is the case with many aquatic plants, the motion of the water lengthening the leaves. It is found in ditches in France, Sweden, Germany, and Siberia; also in a lake or two in Wales: it flowers in July and August.

6. *Alisma ranunculoides*, or small water plantain: leaves linear-lanceolate, capsules globose and squarrose. In a situation where the water is nearly dried up, this plant is from two to six inches high, the stems and proliferous umbels hardly longer than the leaves, and some of the flowering branches procumbent; but on the edge of old turf-pits, where there is plenty of water, it grows with an upright naked stem, from one to two feet high, bearing umbels of numerous rays, and these again others. The root-leaves, in this state, are on very long foot-stalks, linear-lanceolate, not greatly exceeding the foot-stalk in breadth, and are extremely like the paddles of the canoes of some of the South Sea islands. The corolla is bluish white, and opens about noon. It is a native of Sweden, Holland, France, Germany, Italy, and England, in marshes and moors: as on Giggleswick-tarn, Yorkshire; between Burton and Derby; Bungay, Suffolk; and Ellingham-fen, Norfolk.

7. *Alisma subulata*: leaves awl-shaped. This is a Virginian plant.

8. *Alisma parnassifolia*: leaves heart-shaped, acute; petioles jointed. A native of Italy; found in the marshes under the Apennines.

9. *Alisma repens*: stems creeping, leaves lanceolate petioled acute. A native of Spain, on the sandy banks of the river Manzanares; flowering in August. It seems to be the same (though much smaller) with the *Alisma* which Abbé Poiret found on the northern coast of Africa, and which is described by Lamark.

Propagation and Culture. If any one be desirous of cultivating the European species, he must have a piece of water on purpose, or keep them in pots or tubs perpetually immersed in water, unless he has frames of wood with partitions filled with earth, which he can water largely at his pleasure.

ALIS'MA, *f.* in botany. See *ARNICA*, *PRIMULA*, and *SENECIO*.

ALISON'TIA, or *ALISUN'TIA*, a river of Belgic Gaul, now called *Alfitz*; which rising on the borders of Lorraine, and running through the duchy, waters the city of Luxembourg, and, swelled by other rivulets, falls into the Sur.

AL'LITES, *f.* in Roman antiquity, a designation given to such birds as afforded matter of auguries by their flight.

AL'LITURE, *f.* [*alitura*, Lat.] Nourishment, or the reparation of the body by the addition of new nutritious juices.

ALITURGESY, *f.* [*aliturgesia*, Lat. of *ἀλιουργία*, Gr.] A franchisement, or exemption from any public office or charge.

ALIVE, *adj.* [of *a* and *lyf*, Sax. life.] In the state of life; not dead. In a figurative sense, unextinguished; undestroyed; active; in full force. Cheerful; sprightly; full of alacrity. In a popular sense, it is used only to add an emphasis, like the French *du monde*; as, the *best man alive*; that is, the *best*, with an emphasis. This sense has been long in use, and was once admitted into serious writings, but is now merely ludicrous.—The earl of Northumberland, who was the proudest man *alive*, could not look upon the destruction of monarchy with any pleasure. *Clarendon*.—John was quick and understood business, but no man *alive* was more careless in looking into his accounts: *Arbuthnot*.

AL'KAHEST, *f.* in chemistry, the universal menstruum, or dissolvent. A name first used by Paracelsus, and derived from the German words *al* and *geist*, i. e. *all spirit*.—Van Helmont borrowed the word, and applied it to his invention, which he called the universal dissolvent. As it is difficult to say whether the falsity or folly of what is handed down to us with respect to this article be the greatest, the curious are referred to the writers themselves, to whom we are obliged for what is said concerning it. See Paracelsus de Viribus Membranarum, lib. ii. cap. vi. Eph. Germ. D. xi. ann. 8. app. 3. Helmont Complexorium atque Mistionum elementalium signum; sect. 27—29. Helmont Poteff. Medic. sect. 3—24. Helmont Arbor Vitæ. Boerhaave's Chemistry. Alcahest is also a name of the liquor of flints.

ALKALE'SCENT, *adj.* [from *alkali*.] That which has a tendency to the properties of an alkali.—All animal diet is *alkalescent* or anti-acid. *Arbuthnot*.

AL'KALI, *f.* [of *al* and *kali*, i. e. of or from *kali*.] Alkaline salt is called *alafi*, *alafor*, *alafort*, *alkahesi glauveri*; according to some *calcadis*. *Alkali*, because a great quantity of that kind of salt is obtained from a plant called by the Egyptians *kali*, by us *glass-wort*. The name *alkali* hath been given to the fixed salt of all plants; and that because an effervescence arises upon mixing an acid liquor with the salt; all volatile or fixed salts, and all terrestrial matters which ferment with acids, have come to be called *alkalies*.

Alkaline salts are divided into two kinds, the fixed and volatile; and the former into two species, vegetable, and mineral, or fossil. All of these possess some properties in common, and some peculiar to each. Those which they have in common are, 1. An acrid and pungent taste, which, when the salts are very pure and strong, degenerates into absolute causticity, and would entirely destroy the organ of sensation if long applied to it. 2. A tendency to dissolve animal substances, and reduce them to a gelatinous substance. 3. An attraction for acids, with a power of separating earths and metals from them. 4. They change the blue vegetable juices to green; the green to yellow; the yellow to orange; the orange to red; and the red to purple. 5. They unite with oils; and destroy or cause to fade almost all kinds of colours that can be put upon cloth; whence their use in bleaching, &c.

The properties common to both kinds of fixed alkalies are, 1. They resist the action of fire to a great degree, so that they can easily be reduced to a solid form by evaporating any liquid in which they happen to be dissolved. 2. By an intense fire, they flow into a liquid which concretes into a solid mass when cold. 3. If mixed in certain proportions with vitrifiable earths, they melt, in a heat still more intense, into glass. 5. Mixed with ammoniacal salts, with animal substances, or with foot, they extricate a volatile alkali.

The volatile alkali differs from the other two in being unable to resist the fire, and being entirely resolvable into an invisible and permanently elastic fluid, called *alkaline air*. In consequence of its volatility, it always affects the olfactory nerves, and its smell is the general criterion by which its strength may be judged of. Its attraction for acids, power of changing colours, &c. are also considerably weaker than those of the fixed alkalies.

Effervescence with acids is not, as was formerly supposed, a distinguishing property of alkalies; for this effect is merely owing to the fixed air, to which they are united during the process by which they are originally formed. The quantity of this air, however, is never so great as to saturate them entirely; on the contrary, their alkaline properties are always very perceptible, and they are commonly said to be in a *mild* state. But the truth is, they are then in a kind of intermediate state, between what may be called perfectly mild and perfectly caustic. In their perfectly mild state, they are united with such a large quantity of fixed air as entirely overpowers their alkaline properties; and therefore they are no more intitled to the name of alkalies in this state, than when combined with the marine, nitrous, or any other, acid; in which case the compounds are called *neutral salts*. But it is a much more laborious and tedious process to saturate an alkali completely with fixed air than with any other acid; nor does it very easily retain the aerial acid after it has once been combined with it. Hence the caustic taste and properties of the alkali almost always predominate, and the salt contains a portion of pure and caustic alkali, to which alone its virtues are to be ascribed.

Vegetable alkali, when pure, and containing about one-half its weight of fixed air, is of a white colour when dry; and very caustic to the taste. It runs *per deliquium* when exposed to the air; and is usually incapable of being crystallized, though it acquires this property after being employed in the rectification of ardent spirit. After this alkali has been once united with marine acid, it appears to have undergone some change; for the salt then produced, by combining it with the vitriolic acid, resembles Glauber's salt almost as much as it does vitriolated tartar.

The fossil alkali differs from the vegetable in having a smaller attraction for acids; in being more easily fusible by itself, and forming a more soluble compound with the vitriolic acid. It is also easily crystallizable, even without the addition of more fixed air than it naturally contains; and experience has determined it to be more proper for glass or soap manufactures than the vegetable alkali; for which reason the demand for it is very considerable.

The fossil alkali was anciently called *natron* or *nitre*, and is spoken of by Pliny and Tacitus as an ingredient in glass, &c. The knowledge of this salt was lost in the general obscuration of science which took place on the decline of the Roman empire; nor do we find it mentioned till the time of the Hon^{ble} Robert Boyle; and even since that time, though Mr du Hamel gave an accurate account of it in a memoir for the year 1736, little farther notice was taken of it till very lately, when the College of Physicians of London restored it to the Pharmacopœia, calling the vegetable alkali, *kali*; the fossil or mineral, *natron*; and the volatile, *ammonia*.

We are now certainly informed that the fossil alkali is found native in many parts of the world, which never is the case with the vegetable alkali. The places where it abounds most are, Egypt, the country of Tripoli in Barbary, the peak of Teneriffe, in one of the Canary islands, Hungary, several of the provinces of Russia, some parts of Asia, particularly the neighbourhood of Smyrna, &c. though it has not hitherto been found in any of the western countries of Europe, excepting in the neighbourhood of volcanoes; or in mineral waters; and in these last only in a very small quantity.

The demand in this country for fossil alkali, which is the natural basis of sea-salt, is supplied from the ashes of kali, and other sea-plants, from which it is separated in the same manner as the vegetable alkali from the ashes of other plants. The purest kind of ashes containing this salt is called *soda* or *barilla*, and is imported chiefly from foreign countries; that which is obtained from the sea-weed growing on our own coasts, is known by the name of *kelp*, but is excessively impure; a method, however, has been lately discovered, by Mr George Hodson, of Chester, by which the fossil alkali is separated from the muriatic acid

as it exists in common salt, and as it exists in kelp, for which he obtained a patent in 1792. His method is as follows. To extract the alkali from common salt, proceed thus: with a ton of salt mix to the amount of sixteen bushels of charcoal, or rather small-coal; and, in this state, throw it into a furnace for the purpose of fusion. It must be well stirred, in order to effect a proper union of the materials, and to expose, by bringing all the parts successively to the surface, the whole mass to the action of the reverberating flame. After the fusion is completed, it is to remain one hour in the furnace, and then to be drawn out. The substance thus drawn is the ash, in its impure state; to refine it, nothing farther is requisite than to form a lixivium, and evaporate it to dryness.

Modern chemistry has discovered many acids, and has succeeded in decomposing them into simpler substances, and recomposing them. But the alkalies still remain in number only three; and nothing has yet been effected to shew an unequivocal decomposition of the two fixed alkalies.

To extract the alkali from the common salt as it resides in kelp, a ton of kelp must be broken into small lumps, and mixed with ten bushels of charcoal, or small-coal, instead of sixteen. In every other respect the process corresponds with the above description. The *rationale* is as follows: The phlogiston contained in the small-coal, or charcoal, being liberated by the fire, exerts its agency on the common salt, and effects a decomposition in it. The acid of the salt, being separated from its alkaline basis, is dissipated, and the alkali, left in conjunction with the residuum of the charcoal, or small-coal, forms the ashes.

A patent hath also been granted to Mr. Anthony Boulton de Boneuil, of Liverpool, for an invention of an apparatus on a new construction, for the purpose of making fossil alkali; by which that very useful and important article is obtained of a quality equal to that extracted from the best barilla. We shall give the particulars in the inventor's own words. "Previous to specifying my apparatus, I must observe that, to extract fossil alkali from marine salt, two things are wanted: first, the materials containing the necessary principles; secondly, a proper apparatus for working them successively. As for materials, I use charcoal and iron, mixed and melted with Glauber's salt, into which marine salt is at first to be converted, and of course I claim no grant on that head. But I work those materials in a manner hitherto unpractised, and with an apparatus entirely new.

"By this improved apparatus, instead of keeping the mixture of the materials in an open reverberatory furnace, exposed to the violence of the fire, and the course of the air, I keep them in pots or crucibles made of iron, standing upon a mere flat furnace, such as are commonly used for distillation, where their necks are raised a little above the surface of the furnace, and their mouths closely shut with lids. The empty places between each crucible are shut on the surface of the furnace with breaks, to prevent the fire from catching the materials, as the lids are intended to prevent them from the contact of the exterior air; from these two improvements it happens, that the sulphur formed at first, by the mixture of the vitriolic acid lying in the Glauber's salt with the principle lying in the charcoal, meeting with iron on every side, leaves the alkali and turns to iron; by which it is thus so strongly kept, that a martial pyrite is instantly produced, and the fossil alkali remains free, and stands by itself amidst the pyrite. By former methods, the materials being worked in open reverberatory furnaces, and being so exposed both to the violence of the fire and the course of air, it happens, that the fire, acting immediately and on every side upon the materials, burns the sulphur as soon as it is engendered, and consequently before it has turned to iron; the vitriolic acid that becomes again free returns to the alkali, and re-produces Glauber's salt. To extract the fossil alkali from the martial pyrite, by my method, the matter is poured from the iron crucibles into iron pans, and afterwards spread on the ground, where it is left till the mar-

trial earth into which it turns becomes efflorescent; then the earth is elixivated several times, and the water, having thus imbibed the alkali, is boiled, evaporated, and poured into proper pans, wherein the alkali goes out and crystallizes, and becomes equal to the best barilla."

The alkalies may be rendered caustic by the addition of quick-lime. In this state they destroy the parts of a living animal in a manner similar to fire; whence they are called *potential* cauteries, as the former is called the *actual* cautery. The *kali purum*, formerly *lapis infernalis*, of the shops, is of this kind. The alkalies attract moisture from the air when in their caustic state, though neither the fossil alkali nor its combinations do so in any other case. It is only in their caustic state also that they unite with oils, or dissolve in spirit of wine; which last they have been supposed to purify.

Volatile alkali, when procured immediately by the distillation of any substance capable of yielding it, is obtained in a state similar to that in which the alkalies are usually met with, viz. half mild and half caustic. By exposing the liquid alkali to a great quantity of fixed air, we may at last have it perfectly mild and neutralised; in which state it appears as a white salt extremely volatile, though less so than the pure caustic alkali. It dissolves very readily in water; but unless some caustic spirit, or some lime or fixed alkali, be added, in order to abstract part of the fixed air, it will scarcely exhibit the characteristic of volatile alkali; viz. a pungent and urinous smell. The addition of fixed air, however, makes very little difference with regard to the chemical combinations of this salt; for, as fixed air has a very slender power of acidity, it is expelled by every other acid with the greatest ease, and the same combinations formed as though it had not been present. The only difference is, that, when a mild alkali is added to an acid, a strong effervescence is produced by the escape of the fixed air, while, with the caustic alkali, the mixture is made without any ebullition.

Besides their attraction for acids, the alkalies have also an attraction for oils, sulphur, and spirit of wine, in the moist way, when the salts are deprived of their fixed air; and in this, as well as the dry way, with several metals, and vitrifiable earths and stones, as has been already mentioned. With oil the vegetable fixed alkali forms a soap, though less perfect than that made with the caustic mineral alkali. When combined with fixed air, they scarcely unite with oils. Boiled with sulphur, or melted with it in their dry state, they unite into a very fetid compound called *hepar sulphuris*, which is soluble in water, but totally and very quickly decomposed by the contact of air. Vegetable alkali unites with iron, tin, and zinc; corrodes copper, and runs with it into a liquor of a deep blue colour, and joins with lead in fusion. It does not act upon gold in its metallic state; but, if a sufficient quantity be added to a solution of gold in aqua regia, the calx of the metal will be first precipitated and afterwards dissolved.

Vegetable alkali is a principal ingredient in the powders called *fluxes*, used for the fusion of metalline ores. It promotes the fusion of earths, and forms glafs with the crystalline kind. It is soluble in an equal weight of distilled water; and, when exposed to the air, it soon attracts moisture from it, and flows into a liquid. In its caustic state it dissolves in spirit of wine, and forms with it a red tincture called *Van Helmont's tincture of salt of tartar*, formerly used both as an internal and external remedy, but now fallen into disrepute.

Fossil alkali in its caustic state unites with oil into an harder soap than that made with vegetable alkali. With sulphur it forms an *hepar sulphuris* in the same manner as the vegetable alkali, and yields a tincture with spirit of wine, which dissolves part of the salt whilst hot, but lets it fall again in a crystalline form when cold. Gold, silver, or quicksilver, are not affected by a solution of this salt; but copper and tin are dissolved by it in the open air. It affects tin, lead, regulus of antimony, and cobalt, slightly; but acts powerfully upon zinc, and forms a kermes mine-

ral with crude antimony. Copper, iron, bismuth, zinc, antimony, and regulus of cobalt, fused with two parts of fossil alkali, are almost entirely dissolved in a very strong heat; but tin, lead, and regulus of antimony, treated in the same manner only suffer a partial solution.

All the alkalies are of considerable use in medicine, though there must be a considerable diversity in their operations on the human body, as the vegetable alkali shews itself so much more acid and powerful than the fossil. They unite immediately with acids, and change them into mild neutral salts; hence, if any of the strong mineral acids fall upon any part of the human body, and begin to corrode and give pain, the immediate application of the lixivium tartari, or of a solution of any of those alkaline salts in water, or of the salts themselves in powder, will destroy their causticity, and prevent their doing further mischief: Or if any of these acids should drop on clothes, linen, or other substances, and alkaline salts are immediately applied, they will neutralize the acid, and prevent its further corrosion: Or if a person should, through mistake, swallow any of the mineral acids, or corrosive sublimate, or any other corroding salt, which an alkali will decompose, the taking into the stomach solutions of the alkaline salts, or the salts themselves in proper doses, are the most likely means of affording immediate relief.

Fixed alkaline salt loosens the belly, and renders the effect of purgatives more lasting, and is peculiarly useful against that constipation of the bowels which is generally attendant on the studious and sedentary. It destroys acidity in the primæ viæ, converting them into a mild aperient salt, and thus removes a cause of many chronic diseases. It resolves viscid and glutinous humours, by which, and its gentle stimulus, obstructions are removed, and wherever it passes secretions are promoted. It loosens the texture of calcareous concretions, by strongly attracting their air; and, made into a ley with a small quantity of lime, this power is increased. In those flatulent disorders which arise from a destructive bile it also affords great relief.

As a principal medical effect of alkaline salt is to attenuate the blood and humours, it is obviously improper in the scurvy, and all those disorders in which the texture of the blood is already too much enfeebled; in particular disorders this medicine is hurtful, by increasing that coagulation which is always observed to attend them. It is probable, that the restrictions on the Jews with respect to their diet, was in part from the speedy putrefescence to which the prohibited subjects tend; animal food is all alkalescent, but some more so than others; all fish soon putrify, but those without scales, and the shell-fish, the soonest.

Both the vegetable and fossil alkali applied externally in a caustic state, first irritate and inflame the skin, and afterwards act as fire in mortifying and destroying it; and therefore have been much used by surgeons for opening buboes and other abscesses, and for eating away proud or fungous flesh. Various formulæ of caustic alkalies are employed in medicine for different purposes, for which see CHEMISTRY and PHARMACY.

ALKALI, or SAL KALI, *f.* in botany. See SALICORNIA.

AL'KALINE, *adj.* That which has the qualities of alkali.—Any watery liquor will keep an animal from starving very long, by diluting the fluids, and consequently keeping them from an *alkaline* state. People have lived twenty-four days upon nothing but water. *Arbutnot.*

To ALKA'LIZATE, *v. a.* To make bodies alkaline, by changing their nature, or by mixing alkalies with them.

ALKALIZATE, *adj.* That which has the qualities of alkali; that which is impregnated with alkali.—The colour of violets in their syrup, by acid liquors, turns red, and, by urinous and *alkalizable*, turns green. *Newton.*

ALKALIZA'TION, *f.* The act of alkalizing, or impregnating bodies with alkali.

ALKÆN'DA, *f.* in botany. See MYRTUS.

ALKANET,

ALKANET, *f.* in botany. See ANCHUSA.

ALKEKENGİ, *f.* in botany. See ATROPA and PHYSALIS.

ALKERMES, *f.* [of *al*, the Arabic particle, and *kermes*, certain red or scarlet insects.] A celebrated remedy, of the consistence of a confection; whereof the kermes berries are the basis. The other ingredients are pippin-cyder, rose-water, sugar, ambergrease, musk, cinnamon, aloes-wood, pearls, and leaf-gold; but the sweets are usually omitted. The *confectio alhermes* is chiefly made at Montpellier; the grain which gives it the denomination being no where found so plentifully as there.

AL-KO'RAN. See ALCORAN.

ALKMA'AR. See ALCMAER.

ALL, *adj.* [*all*, *æl*, *calle*, *alle*, Sax. *ell*, Welsh; *al*, Du. *alle*, Germ. *alles*, Gr.] Being the whole number; every one.—The great encouragement of *all*, is the assurance of a future reward. *Tillotson*.—Being the whole quantity; every part.—Political power, I take to be a right of making laws with penalties, and of employing the force of the community in the execution of such laws, and in the defence of the commonwealth; and *all* this only for the public good. *Locke*.—The whole extent of place. The whole quantity, applied to duration of time:

On those pastures cheerful spring

All the year doth sit and sing;

And, rejoicing, smiles to see

Their green backs wear his livery.

Crashaw.

ALL, *adv.* Quite; completely.—Justice may be furnished out of fire, as far as her sword goes; and courage may be *all* over a continued blaze. *Addison*.

If e'er the miser durst his farthings spare,
He thinly spreads them through the public square,
Where, *all* beside the rail, rang'd beggars lie,
And from each other catch the doleful cry.

Gay.

Altogether; wholly; without any other consideration.—I am of the temper of most kings, who love to be in debt, are *all* for present money, no matter how they pay it afterward. *Dryden*.—Only; without admission of any thing else:

Sure I shall never marry like my sister,
To love my father *all*.

Shakespeare.

Although: this sense is truly Teutonic, but now obsolete. It is sometimes a word of emphasis, nearly the same with *just*. It was anciently in English what it is now in the other Teutonic dialects, a particle of mere enforcement.

ALL, *f.* The whole; opposed to part, or nothing. Every thing:

The youth shall study, and no more engage
Their flatt'ring wishes for uncertain age;
No more with fruitless care, and cheated strife,
Chace fleeting pleasure through the maze of life;
Finding the wretched *all* they here can have,
But present food, and but a future grave.

Prior.

The phrase, *and all*, is of the same kind.—A torch, snuff and *all*, goes out in a moment, when dipped in the vapour. *Addison*.—*All* is much used in composition; but, in most instances, it is merely arbitrary; as, *all-commanding*. Sometimes the words compounded with it are fixed and classical; as, *Almighty*. When it is connected with a participle, it seems to be a noun; as, *all-surrounding*. In other cases an adverb; as, *all-accomplished*, or completely accomplished.

Proverbs. In the grave *all* are alike. Lat. *Æqua tellus pauperi regnumque pueris horat*. And therefore, as we are *all* to be reduced to the same state in so short a time, what a folly it is for us to puff ourselves up with pride and vanity, on account of any superiority in this world, either of body, mind, or estate; when we do not know but the very next moment may, and a very short time will, put us upon a level with those, who, for their inferiority, we esteem the most mean and despicable.—What *all* say is as

good as sealed; that is, as good as confirmed, and may be reasonably supposed to be true.—*All* cannot do *all*. Lat. *Nemo omnes possumus omnes*. H. Ger. *Gin jeder kan nicht alles*. We ought not therefore to despise or think meanly of those who may not be masters just of the same skill and knowledge we ourselves are, when perhaps they have some qualifications superior to our own, or at least that are of some use to mankind.

ALL-BEARING, *adj.* That which bears every thing; omniparous:

Thus while he spoke the sovereign plant he drew,
Where on th' *all-bearing* earth unmark'd it grew. *Pope*.

ALL-CHEERING, *adj.* That which gives gaiety and cheerfulness to all:

Soon as the *all-cheering* sun
Should, in the farthest east, begin to draw
The shady curtains from Aurora's bed. *Shakespeare*.

ALL-COMMANDING, *adj.* Having the sovereignty over all.—He now sets before them the high and shining idol of glory, the *all-commanding* image of bright gold. *Raleigh*.

ALL-COMPOSING, *adj.* That which quiets all men, or every thing:

Wrapt in embow'ring shades Ulysses lies,
His woes forgot! but Pallas now address,
To break the bands of *all-composing* rest. *Pope*.

ALL-CONQUERING, *adj.* That which subdues every thing:

Second of Satan sprung, *all-conquering* death!
What think'st thou of our empire now? *Milton*.

ALL-CONSUMING, *adj.* That which consumes every thing:

By age unbroke—but *all-consuming* care
Destroys perhaps the strength that time would spare. *Pope*.

ALL-DEVOURING, *adj.* That which eats up every thing:
Secure from flames, from envy's fiercer rage,
Destructive war, and *all-devouring* age. *Pope*.

ALL-FOURS, *f.* A low game at cards, played by two, so named from the four particulars by which it is reckoned, and which, joined in the hand of either of the parties, are said to make *all-fours*.

ALL-GOOD, *f.* in botany. See CHENOPodium.

ALL HAIL, *f.* [from *all*, and *hail* for *health*.] All health. This is therefore not a compound, though perhaps usually reckoned among them; a term of salutation. *Salve*, or *salute*:

All hail, ye fields, where constant peace attends!

All hail, ye sacred solitary groves!

All hail, ye brooks, my true, my real, friends,

Whose conversation pleases and improves! *Walsh*.

ALL-HALLOWS, or ALL-SAINTS, *f.* in the calendar, denotes a festival celebrated on the first of November, in commemoration of all the saints, or holy men. The number of saints being so excessively multiplied, it was found too burthensome to dedicate a feast-day to each. Hence an expedient was had recourse to, by commemorating such in a lump as had not their own days. Boniface IV. in the ninth century, introduced the feast of All-Saints in Italy, which was soon after adopted into the other churches.

ALLHALLOWTIDE, *f.* The term near All-Saints.—Cut off the bough about *Allhallowtide*, in the bare place, and set it in the ground, and it will grow to be a fair tree in one year. *Bacon*.

ALL-HEAL, *f.* in botany. See STACHYS.

ALL-JUDGING, *adj.* That which has the sovereign right of judgment:

I look with horror back,
That I detest my wretched self, and curse
My past polluted life. *All-judging* heaven,
Who knows my crimes, has seen my sorrow for them.

Rowe.

ALL.

ALL-KNOWING, *adj.* Omniscient; all-wise.—Shall we repine at a little misplaced charity, we, who could no way foresee the effect; when an *all-knowing* all-wise Being showers down every day his benefits on the unthankful and undeserving? *Atterbury*.

ALL-MAKING, *adj.* That created all; omnific.

ALL-POWERFUL, *adj.* Almighty; omnipotent; possessed of infinite power.—O *all-powerful* Being! the least motion of whose will can create or destroy a world; pity us, the mournful friends of thy distressed servant. *Swift*.

ALL-SAINTS BAY, one of the most rich and fertile captainships in Brasil, producing abundance of cotton, and vast quantities of sugar. It has several cities and towns, of which St. Salvador is the capital. Lat. 12. 3. S. lon. 40. 10. W.

ALL-SEER, *f.* He that sees or beholds every thing; he whose view comprehends all things:

That high *All-seer*, which I dallied with,
Hath turn'd my feigned prayer on my head,
And giv'n in earnest what I begg'd in jest. *Shakespeare*.

ALL-SEEING, *adj.* That beholds every thing:

The same First Mover certain bounds has plac'd,
How long those perishable forms shall last;
Nor can they last beyond the time assign'd
By that *all-seeing* and all-making mind. *Dryden*.

ALL-SOULS, in the calendar, denotes a feast-day, held on the second of November, in commemoration of all the faithful deceased. The feast of All-Souls was first introduced in the eleventh century, by Odilon abbot of Cluny, who enjoined it on his own order; but it was not long before it became adopted by the neighbouring churches.

ALL-SUFFICIENT, *adj.* Sufficient to every thing.—The testimonies of God are perfect, the testimonies of God are *all-sufficient* unto that end for which they were given. *Hooker*.

ALL-WISE, *adj.* Possess of infinite wisdom.—There is an infinite, eternal, *all-wise*, mind governing the affairs of the world. *South*.

Supreme, *all-wise*, eternal, potentate!
Sole author, sole disposer, of our fate! *Prior*.

ALL'IA, or **ALLAH**, *f.* the name by which the professors of Mahometanism call the Supreme Being. The term *alla* is Arabic, derived from the verb *alah*, to adore. It is the same with the Hebrew *Eloah*, which signifies the *Adorable Being*.

ALLAHABAD, a city of Oude, in Hindostan, seated at the confluence of the Ganges and Jumna. It is 470 miles N. W. of Calcutta. Lat. 25. 45. N. lon. 82. 0. E.

ALLAMANDA, *f.* [from Mr. Frederic Allamand, a Dutch surgeon.] In botany, a genus of the pentandria monogynia class, in the natural order of contortæ. The generic characters are—Calyx: perianthium one-leafed, five parted; parts ovate, acute. Corolla: one-petalled, funnel-shaped; tube cylindric; border semiquinquesid., swelling; divisions spreading; obtuse. Stamina: filaments scarcely any; antheræ five, sagittate, converging in the throat of the tube. Pistillum: germ oval, surrounded with a ring; style filiform, the length of the tube; stigma headed, contracted in the middle. Pericarpium: an orbicular, lens-shaped, echinate, one-celled, two-valved, capsule. Seeds: very many, imbricate, orbiculate, flat, edged with a membranous wing.—*Essential Character*. Corolla, contorted; capsule lens-shaped, erect, echinate, one-celled, two-valved, many seeded.

There is but one species known, called *allamanda cathartica*. It is a milky shrub, with its stem twining, and climbing on trees: branches round, pubescent. Leaves in fours, on very short petioles, elliptic-lanceolate, shining, quite entire, with a villous rachis. Flowers terminal, in erect racemes: twin, pedunculate; corolla yellow. The leaves are cathartic, and an infusion of them is used at

Surinam in the cholic. It is found wild there, at Cayenne, in Guiana, &c. by the sea-side. Introduced in 1785, by Baron Hake.

AL'LANTOIS, or **ALLANTOIDES**, *f.* [from *αλλας*, Gr. a sausage, or hog's pudding; because in some brutes it is long and thick.] The membrane so called which forms part of the secundines; it being also named *alantoides farciminalis*, the "urinary membrane." Some assert, and others deny, the existence of this in the human species. Dr. Hale says, if you first find the hole whence the urine came forth, if the allantois is not too much torn, you may blow up this membrane with a pipe, to its full dimensions, and thus you can separate much of it from the chorion. De Graaf says, that all the membranes of the secundines will appear distinct by blowing, with a pipe, into a hole made through the chorion; and that the allantois is no where perforated by the funis umbilicalis; for the funis does not pass through any of the membranes, it only adheres to the inside of the amnios. Dr. James says, that the allantois, or urinary membrane, does not cover the whole fœtus, but only that part of it which respects the chorion, and does not lie on the placenta; for the allantois cannot be extended any farther than to the edge of the placenta, where the amnios and chorion are so closely joined by fibres, that no membrane can come between them; wherefore the allantois is not every where fastened to the chorion, and consequently is not of the same shape as the other membranes.

This membrane contains, it is said, the urine that is discharged from the bladder: what passes from the bladder into the urachus cannot, in a natural state, return by it. There have been instances of persons discharging their urine at the navel. It is also asserted by some, that the liquor may be forced from the bladder to the allantois by fitting a pipe to it, and from the allantois to the bladder. If you raise the allantois a little, and squeeze it with the hand, you force the liquor into the bladder, and thro' the penis. Neither artery nor vein can be discovered in this membrane. If any anatomists have ever demonstrated this membrane, not one of them has given a distinct figure of it; all the engravings which are designed to represent it, are too incorrect to afford us a distinct idea. Dr. Hunter, in his lectures, absolutely denies the existence of this membrane, except in brutes. See on this subject what Dr. Hales hath inserted in the *Philos. Trans. Abr.* vol. iv. and Mons. Littré in the *Mem. Acad. de Sciences*, 1701.

ALL'AS, a town on, and a strait between, the Isle of Lambock and Combava, in the East Indies. Lat. 10. 20. N. lon. 86. 14. E.

ALLATIUS (Léo), Keeper of the Vatican library, a native of Scio, and a celebrated writer of the 17th century. He was of great service to the gentlemen of Port Royal in the controversy they had with M. Claude touching the belief of the Greeks with regard to the eucharist. No Latin was ever more devoted to the see of Rome, or more inveterate against the Greek schismatics, than Allatius. He never engaged in matrimony; nor was he ever in orders; and Pope Alexander VII. having asked him why he did not enter into orders? he answered, "Because I would be free to marry." The pope rejoined, "If so, why do you not marry?" "Because (replied Allatius) I would be at liberty to take orders." Thus, as Mr. Bale observes, he passed his whole life, wavering betwixt a parish and a wife; sorry, perhaps, at his death, for having chosen neither of them; when, if he had fixed upon one, he might have repented his choice for thirty or forty years. If we believe John Patricius, Allatius had a very extraordinary pen, with which, and no other, he wrote Greek for forty years; and we need not be surprised, that, when he lost it, he was so grieved, that he could scarcely forbear crying. He published several manuscripts, several translations of Greek authors, and several pieces of his own composing. In his compositions he is thought to show more

more erudition than judgment; he used also to make frequent digressions from one subject to another. He died at Rome in 1669, aged 83.

To ALLA'Y, *v. a.* [from *alloyer*, Fr. to mix one metal with another in order to coinage; it is therefore derived by some from *à la loi*, "according to law;" the quantity of metals being mixed according to law; by others, from *allier*, to unite; perhaps from *allocare*, to put together.] To mix one metal with another, to make it fitter for coinage. In this sense, most authors preserve the original French orthography, and write *alloy*. See ALLOY.—To join any thing to another, so as to abate its predominant qualities. It is used commonly in a sense contrary to its original meaning, and is, to make something bad, less bad. To obtund; to repress; to abate. To quiet; to pacify; to repress. The word, in this sense, I think not to be derived from the French *alloyer*, but to be the English word *lay*, with a before it according to the old form. *Johnson*.

ALLAY, *f.* [*alloy*, Fr.] The metal of a baser kind mixed in coins, to harden them, that they may wear less:

For fools are stubborn in their way,
As coins are harden'd by th' alloy.

Butler.

Gold is alloyed with silver and copper, two carats to a pound Troy; silver with copper only, of which eighteen pennyweights is mixed with a pound. Cowell thinks the alloy is added to countervail the charge of coining, which might as well have been done only by making the coin less. Any thing which, being added, abates the predominant qualities of that with which it is mingled; in the same manner, as the admixture of baser metals allays the qualities of the first mass.—Dark colours easily suffer a sensible alloy, by little scattering light. *Newton*.—Alloy being taken from baser metals, commonly implies something worse than that with which it is mixed.—The joy has no alloy of jealousy, hope, and fear. *Roscommon*.

ALLAY'ER, *f.* The person or thing which has the power or quality of allaying.—Phlegm and pure blood are reputed *allayers* of acrimony: and Avicenn countermands letting blood in choleric bodies; because he esteems the blood a *frænum bilis*, or a bridle of gall, obtunding its acrimony and fierceness. *Harvey*.

ALLAY'MENT, *f.* That which has the power of allaying or abating the force of another.

ALLEGANY, or APPALA'CHIAN MOUNTAINS, a chain or range of mountains in North America, which extend north-easterly, and south-westerly, nearly parallel with the coast of the southern states, through which they run. They occupy a space of about 900 miles in length, and from sixty to 200 in breadth, to the eastward of the Mississippi and lakes. The different ridges which compose this immense range have different names in different states, as the Kittattiny, the Blue, the North, and the South, Mountains. They are not confusedly scattered and broken, rising here and there into high peaks over-topping each other, but stretch along in uniform ridges, scarcely half a mile high, spreading towards the south. Some of them terminate in high perpendicular bluffs; others gradually subside into a level country, giving rise to the rivers which run southerly into the gulph of Mexico. In the back parts of Pennsylvania, scarcely one acre in ten of this range is capable of culture; in other parts extensive tracts of fine arable and pasture land intervene between the ridges, having generally a rich black soil, and some of the mountains will admit of cultivation almost to their tops.

ALLEGANY, a river of North America, which rises in the Allegany Mountains, in lat. 42. 0. N. At Fort Venango, at the mouth of French Creek, it is 200 yards wide, and navigable for light batteaux. At Fort Pitt it joins the Monongahela; and then it is called the Ohio. See OHIO.

ALLEGA'TA, [Lat.] a word anciently subscribed at the bottom of rescripts and constitutions of the emperors; as *signata*, or *testata*, was under other instruments.

ALLEGA'TION, *f.* [from *allege*.] Affirmation; de-

claration. The thing alleged or affirmed. An excuse; a plea.—I omitted no means to be informed of my errors; and I expect not to be excused in any negligence on account of youth, want of leisure, or any other idle *allegations*. *Pope*.

To ALLE'GE, *v. a.* [*allego*, Lat.] To affirm; to declare; to maintain. To plead as an excuse, or produce as an argument.—If we forsake the ways of grace or goodness, we cannot *allege* any colour of ignorance, or want of instruction; we cannot say we have not learned them, or we could not. *Sprat*.

ALLE'GEABLE, *adj.* That which may be alleged.

ALLE'GEMENT, *f.* The same with ALLEGATION.

ALLE'GER, *f.* He that alleges.

ALLE'GIANCE, *f.* [*allegiance*, Fr.] In law, is the tie, or *ligamen*, which binds the subject to the king, in return for that protection which the king affords the subject. The thing itself, or substantial part of it, is founded in reason and the nature of government; the name and the form are derived to us from our Gothic ancestors. Under the feodal system, every owner of lands held them in subjection to some superior or lord, from whom or from whose ancestors the tenant or vassal had received them: and there was a mutual trust or confidence subsisting between the lord and vassal, that the lord should protect the vassal in the enjoyment of the territory he had granted him; and, on the other hand, that the vassal should be faithful to the lord, and defend him against all his enemies. This obligation on the part of the vassal was called his *fidelitas*, or fealty: and an oath of fealty was required by the feodal law to be taken by all tenants to their landlord, which is couched in almost the same terms as our ancient oath of allegiance; except that, in the usual oath of fealty, there was frequently a saving or exception of the faith due to a superior lord by name, under whom the landlord himself was perhaps only a tenant or vassal. But when the acknowledgement was made to the absolute superior himself, who was vassal to no man, it was no longer called the oath of fealty, but the oath of allegiance; and therein the tenant swore to bear faith to his sovereign lord, in opposition to all men, without any saving or exception. Land held by this exalted species of fealty, was called *feudum ligium*, a liege fee, the vassals *homines ligii*, or liege men; and the sovereign, their *dominus ligius*, or liege lord. And, when sovereign princes did homage to each other for lands held under their respective sovereignties, a distinction was always made between *simple* homage, which was only an acknowledgement of tenure; and *liege* homage, which included the fealty before mentioned, and the services consequent upon it. In Britain, when it became a settled principle of tenure, that all lands in the kingdom were holden of the king as their sovereign and lord paramount, no oath but that of fealty could be taken to inferior lords; and the oath of allegiance was necessarily confined to the person of the king alone. By an easy analogy, the term allegiance was soon brought to signify all other engagements which are due from subjects to their prince, as well as those duties which were simply and merely territorial. And the oath of allegiance, as administered in England for upwards of 600 years, contained a promise "to be true and faithful to the king and his heirs, and truth and faith to bear of life and limb and terrene honour, and not to know or hear of any ill or damage intended him, without defending him therefrom." But, at the revolution, the terms of this oath being thought perhaps to favour too much the notion of non-resistance, the present form was introduced by the convention parliament, which is more general and indeterminate than the former; the subject only promising "that he will be faithful and bear true allegiance to the king," without mentioning "his heirs," or specifying in the least wherein that allegiance consists. The oath of supremacy is principally calculated as a renunciation of the pope's pretended authority: and the oath of abjuration, introduced in the reign of king William, very amply supplies the loose and general texture

ture of the oath of allegiance; it recognizing the right of his majesty, derived under the act of settlement; engaging to support him to the utmost of the juror's power; promising to disclose all traitorous conspiracies against him; and expressly renouncing any claim of the descendants of the late pretender, in as clear and explicit terms as the English language can furnish. This oath must be taken by all persons in any office, trust, or employment; and may be tendered by two justices of the peace to any person whom they shall suspect of disaffection. And the oath of allegiance may be tendered to all persons above the age of twelve years, whether natives, denizens, or aliens.

But, besides these express engagements, the law also holds that there is an *implied*, *original*, and *virtual*, allegiance, owing from every subject to his sovereign, antecedently to any express promise, although the subject never swore any faith or allegiance in form. Thus Sir Edward Coke very justly observes, that "all subjects are equally bounden to their allegiance as if they had taken the oath; because it is written by the finger of the law in their hearts, and the taking of the corporeal oath is but an outward declaration of the same."

Allegiance, both express and implied, is however distinguished by the law into two sorts or species, the one *natural*, the other *local*; the former being also perpetual, the latter temporary.

Natural allegiance is such as is due from all men born within the king's dominions immediately upon their birth. *Local* allegiance is that which is due from an alien, or stranger born, for so long a time as he continues within the king's dominion and protection; and it ceases, when such stranger transfers himself from this kingdom to another. *1 Blackst. 366, 370.*

By the common law, every layman, above the age of twelve years, was obliged to take the oath of allegiance at the tourn or leet; and it was a high contempt to refuse it. *1 Infl. 68.*

The *oath of allegiance*, or rather the *allegiance* itself, is held to be applicable, not only to the political capacity of the king, or regal office, but to his natural person and blood-royal: and for the misapplication of their allegiance, viz. to the regal capacity or crown, exclusive of the person of the king, were the Spencers banished in the reign of Edward II. And from hence arose that principle of personal attachment and affectionate loyalty, which induced our forefathers to hazard all that was dear to them, life, fortune, and family, in defence and support of their liege lord and sovereign. It is to be observed, however, in explanation of this allegiance, that it does not preclude resistance to the king, when his misconduct or weakness is such as to make resistance beneficial to the community. It seems fairly presumable, that the convention parliament, which introduced the oath of allegiance in its present form, did not intend to exclude all resistance: since the very authority by which the members sat together, was itself the effect of a successful opposition to an acknowledged sovereign. Again: The allegiance above described can only be understood to signify obedience to lawful commands. If, therefore, the king should issue a proclamation, levying money or imposing any service or restraint upon the subject, beyond what the law authorized, there would exist no sort of obligation to obey such a proclamation, in consequence of having taken the oath of allegiance. Neither can allegiance be supposed to extend to the king after he is actually and absolutely deposed, driven into exile, or otherwise rendered incapable of exercising the regal office. The promise of allegiance implies, that the person to whom the promise is made continues king; that is, continues to exercise the power, and afford the protection, which belong to the office of king; for it is the possession of these which makes such a particular person the object of the oath.

ALLE'GIANT, adj. Loyal; conformable to the duty of allegiance: a word not now used.

ALLEGORIC, adj. After the manner of an allegory; not real; not literal.

A kingdom they portend thee; but what kingdom, Real or *allegoric*, I discern not. *Milton.*

ALLEGORICAL, adj. In the form of an allegory; not real; not literal; mythical.—When our Saviour said, in an *allegorical* and mystical sense, Except ye eat the flesh of the Son of Man, and drink his blood, ye have no life in you; the hearers understood him literally and grossly. *Benley.*

ALLEGORICALLY, adv. After an allegorical manner.—Virgil often makes Iris the messenger of Juno, *allegorically* taken for the air. *Peacham.*

ALLEGORICALNESS, f. The quality of being allegorical.

To ALLEGORIZE, v. a. To turn into allegory; to form an allegory; to take in a sense not literal.—An alchymist shall reduce divinity to the maxims of his laboratory, explain morality by sal, sulphur, and mercury; and *allegorize* the scripture itself, and the sacred mysteries thereof, into the philosopher's stone. *Locke.*

ALLEGORY, f. [*allegoric*, Fr. *allegoria*, Sp. *allegoria*, It. and Lat. *αλληγορία*, of *αλλο*, another, and *αγορευειν*, to speak, Gr.] A figure in rhetoric, which consists in choosing a secondary subject, having all its properties and circumstances resembling those of the principal subject, and describing the former in such a manner as to represent the latter. The principal subject is thus kept out of view, and we are left to discover it by reflection. There cannot be a finer or more correct allegory than that in psalm lxxx. where a vineyard is made to represent God's chosen people, the Jews.

Nothing gives greater pleasure than an allegory, when the representative subject bears a strong analogy, in all its circumstances, to that which is represented. But some writers are unlucky in their choice, the analogy being generally so faint and obscure, as rather to puzzle than to please. Allegories, as well as metaphors and similes, are unnatural whenever they express any severe passion which totally occupies the mind. See *METAPHOR*.

ALLE'GRI (Antonio), called *Correggio* from the place of his birth, an eminent historical painter, was born in the year 1494, and died in 1534. Being descended of poor parents, and educated in an obscure village, he enjoyed none of those advantages which contributed to form the other great painters of that illustrious age. He saw none of the statues of ancient Greece or Rome; nor any of the works of the established schools of Rome and Venice. But Nature was his guide; and Correggio was one of her favourite pupils. To express the facility with which he painted, he used to say that he always had his thoughts ready at the end of his pencil. The agreeable smile, and the profusion of graces, which he gave to his madonnas, saints, and children, have been taxed with being sometimes unnatural; but still they are amiable and seducing. An easy and flowing pencil, an union and harmony of colours, and a perfect intelligence of light and shade, give an astonishing relief to all his pictures, and have been the admiration both of his contemporaries and his successors. Annibal Caracci, who flourished fifty years after him, has been particularly lavish in his commendation of this great artist.

ALLE'GRO, f. in music, an Italian word denoting one of the six distinctions of time, and shews that the part is to be played in a sprightly, brisk, lively, and gay, manner. *Piu ALLEGRO*, signifies, that the part it is joined to should be sung or played quicker; as *Poco piu ALLEGRO* intimates, that the part to which it refers ought to be played or sung a little more briskly than *allegro* alone requires.

ALLEIN (Joseph), the son of Tobias Allein, was born at Devizes, in Wiltshire, in 1633, and educated at Oxford. In 1655, he became assistant to Mr. Newton, in Taunton-Magdalen,

Magdalen, in Somersetshire; but was deprived for non-conformity. He died in 1668, aged 35. He was a man of great learning, and greater charity; preserving, though a nonconformist and a severe sufferer on that account, great respect for the church, and loyalty to his sovereign. He wrote several books of piety, which are highly esteemed; but his "Alarm to Unconverted Sinners" is more famous than the rest.

ALLELU'JAH, *f.* [This word is falsely written for *Hallelujah*, הלל and יה.] A word of spiritual exultation, used in hymns; it signifies, *Praise God*.—He will set his tongue to those pious divine strains, which may be a proper prelude to those *allelujahs* he hopes eternally to sing.

ALLEMAN'DE, *f.* [Ital.] A kind of grave solemn music, with good measure, and a slow movement. It is also a brisk kind of dance, very common in Germany and Switzerland.

ALLEMA'NNIC, *f.* in a general sense, denotes any thing belonging to the ancient Germans. Thus, we meet with Allemannic history, Allemannic language, Allemannic law, &c.

ALLEN (Thomas), a celebrated mathematician of the 16th century. He was born at Uttoxeter in Staffordshire, in 1542; was admitted a scholar of Trinity-college, Oxford, in 1561; where he took his degree of master of arts in 1567. In 1570 he quitted his college and fellowship, and retired to Gloucester-hall, where he studied very closely, and became famous for his knowledge in antiquity, philosophy, and mathematics. He received an invitation from Henry earl of Northumberland, a great friend and patron of the mathematicians, and he spent some time at the earl's house; where he became acquainted with those celebrated mathematicians Thomas Harriot, John Dee, Walter Warner, and Nathaniel Torporley. Robert earl of Leicester, too, had a great esteem for Allen, and would have conferred a bishopric upon him; but his love for solitude and retirement made him decline the offer. His great skill in the mathematics gave occasion to the ignorant and vulgar to look upon him as a magician or conjurer. Allen was indefatigable in collecting scattered manuscripts relating to history, antiquity, astronomy, philosophy, and mathematics: which collections have been quoted by several learned authors, and mentioned as in the Bibliotheca Alleniana. He published in Latin the second and third books of Ptolemy, "Concerning the Judgment of the Stars," or, as it is usually called, of the "Quadripartite Construction," with an exposition. He wrote also notes on many of Lilly's books, and some on John Bale's work, "De Scriptoribus Maj. Britanniae." He died at Gloucester-hall in 1632, being 90 years of age.

Mr. Burton, the author of his funeral oration, calls him the very soul and fun of all the mathematicians of his age. And Selden mentions him as a person of the most extensive learning and consummate judgment, the brightest ornament of the university of Oxford. Also Camden says, he was skilled in most of the best arts and sciences. A. Wood has also transcribed part of his character from a manuscript in the library of Trinity-college, in these words:—"He studied polite literature with great application; he was strictly tenacious of academic discipline, always highly esteemed by foreigners and those of the university, and by all of the highest stations in the church of England, and the university of Oxford. He was a sagacious observer, an agreeable companion, &c."

ALLEN (John), archbishop of Dublin in the reign of Henry VIII. was educated in the university of Oxford; from whence removing to Cambridge, he there took the degree of bachelor of laws. He was sent by Dr. Warham, archbishop of Canterbury, to the pope, about certain matters relating to the church. He continued at Rome nine years, and was created doctor of laws. After his return, he was appointed chaplain to cardinal Wolsey, and was commissary or judge of his court as legate *à latere*; in the execution of which office he was suspected of great dishonesty, and even perjury. He assisted the cardinal in visit-

ing, and afterwards suppressing, forty of the smaller monasteries, for the erection of his college at Oxford and that at Ipswich. The cardinal procured for him the living of Dalby in Leicestershire, though it belonged to the master and brethren of the hospital at Burton Lazars. In the year 1525 he was incorporated doctor of laws in the university of Oxford. On the 13th of March 1528 he was consecrated archbishop of Dublin; and about the same time was made chancellor of Ireland. He wrote several pieces relating to the church. His death, which happened in July 1534, was very tragical: for, being taken in a time of rebellion by Thomas Fitzgerald, eldest son to the earl of Kildare, he was by his command most cruelly murdered, being brained like an ox, at Tartaine in Ireland, in the 58th year of his age.

ALLEN (Sir Thomas), vice-admiral of the white, was a distinguished commander in the British navy, during the war between the English and Dutch, in the reign of Charles II. In the year 1665, he attacked a Dutch fleet, richly laden, from Smyrna, consisting of forty merchant ships, and four men of war. In the engagement, which happened near Cadiz, the Dutch commodore, Brackel, was killed, and four of the richest ships taken; the rest took refuge in the bay of Cadiz, where he blocked them up for a considerable time. In the celebrated action with Van Tromp, which happened in 1666, Sir Thomas Allen commanded the white squadron of the English fleet, under prince Rupert and the earl of Albemarle. He attacked the Dutch van, which he entirely routed; and it is remarkable that he killed the three admirals who commanded it. The Dutch are said to have lost twenty ships in this action, and near 4000 men. The English lost only one ship, the Resolution, which was burnt; three captains were killed, and about 300 private men.

ALLEN (isle of), in the county of Kildare, in Ireland, though apparently an English name, seems to be only a corruption of the Irish *Hy-al-lain*, i. e. the district of the great plain country. In this district stands the Hill of Allen, the Mount Croinla of the ancient bards. The bog of Allen, an immense tract of turf-bog, or peat-moist, the largest in the kingdom, runs through part of the counties of Dublin, Carlow, Kildare, Kilkenny, and Meath. A great part of it has of late years been reclaimed by burning, and the sowing of rape-seed.

ALLENBURG, a little town of Tapiau, in Prussia, commodiously situated on the river Alle. Lat. 51. 30. N. lon. 22. 10. E.

ALLENDORF, a small town in the circle of the Upper Rhine, and in the landgraviate of Hesse Cassel, remarkable for its salt-works and three stone-bridges. It is seated on the river Weser, fifteen miles east of Cassel. Lat. 51. 26. N. lon. 10. 5. E.

ALLER, a river which runs through the duchy of Lunenburg, and falls into the Weser a little below Verden.

ALLER, *good*, in our ancient writers. The word *aller* serves to make the expression of superlative signification. So, *aller-good* is the greatest good. Sometimes it is written *alder*.

ALLER'ION, or **ALE'ION**, *f.* in heraldry, a sort of eagle without beak or feet, having nothing perfect but the wings. They differ from martlets by having their wings expanded, whereas those of the martlet are close; and denote Imperialists vanquished and disarmed; for which reason they are more common in French than in German coats of arms.

AL'LESTRY (Richard, D. D.) an eminent divine, born at Uppington in Shropshire, in March 1619; was educated in the grammar-school at Coventry, and afterwards at Christ-church in Oxford. He took up arms for king Charles I. and was sometimes seen with his musket in one hand and his book in the other. He was very active in the service of Charles II. before his restoration, and was employed by the royalists in transacting business with that prince during his exile; but was at last seized at Dover by a party of soldiers, and committed prisoner to

to Lambeth-house, where he was confined six or eight weeks: but soon after the restoration he was made canon of Christ-church, created doctor of divinity, and appointed chaplain in ordinary to the king, and regius professor of divinity. In 1665 he was appointed provost of Eton college, where he raised the school, which he found in a low condition, to an uncommon pitch of reputation. The west side of the outward quadrangle of that college was built from the ground at his expence. The excellent Dr. Hammond, who was his intimate friend, left him his valuable library, which he himself afterwards bequeathed to his successors in the divinity-chair. He was eminent for his piety, benevolence, and integrity; for the sincerity of his friendship, and his disinterested temper. He wrote several books; and a collection of his sermons was printed after his decease, by Dr. Fell, bishop of Oxford. He died August 20, 1680.

AL'LESTRY (Jacob), an English poet of the last century. He was the son of James Allestry, a bookseller of London, who was ruined by the great fire in 1666. Jacob was educated at Westminster-school, entered at Christ-church, Oxford, in 1671, at the age of eighteen, and was elected student in 1672. He took the degree in arts; was music-reader, and *terræ filius*, in 1681; both which offices he executed with great applause, being esteemed a good philologist and poet. He had a chief hand in the verses and pastorals spoken in the theatre at Oxford May 21, 1681, by Mr. William Savile, second son of the marquis of Halifax, and George Cholmondeley, second son of Robert Viscount Kells (both of Christ-church), before James duke of York, his duchess, and the lady Anne; which verses and pastorals were afterwards printed in the "Examen Poeticum." He died October 15, 1686.

ALLEVEU'RE, *f.* A small brass Swedish coin, worth about a halfpenny English money.

To ALLEVIATE, *v. a.* [*allevio*, Lat.] To make light; to ease; to soften. To extenuate; as, He *alleviates* his fault by an excuse.—Most of the distempers are the effects of abused plenty and luxury, and must not be charged upon our Maker; who, notwithstanding, hath provided excellent medicines, to *alleviate* those evils which we bring upon ourselves. *Bentley.*

ALLEVIATION, *f.* The act of making light, of allying, or extenuating. That by which any pain is eased, or fault extenuated.—All apologies for, and *alleviations* of, faults, though they are the heights of humanity, yet they are not the favours but the duties of friendship. *South.*

ALLEY, *f.* [*allée*, a walk, of *aller*, Fr. to go.] A walk in a garden.

Come, my fair love, our morning's task we lose;
Some labour ev'n the easiest life would choose:
Our's is not great; the dangling boughs to crop,
Whose too luxuriant growth our *alleys* stop. *Dryden.*

A passage in towns narrower than a street.—A back friend, a shoulder clapper, one that commands the passages of *alleys*, creeks, and narrow lands. *Shakespeare.*

AL'LEY, *f.* in perspective, that which, in order to have a greater appearance of length, is made wider at the entrance than at the termination.

AL'LEY, *f.* in the new husbandry, implies the vacant space between the outmost row of corn on one bed and the nearest row to it on the next parallel bed; and it is usually about four feet in breadth, exclusive of the partitions between the rows of corn in the beds.

AL'LEY (William), bishop of Exeter in the reign of queen Elizabeth, was born at Great Wycomb, in Buckinghamshire. From Eton school, in the year 1523, he removed to king's college, Cambridge, where he took the degree of bachelor of arts. He also studied some time at Oxford; afterwards he married, was presented to a living, and became a zealous reformer. Upon queen Mary's accession, he left his cure and retired into the north of England; where he maintained his wife and himself by teaching a school, and practising physic. Queen Elizabeth af-

cending the throne, he went to London, where he acquired great reputation by reading a divinity-lecture at St. Paul's, and in July, 1560, was consecrated bishop of Exeter. He died on the 15th of April, 1570, and was buried at Exeter, in the cathedral. He wrote, 1. "The Poor Man's Library," 2 vol. fol. These volumes contain twelve lectures on the first epistle of St. Peter, read at St. Paul's. 2. "A Hebrew Grammar." Whether it was ever published, is uncertain. He translated the Pentateuch in the version of the bible which was undertaken by queen Elizabeth's command.

AL'LEYN (Edward), a celebrated English actor in the reigns of queen Elizabeth and king James, and founder of the college at Dulwich in Surry, was born at London, Sept. 1, 1566. Haywood, in his prologue to Marlowe's Jew of Malta, calls him, Proteus for shapes, and Roscius for a tongue. He usually played the capital parts, and was one of the original actors in Shakespeare's plays. It may appear surprising how one of Mr. Alleyn's profession should be enabled to erect such an edifice as Dulwich College, and liberally endow it for the maintenance of so many persons. But it must be observed, that he had some paternal fortune, which, though small, might lay a foundation for his future affluence. He was himself the first master of his college; so that, to make use of the words of Mr. Haywood, one of his contemporaries, "He was so mingled with humility and charity, that he became his own pensioner, humbly submitting himself to that proportion of diet and clothes which he had bestowed on others." We have no reason to think he ever repented of this distribution of his substance; but, on the contrary, that he was entirely satisfied, as appears from the following memorial in his own writing, found amongst his papers: "May 26, 1620—My wife and I acknowledged the fine at the common pleas bar, of all our lands to the college: blessed be God that he has given us life to do it." He died Nov. 25, 1626, in the 61st year of his age, and was buried in the chapel of his new college, where there is a tombstone over his grave, with an inscription. His original Diary is also there preserved.

AL'LIA, a river of Italy, which, running down a steep channel from the mountains of Crustumium, mixes with the Tiber, forty miles from Rome. It is famous for the great slaughter of the Romans by the Gauls, under Brennus.

ALLIANCE, *f.* [*alleanza*, It. *aliança*, Sp. *alliance*, of *allier*, Fr. of *alligo*, Lat. to tie or unite together.] The state of connection with another by confederacy; a league. In this sense, our histories of queen Anne mention *the grand alliance*. Relation by marriage. Relation by any form of kindred. The act of forming or contracting relation to another; the act of making a confederacy. The persons allied to each other.

ALLIANCE, with the ancient Romans, though a sort of servitude, was much coveted. Ariarathes, we are told by Polybius, offered a sacrifice to the gods by way of thanksgiving, for having obtained an alliance. The reason was, that thenceforwards people were sure not to receive any injuries except from them. There were different sorts of allies: some only united to them by a participation of the privileges of Romans, as the Latini and Hernici; others by their very foundation, as the colonies; others by the benefactions they received from them, as Massinissa, Eumenes, and Attalus, who owed their kingdoms to Rome; others by free treaties, which last, by a long alliance, became subjects, as the kings of Bithynia, Cappadocia, Egypt, and most of the cities of Greece: lastly, others by compulsive treaties, and the law of subjection, as Philip and Antiochus. For they never granted peace to an enemy without making an alliance with him; that is, they never subdued any people without using it as a means of subduing others.

The forms or ceremonies of alliances have been various in different ages and countries. Among us, signing and swearing are the chief; anciently eating and drinking together, chiefly offering sacrifices together, were the customary

tomary rite of ratifying an alliance. Among the Jews and Chaldeans, heifers or calves; among the Greeks, bulls or goats; and among the Romans, hogs; were sacrificed on this occasion. Among the ancient Arabs, alliances were confirmed by drawing blood out of the palms of the hands of the two contracting princes with a sharp stone, dipping herein a piece of their garments, and therewith smearing seven stones, at the same time invoking the gods Vrotalt and Alilat, i. e. according to Herodotus, Bacchus and Urania. Among the people of Cholchis, the confirmation of alliances is said to be effected by one of the princes offering his wife's breasts to the other to suck, which he was obliged to do till there issued blood.

ALLIANCE, in a figurative sense, is applied to any kind of union or connection; thus we say, there is an alliance between church and state.

ALLIAR ZERIS. A term used in preparing the philosopher's stone, to signify philosophical copper, which is also called water of quicksilver, white copper, and many other names.

ALLIARIA, *f.* in botany. See ERYSIMUM.

ALLICIENCY, *f.* [*allicio*, Lat. to entice or draw.] The power of attracting any thing; magnetism; attraction.—The feigned central alliciency is but a word, and the manner of it full occult. *Glanville.*

ALLIENCY, *f.* [from *allidere*, Lat.] Enticingness; alluringness.

To ALLIGATE, *v. a.* [*alligo*, Lat. from *ad*, to, and *ligo*, to bind.] To tie one thing to another; to unite.

ALLIGATI, *f.* in Roman antiquity, the basest kind of slaves, who were usually kept fettered. The Romans had three degrees, or orders, of slaves or servants; the first employed in the management of their estates; the second in the menial or lower functions of the family; the third, called alligati, above-mentioned.

ALLIGATION, *f.* The act of tying together; the state of being so tied. In arithmetic, the rule that teaches to adjust the price of compounds, formed of several ingredients of different value. See ARITHMETIC.

ALLIGATOR, *f.* in zoology, a synonyme of the *lacerta crocodilis*. See LACERTA.

ALLIGATOR-PEAR, *f.* in botany. See LAURUS.

ALLIGATURE, *f.* The link, or ligature, by which two things are joined together.

ALLIONIA, *f.* [named in honour of *Charles Allioni*, professor of botany at Turin, &c.] In botany, a genus of the tetrandria monogynia class, ranking in the natural order of aggregatæ. The generic characters are—Calyx: perianthium common to three flowers, simple, oblong, five-parted; parts ovate, acute, permanent; proper obsolete, superior. Corolla: proper one-petalled, funnel-shaped, edge quinquefid, erect. Stamina: filaments fetaceous, longer than the corolla, bending to one side; antheræ roundish. Pistillum: germ inferior, oblong; style fetaceous, longer than the stamens; stigma multifid, linear. Pericarpium: none. Seeds: solitary, oblong, five-cornered, naked. Receptaculum: naked.—*Essential Character.* Calyx common, oblong, simple, three-flowered; proper obsolete, superior. Corollules irregular. Receptaculum naked.

Species. 1. *Allionia violacea*: leaves heart-shaped, calyxes quinquefid. Native of South America.

2. *Allionia incarnata*: leaves obliquely ovate, calyxes triphyllous. This is an annual glaucous plant; a native of Peru, on rocks, and in sandy soils. Introduced into the Paris garden, from seeds sent by Dombey. It flourishes there, and perfects its seeds in the middle of summer.

ALLIOTICS, *f.* in pharmacy, medicines which by fermentation and cleansing alter and purify the blood.

ALLIOTH, *f.* a star in the tail of the greater bear, much used for finding the latitude at sea.

ALLISION, *f.* [from *allisum*, sup. of *allido*, of *ad*, to, and *lido*, to hurt.] The act of striking one thing against another.—There have not been any islands of note, or considerable extent, torn and cast off from the continent by

earthquakes, or severed from it by the boisterous *allision* of the sea. *Woodward.*

ALLITERATION, *f.* [*ad* and *litera*, Lat.] An ornament of language, chiefly used in poetry, which consists in the repetition of the same letter at certain intervals. It sometimes deforms language however instead of adorning it, especially in prose compositions; and, on this account, as well as the trivial degree of excellence which attaches to it even when judiciously applied, critics in general disregard it. The poets furnish numerous instances of alliteration, most of them perhaps accidental. Dr. Johnson cites the following line from Milton, as an instance:

“Behemothi biggest born—”

But Grey's Odes abound with alliterations; almost every srophe commencing and concluding with an alliterative line:

“Ruin seize thee, ruthless king.”

“To high-born Hoel's harp, or soft Llewellyn's lay.”

“Weave the warp, and weave the woof.”

“Stamp we our vengeance deep, and ratify his doom.”

“Regardless of the sweeping whirlwind's sway.”

“That hush'd in grim repose, expects his evening prey.”

From Mr. Pope we may also draw an example:

“Eternal beauties grace the shining scene,
Fields ever fresh, and groves for ever green.”

ALLIUM, *f.* [derivation uncertain. Some deduce it from *αλλεσθαι*, *exilire*, on account of its quick growth; others from *halo*, because it exhales a strong smell; others from *αγλαδης*, a head of garlic.] In botany, a genus of the hexandria monogynia class, ranking in the natural order of spathaceæ. The generic characters are—Calyx: spathe common, roundish, withering, many-flowered. Corolla: petals six, oblong. Stamina: filaments six, subulate, often the length of the corolla; antheræ oblong, upright. Pistillum: germ superior, short, bluntly three-cornered, the corners marked with a line; style simple; stigma sharp. Pericarpium: capsule very short, broad, three-lobed, three-celled, three-valved. Seeds: few, roundish. In some species three alternate filaments are broad and forked, with an intermediate anther.—*Essential Character.* Corolla six-parted, spreading; spathe many-flowered; umbel heaped; capsule superior.

Species. 1. Stem-leaves flat; umbel capsule-bearing.

1. *Allium ampeloprasum*, or great round-headed garlic: umbel globose, stamens three-cusped, petals with a rough keel. This species is found growing naturally in the East, in Switzerland, in a small island in the Bristol channel, &c. With us it flowers in July and August.

2. *Allium porrum*, or common leek: umbel globose, stamens three-cusped, petals with a rough keel, root coated. It is very like the former, and perhaps only a variety. It flowers in April and May.

3. *Allium lineare*, or linear-leaved garlic: umbel globose, stamens three-cusped, twice as long as the corolla. This grows naturally in Siberia. It has narrower leaves than the common leek, the stalks are smaller, and do not rise so high; the heads of flowers are also smaller, and of a purple colour.

4. *Allium rotundum*, or great round-headed garlic: umbel subglobose, stamens three-cusped, side-flowers nodding. Native of the southern parts of Europe.

5. *Allium victorialis*, or long-rooted garlic: umbel rounded, stamens lanceolate, larger than the corolla, leaves elliptic. Grows on the mountains of Switzerland, Austria, Silesia, and Savoy. The wild plant has the root-leaves half an inch broad; transplanted into a garden, the leaves grow to four inches in breadth, without becoming much longer. The stem is from a foot to eighteen inches in height.

6. *Allium sub-hirsutum*, or hairy garlic or Dioscorides's moly: stamens awl-shaped, lower leaves hirsute. Native

of Italy, Spain, Africa, and the Levant. It flowers in May, and was cultivated in 1596 by Gerard.

7. *Allium magicum*, or Homer's garlic or moly: stamens simple, branches bulb-bearing. This species is preserved by many persons in the gardens for the sake of variety, but it has a very strong scent.

8. *Allium obliquum*, or oblique-leaved garlic: stamens filiform, thrice as long as the flower, leaves oblique. Native of Siberia.

9. *Allium ramosum*, or branched garlic: umbel globose, stamens awl-shaped longer, leaves linear, subconvex. This and the former grow naturally in Siberia, whence their seeds were sent to Petersburg, and from them the botanic gardens have been supplied; but they are only preserved for the sake of variety.

10. *Allium roseum*, or rose garlic: umbel flat topped, petals emarginate, stamens very short, simple. It grows naturally about Montpellier, and in Piedmont, in the fields, olive-grounds, and vineyards.

11. *Allium Tartaricum*, or Tartarian garlic: umbel flat, stamens simple, leaves femicylindrical. Native of Siberia.

11. Stem-leaves flat; umbel bulb-bearing. 12. *Allium sativum*, or common garlic: bulb compound, stamens three-cusped. Garlic is said to be found wild in the island of Sicily. It has many bulbs, commonly called cloves, invested with a white skin; the leaves are linear, long, and narrow, like those of grass. Cultivated in 1551; and probably much earlier.

13. *Allium scorodoprasum*, or rochambole: stamens three-cusped, leaves crenulate, sheaths two-edged. Rochambole is found wild in Sweden, Denmark, and Hungary. This has compound bulbs, but the cloves are smaller than those of garlic.

14. *Allium arenarium*, or sand garlic: stamens three-cusped, sheaths columnar, spathe awnless. It grows wild in Thuringia, Scania, Denmark, Switzerland, Italy, and Westmoreland.

15. *Allium carinatum*, or mountain garlic: stamens awl-shaped, spathe very long. It is found wild in Scania, Germany, Italy, and Switzerland; also in Westmoreland; about Ramsgate, in the isle of Thanet; and between Sandwich and Deal.

III. Stem-leaves columnar; umbel capsule-bearing. 16. *Allium sphaerocephalon*, or small round-headed garlic: stamens three-cusped, longer than the corolla, leaves femicolumnar. Native of Italy, Germany, Switzerland, and Siberia. Haller thinks that the eighteenth is not specifically distinct from this.

17. *Allium parviflorum*, or small-flowered garlic: umbel globose, stamens simple, longer than the corolla, spathe awl-shaped. Like the former, except in having simple filaments. It is a native of the south of Europe.

18. *Allium descendens*, or purple-headed garlic: stamens three-cusped, outer peduncles shorter. Native of Italy and Switzerland.

19. *Allium moschatum*, or musk-smelling garlic: umbel flat-topped, mostly six-flowered, petals acute, stamens simple, leaves fetaceous. It grows wild in Provence, Narbonne, and Spain. Casp. Bauhin relates, that Saltzman brought him the plant from the hills about Montpellier in 1598, and that he cultivated it in his garden.

20. *Allium flavum*, or sulphur-coloured garlic: flowers pendulous, petals ovate, stamens longer than the corolla. Gouan and Gerard think this to be a variety of the last. It is a native of the south of France, Italy, and Austria.

21. *Allium pallens*, or pale-flowered garlic: flowers pendulous, truncated; stamens simple, equalling the corolla. Native of Italy, Spain, Montpellier, and Hungary. Introduced in 1779, by Abbé Poirét.

22. *Allium paniculatum*, or panicle garlic: peduncles capillary, spread out; stamens awl-shaped, spathe very long. The leaves are awl-shaped and channelled; and it is a native of Italy, Austria, Switzerland, Carniola, Sibe-

ria, and the Levant. Gerard joins this with the foregoing.

23. *Allium vineale*, or crow garlic: stamens three-cusped. This is a native of Germany, Switzerland, Italy, &c. With us it is frequent in pastures, and communicates its rank taste to the milk and butter. In other countries it grows also among the corn, and in vineyards.

24. *Allium oleraceum*, or purple-striped garlic: stamens simple; leaves rough, femicolumnar; furrowed underneath. Native of Sweden, Germany, Switzerland, Italy; and with us in Westmoreland, and Yorkshire; near, Bristol; and in Essex, near Notley, among corn.

25. *Allium Pallasii*, or Pallas's garlic: umbel difform, stamens simple, equalling the corolla; style very short. The leaves are shorter than the stem, and alternate.

IV. Leaves radical, stem naked. 26. *Allium nutans*, or flat-stalked garlic: scape two-edged, leaves linear flat, stamens three-cusped. It varies so much in different ages and soils as scarcely to be known. The cusps of the stamens are obliterated in old plants. A native of Siberia.

27. *Allium ascalonicum*, or shallot or eschallote: scape columnar, leaves awl-shaped, umbel globose, stamens three-cusped. Hasselquist found the eschallotte native in Palestine, and it was cultivated here in 1633.

28. *Allium senescens*, or narcissus-leaved onion or garlic: scape two-edged, leaves linear, convex beneath, smooth, umbel roundish, stamens awl-shaped. This species is a native of Siberia, the Alps, Silesia, and the island of Sicily.

29. *Allium odorum*, or sweet-smelling garlic: scape nearly columnar, leaves linear, channelled, angular beneath, umbel flat-topped. Is a native of the south of Europe, China, Japan, &c.

30. *Allium inodorum*, or Carolina garlic: scape naked subtriquetrous, leaves linear flat keeled beneath, umbel fastigate floriferous, stamens simple. Native of Carolina. It was introduced in 1776, by the duchess dowager of Portland, and it flowers in March and April.

31. *Allium angulosum*, or angular-scaped garlic: scape two-edged, leaves linear-channelled, somewhat angular beneath, umbel flat-topped. Allioni can scarcely find any certain difference between the twenty-eighth and this, which is found in meadows, whereas that grows on rocks; the flowers also are larger, the plant is higher, and the leaves are not flexuose. Native of Siberia, Italy, Austria, Switzerland, and Germany, in moist places.

32. *Allium nigrum*, or black garlic: scape columnar, leaves linear, umbel hemispherical, petals erect, spathe pointed, bifid. Resembles No. 28, but is twice the size; has the leaves of narcissus. It is a native of Provence, Italy, Austria, and the neighbourhood of Algiers.

33. *Allium Canadense*, or Canada tree-onion: scape columnar, leaves linear, head bulb-bearing. Native of North America.

34. *Allium ursinum*, or ramsons: scape three-sided, leaves lanceolate, petiolate, umbel flat-topped. Native of Sweden, Denmark, Germany, Switzerland, Italy, in woods and moist shady places; and in England is not uncommon.

35. *Allium triquetrum*, or three-cornered moly: scape and leaves three-sided, stamens simple. A native of Italy and Spain.

36. *Allium cepa*, or common onion: scape swelling out below, and longer than the columnar leaves. The common onion is too well known, by its fistular leaves and swelling stalks, to need a particular description. The Latin name *cepa* is derived from *caput*, a head, on account of the form of its bulb; for the same reason, the Greeks called it *κρομμύον*. Our English and French names are from the Latin *unio*; because the bulb never throws out any offsets. The varieties of the common onion are—the Strasburgh, or common oval; the Spanish, silver-skinned, and red-skinned; the Portugal great oval onion; and the Tripoli. All these vary from seeds, and there are several intermediate differences which are not worth enumerating. The virtues of this genus are considerable. The common onion

onion has been considered as of an alexipharmic quality, and has been prescribed in malignant and epidemical distempers. They are very diuretic and powerful in cleansing and breaking away any obstructions in the urinary passages. They are likewise very efficacious in all infarctions of the lungs, greatly promoting expectoration, and relieving asthma and difficulty of breathing. Externally they are employed in cataplasms for suppurating hard tumors. Garlic is still more powerful than onions. As it is very heating and penetrating, it should not be used too freely, being apt to cause head-achs and other inconveniences. A clove or two of garlic pounded with honey, and taken two or three nights together, is good in rheumatic cafes. A quart of water poured boiling hot upon a pound of the fresh root, cut into slices, and suffered to stand upon it in a close vessel, for twelve hours, becomes strongly impregnated with the taste and smell of the garlic. This infusion, with a proper quantity of sugar, makes the syrup of garlic of the shops. Vinegar and honey excellently coincide with and improve this medicine, as a detergent and deobstruent, in disorders of the breast: a composition of this kind is prepared by infusing an ounce and a half of the fresh root in half a pint of vinegar, and dissolving in the strained liquor, by the heat of a water-bath, ten ounces of clarified honey: to cover in some degree the ill smell of the garlic, a little carraway and sweet-fennel seed, bruised, two drachms of each, are boiled for a short time in the vinegar, before the garlic is put in. The garlic itself is never to be boiled; its essential oil (in which its virtue consists) exhaling during that process.

37. *Allium moly*, or yellow moly: scape subcylindric, leaves lanceolate, sessile; umbel level-topped. This was formerly preserved in gardens for the sake of its yellow flowers, but, having a very strong garlic scent, most people have rooted it out. A native of Hungary, on Monte Baldo, about Montpellier, and on the Pyrenees.

38. *Allium tricoccum*, or three-seeded garlic: scape naked, semicolumnar; leaves lanceolate-oblong, flat, smooth; umbel globular, seeds solitary. Native of North America.

39. *Allium fistulosum*, or Welsh onion or ciboule: scape equalling the columnar swelling leaves. Ciboule or Welsh onion is perennial, and does not form bulbs like the common onion; it was cultivated in 1629.

40. *Allium schœnoprassum*, or cives or chives: scape equalling the columnar awl-siliform leaves. These smell very strong, and there is a variety of them found in Siberia, &c. figured by Gmelin and Buxbaum, described by Murray in the new Gottingen Comment. In the common cives the leaves are straight; in this they are reflected at the ends; in that the form of the umbel can scarcely be called pyramidal, as it is in this. The scape however of both is clothed with the sheath of the leaves, so that it cannot be said that it is truly naked. A native of Italy, Switzerland, Sweden, and Siberia.

41. *Allium Sibiricum*, or Siberian garlic: scape columnar, leaves semicylindric, stamens awl-shaped. This and the next are natives of Siberia. Introduced in 1777 by chevalier Murray.

42. *Allium tenuissimum*, or slender-leaved garlic: scape columnar, empty; leaves awl-siliform; heads loose, few-flowered. It is much eaten by the field-mice, and they lay up the roots for their winter food.

43. *Allium chamæ-moly*, or bastard garlic: scape scarcely any, naked; capsules drooping, leaves flat ciliate. Native of Italy; flowering in January.

44. *Allium gracile*, or Jamaica garlic: scape naked, columnar, very long; leaves linear, channelled; stamens subulate, connate at the base. This is a native of Jamaica, was introduced in 1787 by Hinton East, Esq. and it flowers in February.

45. *Allium Neapolitanum*, or Naples garlic: scape naked ancipital, leaves lanceolate channelled, umbel scattered. It is cultivated in the gardens near Naples, and begins to grow spontaneously about the city, flowering in March.

Propagation and Culture. Garlic is easily propagated by planting the cloves or small bulbs of the root in the spring, with a dibber or in drills, in beds four feet wide, in rows six inches from each other, and four or five inches distant in the rows; keeping them clean from weeds. About the beginning of June, the leaves should be tied in knots, to prevent their spindling or running to seed, which will greatly enlarge the bulb. Towards the end of July the leaves will begin to wither and decay, when the roots should be taken up, cleaned and dried in the sun, tied in bunches and hung up in a dry room, to prevent their rotting, and thus preserved for winter use.

Rocambole may be propagated either by the roots, or the bulbs produced on the stalks: they should be planted in autumn, especially on dry ground, otherwise their bulbs will not be large. They are to be planted and prepared for use in the same manner as garlic.

All the flowering sorts are very hardy, and will thrive in almost any soil and situation; they are easily propagated either by their roots, or seeds; if from the roots, the best time is in autumn, that they may take good root in the ground before the spring, which is necessary, in order to have them flower strong the following summer. If by seeds, they may be sown in a border of common earth, either in autumn, soon after the seeds are ripe, or in the spring following; and will require no farther care, but to keep them clear from weeds: in the following autumn, they may be transplanted into the borders where they are to remain. They flower in May, June, and July.

Species the fifth, sixth, seventh, tenth, sixteenth, eighteenth, twentieth, twenty-eighth, thirty-first, and thirty-seventh, are the best known in the gardens, but lately have been little cultivated; most of them are from twelve to eighteen inches in height, and continue a month in flower: the fifth and seventh are from two feet to a yard high, and produce large specious umbels. The yellow moly (No. 37.) has some beauty in the flowers, and deserves a place in borders where few better things will thrive: it increases plentifully both by roots and seeds.

Of the leek there has been generally supposed two sorts, but I have made trial of them both, by sowing their seeds several times, and find they are the same; the difference which has risen between them, has been occasioned by some persons having saved the seeds from old roots, and not from the seedling leeks, whereby they have degenerated them, and rendered them smaller and narrower leaved; but by care this may be recovered again, as I have experienced. Leeks are cultivated by sowing their seeds in the spring, in the same manner as is directed below for onions, with which these are commonly sown, the two sorts of seeds being mixed according to the proportion which is desired of either sort; though the most common method is, to mix an equal quantity of both, for the onions will greatly out-grow the leeks in the spring; but, these being drawn off early in August, the leeks will have time to grow large afterwards, so that there may be a moderate crop of both sorts. The management of leeks being exactly the same with onions, we shall not repeat it; but shall only add, that many persons sow their leeks very thick in beds in the spring; and, in June, after some of their early crops are taken off, they dig up the ground, and plant their leeks out thereon, in rows a foot apart, and six inches asunder in the rows, observing to water them until they have taken root; after which they will require no farther culture, but to clear the ground from weeds. The leeks thus planted will grow to a large size, provided the ground be good. If you would save the seeds of this plant, you should make choice of some of the largest and best leeks you have, which must remain in the place where they grew until February, when they should be transplanted in a row against a warm hedge, paling, or wall, at about eight inches asunder; and, when their stems advance, which will be in May or June, they should be supported by a string, to prevent their being broken down, to which they are very liable, especially when

when in head; and the closer they are drawn to the fence in autumn, the better the seeds will ripen; for it sometimes happens in cold summers or autumns, that those which grow in the open garden do not perfect their seeds in this country, especially if there should be sharp frosts early in autumn, which will entirely spoil the seed. When it is ripe (which may be known by the heads changing brown) you should cut off their heads with about a foot or more of the stalk to each, and tie them in bundles, three or four heads in each, and hang them up in a dry place, where they may remain until Christmas or after, when you may thresh out the seeds for use. The husk is very tough, which renders it very difficult to get out the seeds; therefore some persons who have but a small quantity rub it hard against a rough tile, which will break the husks, and get out the seeds better than most other methods I have known used.

The onion is propagated by seeds, which should be sown at the latter end of February or the beginning of March, on good, rich, light ground, which should be well dug and levelled, and cleared from the roots of all bad weeds; then the seeds should be sown in a dry time, when the surface of the ground is not moist; and, where they are intended for a winter crop, they must not be sown too thick. In cold wet land it is better to defer sowing till the middle of March; and in very moist rich soils it may be done any time before the middle of April. But the early-sown crops bulb or apple best, and grow to the largest size. The common allowance of seed is six pounds to an acre of land; or an ounce to a rod or pole. But the generality of gardeners sow more, because many of them allow for a crop to draw out, which they call cullings; these are thinned out when young, and tied in bunches for the market; but those who have regard to their principal crop never practise this, but sow no more seed than is sufficient, for, when the plants come up too close, they draw each other weak; and, when this happens, their roots never grow so large as those which are thin sowed: besides there is a great trouble in hoeing them; and, when they are thinned for the market, the ground is trodden over, and the onions which are to stand have their leaves bruised, whereby they are greatly injured; so that, where young onions are wanted, it is a much better way to sow some separate beds for this purpose, than to injure the future crop. It is a common practice to mix other crops with the onion; but this is an obstruction to the main crop, without any great advantage; it is better therefore not to sow any thing with it, unless perhaps a little cos lettuce. In about six or seven weeks after sowing, the onions will be up forward enough to hoe; at which time (choosing dry weather) you should, with a small hoe about two inches and a half broad, cut up lightly all the weeds; and also cut out the onions where they grow too close in bunches, leaving them at this first hoeing at least two inches apart. This, if well performed, and in a dry season, will preserve the ground clear of weeds at least a month or five weeks; when you must hoe them over a second time, cutting up all the weeds as before, and also cut out the onions to a larger distance, leaving them this time three or four inches asunder. This also, if well performed, will preserve the ground clean a month or six weeks longer, when you must hoe them over the third and last time. Now you must carefully cut up all weeds, and single out the onions to near six inches square; by which means they will grow much larger than if left too close. This time of hoeing, if the weather proves dry, and it is well performed, will keep the ground clear until the onions are fit to pull up; but, if the weather should prove moist, and any of the weeds should take root again, you should, about a fortnight or three weeks after, go over the ground and draw out all the large weeds with your hands; for, the onions having now begun to bulb, they should not be disturbed with a hoe. Toward the middle of August your onions will have arrived at their full growth, which may be known by their blades falling to the ground and shrink-

ing; you should therefore, before their necks or blades are withered off, draw them out of the ground, cropping off the extreme part of the blade, and lay them abroad upon a dry spot of ground, observing to turn them every other day at least, to prevent their striking fresh root; which they will suddenly do, especially in moist weather. In about a fortnight's time your onions will be dry enough to house, which must be performed in perfectly dry weather; in doing of this, you must carefully rub off all the earth from the roots, and be sure to mix no faulty ones amongst them, which will in a short time decay, and spoil all those that lie near them; nor should you lay them too thick in the house, which would occasion their sweating, and thereby rot them; nor should they be put in a lower room, or ground floor, but in a loft or garret; and, the closer they are kept from the air, the better they will keep. You should, at least once a month, look over them to see if any of them are decayed; these must be immediately taken away, otherwise they will infect all that lie near them. But, notwithstanding all the care you can possibly take in the drying and housing your onions, many of them will grow in the loft, especially in mild winters, which are generally moist; therefore those who would preserve them late in the season, should select a parcel of the firmest and most likely to keep, from the others, and with a hot iron slightly singe their beards, or roots, which will effectually prevent their sprouting; but in doing this there must be great caution used not to scorch the pulp of the onions, for that will cause them to perish soon after. The best onions for keeping are the Strasburgh kind, which is an oval-shaped bulb; but this seldom grows so large as the Spanish, which is flatter; the white sort is esteemed the sweetest; but these varieties are not lasting; for, if you save the seeds of the white onions only, you will have a mixture of the red ones amongst them: nor will the Strasburgh onion keep long to its kind, but will by degrees grow flatter, as do the large Portugal and Tripoli onions, when planted in our climate, which in a year or two will be so far degenerated, as not to be known they were from that race. It is of great importance to have fresh seed, for, if it is above a year old, not one plant in fifty will grow. - This is an objection against foreign seed, which cannot be depended upon: it is necessary, however, to import it sometimes, for it degenerates in our climate. The goodness of the seed may easily be tried, by forcing it in the hot-house, or in warm water. In order to save seeds at home, you must in the spring make choice of some of the firmest, largest, and best-shaped, onions, (in quantity proportionable to the seed you intend to save;) and, having prepared some good ground, (which should be well dug, and laid out in beds about three feet wide,) in the beginning or middle of March you must plant your onions in the following manner: Having strained a line about four inches within the side of the bed, you must, with a spade, throw out an opening about six inches deep, the length of the bed, into which you should put the onions, at about nine inches distance from each other; with a rake draw the earth into the opening again to cover the bulbs; then proceed to remove the line again about a foot farther back, where you must make an opening as before, and so again till the whole is finished; so that you will have four rows in each bed, between which you must allow a space of two feet for an alley, to go among them to clear them from weeds, &c. In a month's time their leaves will appear above ground, and many of the roots will produce three or four stalks each; you must therefore keep them diligently cleared from weeds, and about the beginning of June, when the heads of the flowers begin to appear, you must provide a parcel of stakes about four feet long, which should be driven into the ground, in the rows of onions, at about six or eight feet apart; to which you should fasten some packthread, rope-yarn, or small cord, which should be run on each side the stems of the onions, a little below their heads, to support them from breaking down with the wind and rain; for, when

the feeds are formed, the heads will be heavy, and are very often broken down by their own weight, where they are not well secured; and, if the stalks are broken before the feeds have arrived to maturity, they will not be near so good, nor keep so long as those which are perfectly ripened. About the end of August the onion feed will be ripe, which may be known by its changing brown, and the cells in which the feeds are contained opening; so that, if it be not cut in a short time, the feeds will fall to the ground: when you cut off the heads, they should be spread abroad upon coarse cloths in the sun, observing to keep them under shelter in the night, as also in wet weather; and, when the heads are quite dry, you must beat out the feeds, which are very easily discharged from their cells: then having cleared them from all the husks, &c. after having exposed them one day to the sun to dry, you must put them up in bags to preserve them for use. The directions here given are for the general crop of winter onions; but there are two other crops of this common sort of onion, cultivated in the gardens about London to supply the market, one of which is commonly called the Michaelmas onion. These are sown in beds pretty close, in the middle of August, and must be well weeded when they come up. In the spring of the year, after the winter onions are over, they are tied up in bunches; but from the thinning of these, they carry to market young green onions in March, for fallads, &c. In the spring they sow more beds in the same manner, to draw up young onions for fallads, after the Michaelmas onions are grown too large for that purpose; and, where a supply of these is required, there may be three different sowings, at about three weeks distance from each other, which will be sufficient for the season. To have onions for pickling, some feed should be sown late in light poor land: the middle of April is the proper time. Sow it pretty thick, and do not thin it, unless when it rises in clusters. The bulbs will be fit to take up in August.

The scallion, or efallion, is a sort of onion which never forms any bulbs at the roots, and is chiefly used in the spring for green onions, before the other sorts, sown in July, are big enough; but this sort of onion, how much soever in use formerly, is now so scarce as to be known to few people, and is rarely to be met with, except in curious botanic gardens: the gardeners near London substitute for this, those onions which decay and sprout in the house: these they plant in a bed early in the spring, which in a short time will grow large enough for use; when they draw them up, and, after pulling off all the outer coat of the root, they tie them up in bunches, and sell them in the market for scallions. The true scallion is easily propagated by parting the roots, either in spring or autumn; but the latter season is preferable, because of their being rendered more fit for use in the spring: these roots should be planted three or four in a hole, at about six inches distance every way, in beds or borders three feet wide, which in a short time will multiply exceedingly, and will grow upon almost any soil and in any situation; and their being so hardy as to resist the severest of our winters, and being green, and fit for use so early in the spring, renders them worthy of a place in all good kitchen-gardens.

The cives are a very small sort of onion, which never produce any bulbs, and seldom grow above six inches high in the blade, which is also very small and slender, and in round bunches; this was formerly in great request for fallads in the spring, as being milder than those onions which had stood through the winter; these are propagated by parting their roots, are also very hardy, and will be fit for use early in the spring.

The ciboule, or Welsh onions, are also propagated for spring use only; these never make any bulb, therefore are only fit to be used green for fallads, &c. They are sown about the end of July, in beds of about three feet and a half wide, leaving alleys of two feet broad, to go between the beds to clean them, and in a fortnight's time they will appear above ground, when they must be carefully cleared

from weeds; towards the middle of October their blades will die away, so that the whole spot will seem to be naked, which has led many people to dig up the ground again, supposing the crop totally lost; whereas, if they stand undisturbed, they will come up again very strong in January, and from that time grow very vigorously, resisting all weathers; and by March will be fit to draw for young onions, and are, in the markets, more valued than any other sort at that season; for they are extremely green and fine, though they are much stronger than the common onion in taste, approaching nearer to garlic, which has occasioned their being less esteemed for the table: but as no winter, however hard, will hurt them, it is proper to have a few of them to supply the table, in case the common sort should be destroyed by frosts.

The roots of these onions, if planted out at six or eight inches distance, in March, will produce ripe feeds in autumn, but it will be in small quantities the first year; therefore the same roots should remain unremoved, which the second and third year will produce many stems, and afford a good supply of feeds; these roots will abide many years good, but should be transplanted and parted every second or third year, which will cause them to produce strong feeds.

The eschalotte, chalott, or shallot, is propagated by the smaller roots or off-sets, planted in November or February, on beds four feet wide, six inches from each other, and two or three deep. They want no culture but to keep them clean from weeds. The end of July or beginning of August, the roots will have attained their full growth; but the time of taking them up is best determined by the withering of the leaves: this should be done in a dry day. Spread them in the sun, and, when dry, clean and tie them in bunches for use.

AL'L'IUM, *f.* in botany. See HYACINTHUS, HYPOXIS, and TRADESCANTIA.

AL'LIX (Dr. Peter), a learned French protestant divine, born at Alençon, in 1641. He became minister of the reformed church at Rouen, where he published many learned and curious pieces; the credit of which induced the reformed to call him to Charenton, about a league from Paris, being the principal church they had in France. On the revocation of the edict of Nantz, he retired to England; where he studied the language with so much success, as to publish a work, intitled, "Reflections on the Books in the Holy Scriptures, to establish the Truth of the Christian Religion," two vols. which he dedicated to James II. acknowledging his obligations to that prince, and his kind behaviour to the distressed refugees in general. He wrote several other treatises relating to ecclesiastical history; which rendered him as famous in England as in France, for his ingenious and solid defences of the reformed religion. He was complimented with the degree of D. D. and in 1690 was made treasurer of the church of Salisbury. He died in 1717.

ALLO'A, or AL'LOWAY, a sea-port town in Scotland, seated on the Forth, about twenty miles higher up the river than Leith, and five miles east of Stirling. It is a populous place; has two market days in the week; and is remarkable for its fine castle, the seat of the earl of Mar, and for the coal-mines near it. The harbour is extremely commodious, with great depth of water; and vessels are expeditiously loaded with coals from the pits by an uncommon waggon-way, on which one horse draws with ease three waggons at once, each containing a ton and a half. An excellent dry-dock has also lately been erected here, capable of receiving ships of the greatest burthen. There is likewise a large glass-house for blowing bottles, of which vessels are supplied with any quantity upon the shortest notice.

ALLOBROGES, *f.* [from *Allobrox*.] A people of Gallia Narbonensis, situated between the rivers Iara and Rhodanus, and the Lacus Lemanus: commended by Cicero for their fidelity; discommended by Horace, on account of their fondness for novelty.

ALLOCA'TION, *f.* [*alloco*, Lat.] The act of putting one

one thing to another. The admission of an article in reckoning, and addition of it to the account.

ALLOCATIO'NE FACIENDA, *f.* is a writ directed to the lord-treasurer, or barons of the exchequer, commanding them to allow an accountant such sums as he has lawfully expended in the execution of his office.

ALLOCUTION, *f.* [*allocutio*, Lat. of *ad*, to, and *loquor*, to speak.] The act of speaking to. An oration or speech made by a general to his soldiers, to encourage them to fight, and to dehort them from sedition.

ALLO'DIAL, *adj.* [from *allodium*.] Held without any acknowledgment of superiority; not feudal; independent.

ALLO'DIUM, *f.* [A word of very uncertain derivation, but most probably of German original.] A possession held in absolute independence, without any acknowledgment of a lord paramount. It is opposed to *fee*, or *feudum*, which intimates some kind of dependence. See **FEOBAL SYSTEM**.

ALLO'NGE, *f.* [*allonge*, Fr.] A pass or thrust with a rapier, so called from the lengthening of the space taken up by the fencer. It is likewise taken for a long rein, when the horse is trotted in the hand.

To **ALLO'O**, *v. a.* [This word is generally spoke *halloo*, and is used to dogs, when they are incited to the chase or battle; it is commonly imagined to come from the French *allons*; perhaps from *all lo*, look all; shewing the object.] To set on; to incite a dog, by crying *alloo*.

Alloo thy furious mastiff; bid him vex
The noxious herd, and print upon their ears
A sad memorial of their past offence.

Philips.

ALLO'PHYLIUS, *f.* [*αλλοφυλος*, of *αλλος*, another, and *φυλη*, a tribe, Gr.] One of another tribe, nation, or kindred; a stranger, or alien.

ALLO'PHYLUS, *f.* [*αλλοφυλος*, Gr. *alienigenus*, Lat. foreign.] In botany, of the octandria monogynia class, ranking in the natural order of guttiferæ. The generic characters are—Calyx: perianthium four-leaved; leaflets orbiculate; two exterior, opposite, smaller by half. Corolla: of four petals, less than the calyx, orbiculate, equal: claws broad, length of the two smaller leaves of the calyx. Stamina: filaments filiform, the length of the corolla; antheræ roundish. Pistillum: germ superior, roundish, twin; style filiform, longer than the stamens; stigma bifid, with the divisions rolled back.—*Essential Character*. Calyx, four-leaved; leaflets orbiculate, two opposite smaller. Petals, four; less than the calyx: germ twin: stigma quadrifid.

Species. 1. *Allophylus zeylanicus*: leaves oval acuminate quite entire; racemes axillary very short. This is a tree having the appearance of *Persea*; it is a native of the island of Ceylon.

2. *Allophylus rigidus*: leaves simple, toothletted and spiny; flowers in racemes. 3. *Allophylus racemosus*: leaves ternate, flowers in racemes. Natives of Hispaniola.

4. *Allophylus cominia*: leaves ternate, flowers in panicles. It grows plentifully in Jamaica.

5. *Allophylus ternatus*: leaves ternate serrate, racemes long terminating. This is only a shrub five feet in height, with spreading branches. It is a native of CochinChina, by the banks of rivers. The inhabitants use the leaves as a cataplasm in contusions.

AL'LOQUY, *f.* [*alloquium*, Lat. of *ad*, to, and *loquor*, to speak.] The act of speaking to another; address; conversation.

To **ALLOT**, *v. a.* [from *lot*.] To distribute by lot. To grant:

I shall deserve my fate, if I refuse
That happy hour which heaven allots to peace. *Dryden.*

To distribute; to parcel out; to give each his share.—Since fame was the only end of all their studies, a man cannot be too scrupulous in allotting them their due portion of it. *Tatler.*

ALLO'TMENT, *f.* That which is allotted to any one;

the part, the share, the portion granted.—There can be no thought of security or quiet in this world, but in a re-signation to the allotments of God and nature. *L'Estrange*. Part appropriated.—It is laid out into a grove for fruits and shade, a vineyard, and an allotment for olives and herbs. *Broomer*.

ALLOT'TERY, *f.* That which is granted to any particular person in a distribution.—Allow me such exercises as may become a gentleman, or give me the poor allottery my father left me by testament. *Shakespeare*.

To **ALLO'W**, *v. a.* [*allower*, Fr. *alyfan* or *allefan*, Sax. of *allaudo*, Lat. of *ad*, to, and *laudo*, to commend.] To admit; as, to allow a position; not to contradict; not to oppose.—The principles which all mankind allow for true, are innate; those, that men of right reason admit, are the principles allowed by all mankind. *Locke*. To justify; to maintain as right. To grant; to yield; to own any one's title to.—We will not, in civility, allow too much sincerity to the profession of most men: but think their actions to be interpreters of their thoughts. *Locke*.—To grant license to; to permit.—But, as we are allowed of God to be put in trust with the gospel, even so we speak, not as pleasing men, but God, which trieth our hearts. 1 *Theff.* ii. 4.—To give a sanction to; to authorize. To give to; to pay to:

Ungrateful then! if we no tears allow
To him that gave us peace and empire too. *Waller.*

To appoint for; to set out to a certain use; as, He allowed his son the third part of his income. To make abatement, or provision; or to settle any thing, with some concessions or cautions regarding something else.—If we consider the different occasions of ancient and modern medals, we shall find they both agree in recording the great actions and successes in war; allowing fill for the different ways of making it, and the circumstances attending it. *Addison*.

ALLO'WABLE, *adj.* That which may be admitted without contradiction. That which is permitted or licensed; lawful; not forbidden.—Reputation becomes a signal and a very peculiar blessing to magistrates; and their pursuit of it is not only allowable but laudable. *Atterbury*.

ALLO'WABLENESS, *f.* The quality of being allowable; lawfulness; exemption from prohibition.

ALLO'WANCE, *f.* Admission without contradiction.—Without the notion and allowance of spirits, our philosophy will be lame and defective in one main part of it. *Locke*. Sanction; license; authority. Permission; freedom from restraint.—They should be accustomed betimes to consult and make use of their reason, before they give allowance to their inclinations. *Locke*.—A settled rate, or appointment for any use.—And his allowance was a continual allowance given him of the king; a daily rate for every day all his life. 2 *Kings*.—Abatement from the strict rigour of a law, or demand.—Parents never give allowances for an innocent passion. *Swift*.—Established character; reputation:

His bark is stoutly timber'd, and his pilot
Of very expert and approv'd allowance. *Shakespeare.*

ALLO'Y, *f.* A word used for the tempering and mixture of other metals with silver or gold. In the mint, a pound weight of gold is coined into forty-four guineas and a half, which is equal to 46l. 14s. 6d. An ounce therefore of such gold coin is worth 3l. 17s. 10½d. in silver. A pound weight of standard silver bullion is coined into sixty-two shillings: therefore an ounce of silver bullion is worth 5s. 2d.—That precise weight and fineness, by law appropriated to the pieces of each denomination, is called the standard. Fine silver is silver without the mixture of any baser metal. Alloy is baser metal mixed with it. Let another piece be coined of the same weight, wherein half the silver is taken out, and copper, or other alloy, put into the place, it will be worth but half as much; for the value of the alloy is so inconsiderable as not to be reckoned. *Locke*. Abatement; diminution.—The pleasures of sense are probably

bably relished by beasts in a more exquisite degree than they are by men; for they taste them sincere and pure, without mixture or alloy. *Atterbury.*

ALL'-SEED, *f.* in botany. See LINUM and CHENOPodium.

ALL'-SPICE, *f.* in botany. See MYRTUS.

ALLUBE'SCENCY, *f.* [*allubescencia*, Lat.] Willingness; content.

To ALLU'DE, *v. n.* [*alludir*, Sp. and It. of *alludo*, Lat. of *ad*, to, and *ludo*, to play.] To have some reference to a thing, without the direct mention of it; to hint at; to insinuate. It is used of persons; as, He *alludes* to an old story: or of things; as, The lampoon *alludes* to his mother's faults.

ALL'UM. See A'LUM.

ALLU'MINOR, *f.* [*allumer*, Fr. to light.] One who colours or paints upon paper or parchment; because he gives graces, light, and ornament, to the letters or figures coloured.

To ALLU'RE, *v. a.* [*lurer*, Fr. *looren*, Dut. *beloeren*, Sax.] To entice to any thing, whether good or bad; to draw towards any thing by enticement.—Unto laws that men make for the benefit of men, it hath seemed always needful to add rewards, which may more *allure* unto good, than any hardness deterreth from it; and punishments, which may more deter from evil, than any sweetness there-to *allureth*. *Hooker.*

The golden sun, in splendour likest heav'n,
Allur'd his eye.

Milton.

ALLU'RE, *f.* Something set up to entice birds, or other things, to it. We now write *lure*.

ALLU'REMENT, *f.* [from *allure*.] That which allures, or has the force of alluring; enticement; temptation of pleasure:

To shun th' *allurement* is not hard
To minds resolv'd, forewarn'd, and well prepar'd;
But wond'rous difficult, when once beset,
To struggle thro' the straits, and break th' involving net.
Dryden.

ALLU'RER, *f.* The person that allures; enticer; inveigler.

ALLU'RINGLY, *adv.* In an alluring manner; enticingly.

ALLU'RINGNESS, *f.* The quality of alluring or enticing; invitation; temptation by proposing pleasure.

ALLU'SION, *f.* [*allusion*, Fr. *allusione*, It. *allusion*, Sp. of *allusio*, Lat. of *allusum*, sup. of *alludo*, *ad*, to, and *ludo*, to play.] That which is spoken with reference to something supposed to be already known, and therefore not expressed; a hint; an implication. It has the particle *to*.—Expressions now out of use, *allusions* to customs lost to us, and various particularities, must needs continue several passages in the dark. *Locke.*

ALLU'SIVE, *adj.* [*alludo*, *allusum*, Lat.] Hinting at something not fully expressed.—Where the expression in one place is plain, and the sense affixed to it agreeable to the proper force of the words, and no negative objection requires us to depart from it; and the expression, in the other, is figurative or *allusive*, and the doctrine, deduced from it, liable to great objections; it is reasonable, in this latter place, to restrain the extent of the figure and allusion to a consistency with the former. *Rogers.*

ALLU'SIVELY, *adv.* In an allusive manner; by implication; by insinuation.—The Jewish nation, that rejected and crucified our Saviour, within the compass of one generation, were, according to his prediction, destroyed by the Romans, and preyed upon by those eagles (*Mace. xxiv. 28.*) by which, *allusively*, are noted the Roman armies, whose ensign was the eagle. *Hammond.*

ALLU'SIVENESS, *f.* The quality of being allusive.

ALLU'VION, *f.* [*alluvio*, Lat. of *ad*, to, and *luo*, to wash.] The carrying of any thing to something else by the motion of the water. The thing carried by water to something else.

ALLUVION, in law, is the washing of the sea or of a river; in which case the law is, that if land be gained of the sea by washing up of sand and earth, by small and imperceptible degrees, so as in time to make it *terra firma*, it shall go to the owner of the land adjoining; but, if the alluvion be sudden and considerable, it belongs to the king by his prerogative: so that the quantity of the ground gained, and the time during which it is gaining, are what make it either the king's or the subject's property. In the same manner, if a river, running between two lordships, by degrees gaineth upon one of them, and leaves the other dry; the owner who loseth his ground thus imperceptibly has no remedy: but if the course of the river be changed by a sudden and violent flood, or other hasty means, and thereby a man loseth his ground, he shall have what the river has left in another place, as a recompense for this sudden loss. 2 *Black. 262.*

ALLU'VIOUS, *adj.* That which is carried by water to another place; and lodged upon something else.

To ALLY, *v. a.* [*allier*, Fr.] To unite by kindred; friendship, or confederacy. To make a relation between two things, by similitude, resemblance, or any other means.

ALLY, *f.* [*allie*, Fr.] One united by some means of connexion; as marriage, friendship, confederacy.—We could hinder the accession of Holland to France, either as subjects, with great immunities for the encouragement of trade, or as an inferior and dependent *ally* under their protection. *Temple.*

ALMACAR'RON, a sea-port town of Spain, in the province of Murcia, at the mouth of the river Guadalquivir. It is about twenty miles west of Carthage, and is remarkable for the prodigious quantity of alum found in its territory. Lat. 37. 40. N. lon. 1. 15. W.

ALMA'DE, a town of Spain, in the province of La Mancha, in the kingdom of Castile, situated upon the top of a mountain, where are the most ancient as well as the richest silver mines in Europe.

AL'MADIE, *f.* a kind of canoe, or small vessel, about four fathoms long, commonly made of bark, and used by the negroes of Africa.

AL'MADIE, *f.* is also the name of a kind of long-boats, fitted out at Calicut, which are eighty feet in length, and six or seven in breadth. They are exceedingly swift, and are otherwise called *cathuri*.

AL'MAGEST, *f.* the name of a celebrated book composed by Ptolemy; being a collection of a great number of the observations and problems of the ancients, relating to geometry and astronomy, but especially the latter. And being the first work of this kind which has come down to us, and containing a catalogue of the fixed stars, with their places, besides numerous records and observations of eclipses, the motions of the planets, &c. this work will ever be held dear and valuable to the cultivators of astronomy.

In the original Greek it is called *συναξίς μεγίστη*, the great composition or collection. And to the word *μεγίστη*, *megiste*, the Arabians joined the particle *al*, and thence called it *Almaghesti*, or, as we call it, from them, the *Almagest*. Ptolemy wrote this book at Alexandria in Egypt, where the Arabians found it on the capture of that kingdom. It was by them translated out of Greek into Arabic, by order of the caliph Almainon, about the year 827; and first into Latin about 1230, by favour of the emperor Frederic II. The Greek text was not known in Europe till the beginning of the 15th century, when it was brought from Constantinople by George, a monk of Trabezond, who translated it into Latin, which translation has several times been published. Riccioli, an Italian jesuit, also published, in 1651, a body of astronomy; which, in imitation of Ptolemy, he called "*Almagestum Novum*," the New *Almagest*; being a large collection of ancient and modern observations and discoveries in the science of astronomy.

ALMA'GRA, *f.* a fine deep red ochre, with some admixture of purple, very heavy, and of a dense yet friable structure, and rough dusty surface. It adheres very firmly to the tongue, melts freely and easily in the mouth, is of

an austere and strongly astringent taste, and stains the skin in touching. It is the *Sil Atticum* of the ancients: it ferments very violently with acid menstrua; by which single quality it is sufficiently distinguished from the *Sil Syriacum*, to which it has in many respects a great affinity. It is found in immense quantities in many parts of Spain; and in Andalusia there are in a manner whole mountains of it. It is used in painting, and in medicine as an astringent.

ALMA'GRO, a fortress of Spain, the capital of one of the districts of La Mancha. It was built by the archbishop Roderic, of Toledo, who finished it in 1214, and put a considerable garrison into it to restrain the incursions of the Moors.

AL'MAIN, *f.* [*allemain*, Fr. q. d. all man; but Cluverius derives it of *allmanni*, because they were a mixture of men of all nations and countries.] A German.

ALMAIN, in music, a certain kind of air that moves in common time.

ALMAIN RIVETS, a certain light kind of armour, with plates of iron, for defence of the arms, used by Germans.

ALMA'MON, caliph of Bagdat, a philosopher and astronomer in the beginning of the 9th century, ascended the throne in the year 814. He was son of Harun Al-Rashid, and grand-son of Almanzor. His name is otherwise written *Mamon*, *Almaon*, *Almamun*, *Alamoun*, or *Al-Maimon*. Having been educated with a love for the liberal sciences, he applied himself to cultivate and encourage them in his own country. For this purpose he requested the Greek emperors to supply him with such books on philosophy as they had among them; and he collected skilful interpreters to translate them into the Arabic language. He also encouraged his subjects to study them; frequenting the meetings of the learned, and assisting at their exercises and deliberations. He caused Ptolemy's *Almagest* to be translated in 827, by Isaac Ben-honain, and Thabet Ben-korah, according to Herbelot; but, according to others, by Sergius, and Alhazen, the son of Joseph. In his reign, and doubtless by his encouragement, an astronomer of Bagdat, named Habash, composed three sets of astronomical tables. Almamon himself made many astronomical observations, and determined the obliquity of the ecliptic to be then $23^{\circ} 35'$ (or $23^{\circ} 33'$ in some manuscripts); but Vossius says $23^{\circ} 51'$ or $23^{\circ} 34'$. He also caused skilful observers to procure proper instruments to be made, and to exercise themselves in astronomical observations; by which he revived the sciences in the East to such a degree, that many learned men were found, not only in his own time, but after him, in a country where the study of the sciences had been long forgotten. This learned king died near Tarsus in Cilicia, by having eaten too freely of some dates, on his return from a military expedition, in the year 833.

AL'MANACK, *f.* [Derived, by some, from the Arabic *al*, and *manah*, Heb. to count, or compute; by others, from *al*, Arabic, and *man*, a month, or *μανηος*, the course of the months; by others, from a Teutonic original, *al*, and *maan*, the moon, an account of every moon, or month: all of them are probable.] A calendar; a book in which the revolutions of the seasons, with the return of feasts and fasts, are noted for the ensuing year.

Almanacks are of various kinds and composition, some books, others sheets, &c. some annual, others perpetual. The essential part is the calendar of months, weeks, and days; the motions, changes, and phases, of the moon; with the rising and setting of the sun and moon. To these are commonly added various matters, astronomical, astrological, chronological, meteorological, and even political, rural, medical, &c. as also eclipses, solar ingresses, aspects and configurations of the heavenly bodies, lunations, heliocentric and geocentric motions of the planets, prognostications of the weather, and predictions of other events, the tides, twilight, equation of time, &c. Till about the 4th century, almanacks bore the marks of heathenism only; from thence to the 7th century, they were a mixture of heathenism and christianity; and ever since they have been

altogether christian: but at all times, astrological and other predictions have been considered as an essential part, and still are so to this day with several of them, notwithstanding that most people affect to disbelieve in such predictions.

NAUTICAL ALMANACK, and *Astronomical Ephemeris*, is a national almanack, chiefly for nautical purposes, which was begun in the year 1767, under the direction of the Board of Longitude. It is still published by anticipation for several years beforehand, for the convenience of ships going out upon long voyages, for which it is highly useful, and was found eminently so in the course of the late voyages round the world for making discoveries. Besides most things essential to general use, that are to be found in other almanacks, it contains many new and important particulars; more especially, the distances of the moon from the sun and fixed stars, which are computed for the meridian of the Royal Observatory of Greenwich, and set down to every three hours of time, expressly designed for computing the longitude at sea, by comparing these with the like distances observed there.

Construction of ALMANACKS. The first thing to be done is, to compute the sun's and moon's place for each day of the year, or it may be taken from some ephemerides, and entered into the almanack; next, find the dominical letter, and, by means thereof, distribute the calendar into weeks; then, having computed the time of Easter, by it fix the other moveable feasts; adding the immoveable ones, with the names of the martyrs, the rising and setting of each luminary, the length of day and night, the aspects of the planets, the phases of the moon, and the sun's entrance into the cardinal points of the ecliptic, i. e. the two equinoxes and solstices. By the help of good astronomical tables or ephemerides, the construction of almanacks is extremely easy.

Almanacks for one year pay a duty of four-pence; those for more years, pay for three years one penny; but perpetual almanacks are to pay only for three years, at two-pence. Out of the duties by this act there shall be paid to each university 500l. per ann. half-yearly, at Midsummer and Christmas, and the surplus shall be paid into the exchequer to go to the sinking fund. Selling unstamped almanacks incurs the same penalty as for selling unstamped newspapers. Almanacks in bibles and common prayer-books are exempted.

ALMANACK, among antiquaries, is also the name given to a kind of instrument, usually of wood, inscribed with various figures and Runic characters, and representing the order of the feasts, dominical letters, days of the week, and golden number, with other matters necessary to be known throughout the year; used by the ancient northern nations, in their computations of time, both civil and ecclesiastical. Almanacks of this kind are known by various names, among the different nations wherein they have been used; as rimstocks, primstaries, runstocks, runstafis, *Scipiones Runici*, *Bacculi Annales*, clogs, &c. They appear to have been used only by the Swedes, Danes, and Norwegians. From the second of these people, their use was introduced into England, whence divers remains of them in the counties. Dr. Plot has given the description and figure of one of these clogs, found in Staffordshire, under the title of "The perpetual Staffordshire Almanack."

ALMA'NAR, *f.* in astrology, denotes the pre-eminence, or prevalency, of one planet over another.

ALMA'ND, or AMAN, a river of Athol, a branch of the Tay. It has a cascade near thirty yards high, close by which two rocks so meet over the river as to make a natural bridge.

AL'MANDINE, *f.* [Fr. of *almandina*, Ital.] A ruby, coarser and lighter than the oriental, and nearer the colour of the granate.

ALMAN'ZA, a town of New-Castile, on the frontiers of the kingdom of Valencia, in Spain, situated in N. lat. 38. 54. W. lon. 1. 19. It is remarkable for the defeat of the allies in 1707, under the marquis de las Minas and the earl of Galway. In the beginning of this action, the English troops

troops penetrated through the centre of the Spanish army; but the Portuguese cavalry being broken by the Spanish, and the French infantry making a dreadful fire on their flanks, the allied army was at last broken, and began their retreat when it was almost dark. Colonel Hill carried off the remains of thirteen battalions towards the river Xucar, which if they could have passed, they might have been safe: but, being very much fatigued, they were obliged to halt; by which means they were surrounded, and forced to surrender prisoners of war. In this battle, the allies lost 120 standards, together with all their artillery and baggage; a great number were killed, and several thousands taken prisoners. The Marquis de las Minas was dangerously wounded; and his mistress in the garb of an amazon was killed by his side. The earl of Galway had two cuts across the face, which, though not dangerous, had prevented him from seeing or giving orders properly.

ALMA'RIA, in old records, the archives of a church; a library.

AL/MARIC HERESY, a tenet broached in France by one Almaric, in the year 1209. It consisted in affirming, that every Christian was actually a member of Christ; and that without this faith no one could be saved. His followers went farther, and affirmed, that the power of the Father lasted only during the continuance of the Mosaic law; that the coming of Christ introduced a new law; that at the end of this began the reign of the Holy Ghost; and that now confession and the sacraments were at an end, and that every one is to be saved by the internal operations of the Holy Spirit alone, without any external act of religion.—Their morals were as infamous as their doctrine was absurd. Their tenets were condemned by a public decree, of the council of Sens, in the year 1209.

AL/ME, or ALMA, singing and dancing girls in Egypt, who, like the Italian *Improvvisatori*, can occasionally pour forth "unpremeditated verse." They are called *Almé*, from having received a better education than other women. They form a celebrated society in this country. To be received into it, according to Mr. Savary, it is necessary to have a good voice, to understand the language well, to know the rules of poetry, and be able to compose and sing couplets on the spot, adapted to the circumstances. The *Almé* know by heart all the new songs. Their memory is furnished with the most beautiful tales. There is no festival without them; no entertainment of which they do not constitute the ornament. They are placed in a rostrum, from whence they sing during the repast. They then descend into the saloon, and form dances which have no resemblance to ours. They are pantomime ballets, in which they represent the usual occurrences of life. The mysteries of love, too, generally furnish them with scenes. The suppleness of their bodies is inconceivable. One is astonished at the mobility of their features, to which they give at pleasure the impression suited to the characters they play. The indecency of their attitudes is often carried to excess. Their looks, their gestures, every thing, speaks, but in so expressive a manner, that it is impossible to mistake them. At the beginning of the dance, they lay aside with their veils the modesty of their sex. A long robe of very thin silk goes down to their heels, which is slightly fastened with a rich girdle. Long black hair, plaited and perfumed, is flowing on their shoulders. A shift, transparent as gauze, scarcely hides their bosom. As they put themselves in motion, the shapes, the contours, of their bodies, seem to develop themselves successively. Their steps are regulated by the sound of the flute, of castanets, the tambour de basque, and cymbals, which accelerates or retards the measure. They are still further animated by words adapted to such scenes. They appear in a state of intoxication. They are the Bacchants in a delirium. It is when they are at this point, that, throwing off all reserve, they abandon themselves totally to the disorder of their senses; it is then that a people far from delicate, and who like nothing hidden, redouble their applauses. These *Almé* are sent for into all the harems. They teach the

women the new airs; they amuse them with amorous tales, and recite in their presence poems, which are so much the more interesting, as they furnish a lively picture of their manners. They initiate them into the mysteries of their art, and teach them to contrive lascivious dances. These girls, who have a cultivated understanding, are very agreeable in conversation. They speak their language with purity. The habit of dedicating themselves to poetry renders the softest and most sonorous expressions familiar to them. They repeat with a great deal of grace. In singing, nature is their only guide. Sometimes two of them sing together, but always with the same voice. It is the same with an orchestra, where all the instruments playing in unison execute the same part.

The *Almé* assist at the marriage-ceremonies, and march before the bride, playing on instruments. They make a figure likewise at funerals, and accompany the procession, singing sorrowful airs. They break forth into groans and lamentations, and give every sign of grief and despair. These women are paid very high, and seldom appear but amongst the grandes and rich men.

The common people in Egypt have also their *Almé*. They are girls of the second class, who try to imitate the former; but they have neither their elegance, their graces, nor their knowledge. They are every where to be met with. The public places and the walks about Grand Cairo are full of them. As the populace require allusions still more strongly marked, decency will not permit the relation to what a pitch they carry the licentiousness of their gestures and attitudes.

ALME, or dancing-girls, are also employed all over the east, as affording the principal diversion at all public entertainments. They are mostly prostitutes; and, by the laws of their society, are bound to refuse no one for their price, which is rated according to their beauty and other accomplishments. There are even particular sets of them appropriated to the service of the Gentoo temples, and the use of the bramin priests who attend them. These poor creatures say that they were first debauched by their god, and afterwards by him consigned over to the use of the priests who belong to his temples.

These dancing-girls, whether in a settled or unsettled condition, live in a band or community under the direction of some superannuated female of the same profession, under whom they receive a regular education, and are trained up in all the arts of love and pleasing, like scholars in an academy. Thus they acquire the art of captivating the affections of the other sex to such a degree, that nothing is more common than for one of the princes or chief people of the country to take a liking to one of these girls, and waste immense sums on her, though at the same time their own harem is stocked with beauties far superior, and who are besides possessed of the natural modesty of the sex, to which the others have not the smallest pretensions. Thus some of these girls acquire immense wealth. In the neighbourhood of Goa, for instance, on a part of the continent bordering on the district of that island, the dancing girls founded a village, after being driven from Goa by the zeal of the archbishop. Here they reside in a body corporate, and attend the parties of pleasure of the noblemen and principal inhabitants, for it is not every one's purse that can afford them. Here many of them acquire considerable fortunes by this scandalous traffic, and throw it into a common stock for the sake of carrying on merchandise; being concerned in shipping and the most profitable voyages, for which they have regular factors and brokers.

The dress of these women varies according to the country they live in; but in all it is the most gorgeous imaginable. They are loaded with jewels, literally from top to toe, since even on their toes they wear rings. Their necks are adorned with carcanets, their arms with bracelets, and their ancles with chains of gold and silver, often enriched with precious stones. They also wear nose-jewels, which at first have an odd appearance, but to which the eye is soon reconciled. In Hindostan these dancing girls,

as well as the other women of the country, have a peculiar method of preserving and managing their breasts, which at the same time makes no inconsiderable part of their finery. They inclose them in a pair of hollow cases, exactly fitted to them, made of very light wood, linked together and buckled at the back. These at once confine their breasts so that they cannot grow to any disgustfully exuberant size; though, from their smoothness and pliancy, they play so freely with every motion of the body, that they do not crush the tender texture of the flesh in that part, like the stiff whale-bone stays in use among the Europeans. The outside of them is spread over with a thin plate of gold or silver, or set with gems, if they can afford it. Another occasional ornament the dancing-girls put on, particularly when they resort to their gallants, viz. a necklace of many loose turns, composed of flowers strung together, which they call *mogrees*, somewhat resembling Spanish double jessamy, but of a much stronger and more agreeable fragrant odour, and far preferable to any perfumes. "They have nothing (says Mr. Grose) of that nauseous boldness which characterises the European prostitutes, their style of seduction being all softness and gentleness."

With regard to the performances of these women as dancers, we have various accounts. The author of *Memoirs of the War in Asia*, acquaints us, "that their attitudes as well as movements are not ungraceful. Their persons are delicately formed, gaudily attired, and highly perfumed. By the continuation of wanton attitudes, they acquire, as they grow warm in the dance, a frantic lasciviousness themselves, and communicate, by a natural contagion, the most voluptuous desires to the beholders." Mr. Ives seems to have been very cool on this subject. "I could not," says he, "observe any thing in their performance worthy of notice." Their movements are more like tumbling or shewing postures than dancing. Their dress is thin and light; and their hair, neck, ears, arms, wrists, fingers, legs, feet, and even their toes, are covered with rings of gold and silver, made after a clumsy manner. They wear two rings in their noses; and, by their staring looks and odd gesticulations, you would rather suspect them to be mad women than morris-dancers. The band of music that attends them is not less singular in its way: it is chiefly composed of three or four men, who hold two pieces of bell-metal in their hands, with which they make an incessant noise; another man beats what he is pleased to call a drum; and, that they may not want vocal music to complete the band, there are always two others appointed to sing. These last generally lay in their mouths a good loading of beetle-nut before they begin; which, after having been well chewed, tinges the saliva with such a redness, that a stranger would judge them to bleed at the mouth by too violent an exertion of their voice. These gentry are called *ticky-taw* boys, from the two words *ticky-taw*, which they continually repeat, and chant with great vehemence. The dancing-girls are sometimes made use of in their religious ceremonies, as, when the priests bring forth the images of their gods into the open fields on a car ornamented with lascivious figures, these girls dance before the images amidst a great croud of people; and, having been selected for their superior beauty, are very profitable to their masters the priests, who are said to prostitute them to all comers."

Mr. Grose informs us, that "these dances would hardly at first relish with Europeans, especially as they are accompanied with a music far from delightful, consisting of little drums called *gumgums*, cymbals, and a sort of fife, which makes a hideous din, and are played on by men, whose effeminacy, grimaces, and uncouth shrivelled features, all together shock the eye and torture the ear. However by use we become reconciled to the noise, and may observe some not unpleasing airs, with which the dancers keep time: the words often express the matter of a pantomime dance, such as a lover courting his mistress; a procureur bringing a letter, and endeavouring to

seduce a woman from one gallant in favour of another; a girl, timorous and afraid of being caught in an intrigue. All these love-scenes the girls execute in character dances, and with no despicable expression, if they are proficient in their art; for then their gestures, air, and steps, are marking and well adapted. In some of their dances, even in public, modesty is not much respected by the lascivious attitudes into which they throw themselves, without exposing any nudity; being richly clad and bedecked with jewels after their manner. But in private parties to which they are called, as in gardens, they give themselves a great loose, and have dances in reserve, in which, though still without any grossness in discovering their bodies, they are mistresses of such motions and lewdness of looks and gestures as are perhaps more provoking.

ALME'DIA, a frontier town of Portugal, in the province of Tra los Montes, on the confines of Leon, where a very severe action was fought between the French and Portuguese in 1663; 17 miles N. W. of Ciudad Rodrigo. N. lat. 40. 41. W. lon. 7. 10.

AL'MEHRAB, in the Mahometan customs, a niche in their mosques, pointing towards the kebla or temple of Mecca, to which they are obliged to bow in prayer.

ALMEI'SAR, a celebrated game among the ancient Arabs, performed by casting of lots with arrows, strictly forbidden by the laws of Mahomet, on account of the frequent quarrels occasioned by it. The manner of the game was thus: A young camel, being brought and killed, was divided into a number of parts. The adventurers, to the number of seven, being met, eleven arrows were provided without heads or feathers; seven of which were marked, the first with one notch, the second with two, the third with three, &c. the other four had no marks. These arrows were put promiscuously into a bag, and drawn by an indifferent person. Those to whom the marked arrows fell, won shares in proportion to their lot; the rest, to whom the blanks fell, were intitled to no part of the camel, but obliged to pay the whole price of it. Even the winners tasted not of the flesh themselves more than the losers, but the whole was distributed to the poor.

ALMENE, in commerce, a weight of two pounds used to weigh saffron in several parts of the continent of the East Indies.

ALME'RIA, a sea-port town in the kingdom of Granada in Spain, pleasantly situated in a fine bay at the mouth of the river Almeria, on the Mediterranean: N. lat. 36. 51. W. lon. 3. 20. This town is by some thought to have risen upon the ruins of the ancient Abdera, and was formerly a place of great consequence. It was taken from the Moors in 1147, by the emperor Conrad III. in conjunction with the French, Genoese, and Pisans. It was at that time the strongest place in Spain held by the infidels; from which their privateers, which were exceedingly numerous, not only infested the sea-coasts inhabited by the Christians, but gave equal disturbance to the maritime provinces of France, Italy, and the adjacent islands. The city being well fortified, having a strong castle, a numerous garrison, and being excellently provided with every thing necessary, made a vigorous resistance; but was at last taken by storm, when the victor put to the sword all the inhabitants who were found in arms, distributing the best part of the plunder among his allies, whom he sent away thoroughly satisfied. The Genoese, particularly, acquired here that emerald vessel which still remains in their treasury, and is deemed invaluable.

Upon its reduction by the Christians, Almeria became a bishopric; but is at present very little better than a village, indifferently inhabited, and has nothing to testify so much as the probability of its former greatness, except certain circumstances which cannot be effaced even by the indolence of the Spaniards themselves. What these are, Udal ap Rhys, a Welshman, thus describes in his *Tour through Spain and Portugal*. "Its climate (says he) is so peculiarly blessed, that words are insufficient to express its charms and excellencies. Its fields and meads are covered

ed with flowers all the year round; they are adorned also with palms, myrtles, plane-trees, oranges, and olives; and the mountains and promontories near it are noted for producing a great variety of precious stones, inasmuch that the next promontory to it is called the *Cape of Gates*, which is a corruption from the word *agates*, the hills thereabouts abounding in that sort of precious stones, as well as in emeralds and amethysts, granites or coarse rubies, and extreme curious alabaster in the mountains of Filaures."

ALMIGHTINESS, *f.* Unlimited power; omnipotence; one of the attributes of God.—In the wilderness, the bittern and the stork, the unicorn and the elk, live upon his provisions, and revere his power, and feel the force of his *almightiness*. *Taylor*.

ALMIGHTY, *adj.* [from *all* and *mighty*.] Of unlimited power; omnipotent. The Lord appeared unto Abraham, and said unto him, I am the *almighty* God; walk before me, and be thou perfect. *Genesis*, xvii. 1.

ALMESFEO'H, or **ALMSFEOH**, alms-money, Peterpence; a tribute formerly annually paid in England to the pope on the eighth of August; called also *hearth-penny*.

ALMIS'SA, a small town in Venetian Dalmatia, at the mouth of the Cetina. It stands between two high mountains on a steep rock, 10 miles E. of Spalatro. Lat. 44. 4. N. lon. 17. 45. E.

AL'MOND, *f.* [*amand*, Fr. derived by Menage from *amandala*, a word in low Latin; by others, from *Allemand*, a German; supposing that almonds come to France from Germany.] The nut of the almond-tree, either sweet or bitter.

ALMOND, *f.* in botany. See **AMYGDALUS** and **BRABEIUM**.

ALMOND, in commerce, a measure by which the Portuguese sell their oil; twenty-six almonds make a pipe.

ALMONDS of the **THROAT**, or **TONSILS**, called improperly *Almonds of the ears*, are two round glands placed on the sides of the basis of the tongue, under the common membrane of the fauces; each of them has a large oval sinus, which opens into the fauces, and in it are a great number of smaller ones, which discharge themselves thro' the great sinus of a mucous and slippery matter into the fauces, larynx, and œsophagus, for the moistening and lubricating those parts. When the œsophagus muscle acts, it compresses the *almonds*, and they frequently are the occasion of a sore throat.—The tonsils, or *almonds of the ears*, are also frequently swelled in the king's evil; which tumour may be very well reckoned a species of it. *Wifeman*.

ALMONDS, among lapidaries, signify pieces of rock-crystal, used in adorning branch-candlesticks, &c. on account of the resemblance they bear to the fruit of that name.

ALMOND-FURNACE, or **ALMAN-FURNACE**, called also the *Sweep*; is a peculiar kind of furnace used in refining, to separate metals from cinders and other foreign substances.

AL'MONDBURY, or **ALBANEURY**, i. e. the town or grove of St. Alban, in Yorkshire, where Paulinus the Apostle (so called because he converted many of them from heathenism) built a cathedral, and dedicated it to St. Alban, the first English martyr. It is six miles from Halifax.

AL'MONDSBURY is in Gloucestershire, about six miles and a half north from Bristol, and in the road to Gloucester. This village is said to derive its name from Alemond, a West Saxon prince, the father of Egbert, the first sole monarch of England, (who is supposed to be buried in the church,) and from a fortification of a rampier, and a double-ditch, at Knoie, in this parish, for such our ancestors called bergs, and we by frequent use have softened the word into borough or bury. On the brow of the hill, surrounded by the fortification, stands Knoie, an ancient seat belonging to the family of Chester.

AL'MONER, or **ALMNER**, *f.* [*elemosynarius*, Lat.] The officer of a prince, or other person, employed in the distribution of charity.

Almoners were employed in religious houses, to whom belonged the management and distribution of the alms of

the house. By the ancient canons, all monasteries were to spend at least a tenth part of their incomes in alms to the poor. The almoner of St. Paul's is to dispose of the monies left for charity, according to the appointment of the donors, to bury the poor who die in the neighbourhood, and to breed up eight boys to singing, for the use of the choir. By an ancient canon, all bishops are required to keep almoners.

Lord ALMONER, or **Lord High ALMONER** of **ENGLAND**, is an ecclesiastical officer, generally a bishop, who has the forfeiture of all deadlands, and the goods of *felos de se*, which he is to distribute among the poor. He has also, by virtue of an ancient custom, the power of giving the first dish from the king's table to whatever poor person he pleases, or, instead of it, an alms in money.

Great ALMONER, (*grand aumônier*,) in France, was reckoned before the revolution the highest ecclesiastical dignity in that kingdom. To him belonged the superintendency of all hospitals and houses of lepers. The king received the sacrament from his hands; and he said mass before the king in all grand ceremonies and solemnities.

ALMONER is also a more fashionable title given by some writers to chaplains. In this sense we meet with almoner of a ship, almoner of a regiment.

AL'MONRY, *f.* The place where the almoner resides, or where the alms are distributed.

ALMO'ST, *adv.* [from *all* and *most*; that is, Most part of all.] Nearly; well nigh; in the next degree to the whole, or to universality.—There can be no such thing or notion, as an *almost* infinite; there can be nothing next or second to an omnipotent God. *Bentley*.

ALMS, *f.* [in Saxon *elmes*, from *elemosyna*, Lat.] What is given gratuitously in relief of the poor. It has no singular.—The poor beggar hath a just demand of an *alms* from the rich man; who is guilty of fraud, injustice, and oppression, if he does not afford relief according to his abilities. *Swift*.

Giving *alms* never lessens the stock. Sp. *El dar limosna nunca mengua la bolsa*. The blessings of heaven, so positively promised in Scripture to the charitable and compassionate man, and the visible effect of them so often experienced, leave us no room to call the truth of this aphorism in question. And indeed, were it but the advantage this character gives a man in the eye of the world, (though that ought to be the last motive to charity,) it meets with a more than sufficient reward.

In the early ages of Christianity, the alms of the charitable were divided into four parts; one of which was allotted to the bishop, another to the priests, and a third to the deacons and sub-deacons, which made their whole subsistence; the fourth part was employed in relieving the poor, and in repairing the churches.

No religious system is more frequent or warm in its exhortations to alms-giving than the Mahometan. The Alcoran represents alms as a necessary means to make prayer be heard. Hence that saying of one of their khalifs: "Prayer carries us half-way to God, fasting brings us to the door of his palace, and alms introduces us into the presence-chamber." Hence many illustrious examples of this virtue among the Mahometans. Hasan, the son of Ali, and grandson of Mohammed, in particular, is related to have thrice in his life divided his substance equally between himself and the poor, and twice to have given away all he had. And the generality are so addicted to the doing of good, that they extend their charity even to brutes.

ALMS, also denotes lands or other effects left to churches or religious houses, on condition of praying for the soul of the donor. Hence, *Free ALMS* was that which is liable to no rent or service; and *Reasonable ALMS* was a certain portion of the estates of intestate persons, allotted to the poor.

ALMS-BOX, or **CHEST**, a small chest or coffer, called by the Greeks *κίστη*, wherein anciently the alms were collected, both at church and at private houses. The alms-chest in English churches, is a strong box, with a hole

in the upper part, having three keys, one to be kept by the parson or curate, the other two by the church-wardens. The erecting of such alms-chest in every church is enjoined by the book of canons, as also the manner of distributing what is thus collected among the poor.

ALMS-DEED, f. An act of charity; a charitable gift.—This woman was full of good works, and *alms-deeds* which she did. *Acts*, ix. 36.

ALMS-GIVER, f. He that gives alms; he that supports others by his charity.—He endowed many religious foundations, and yet was he a great *alms-giver* in secret, which shewed that his works in public were dedicated rather to God's glory than his own. *Bacon*.

ALMS-HOUSE, f. A house devoted to the reception and support of the poor; an hospital for the poor:

Behold you *alms-house*, neat, but void of state,
Where age and want sit smiling at the gate.

Pepe.

ALMS-MAN, f. A man who lives upon alms; who is supported by charity.

ALMS (James), was born at Gosport, in Hampshire. In the fourteenth year of his age he acted as aid-de-camp to captain Watton, of the Dragon, in the engagement of Matthews and Lestock, and received from his commander many marks of approbation. From the Dragon he went to the *Namur*, of 74 guns, which ship bore a part in the memorable capture of the French Squadron, and their East-India convoy, by lord Anson, May 3, 1747. In October following, in the same ship, he accompanied admiral Boscawen to the East Indies; and this ship, with three others, was wrecked on the Coromandel coast, in April 1749; but our young hero, reserved by Providence for more brilliant services, was one out of twenty-three saved from the crew of the *Namur*. Immediately after this disaster, he was promoted to be lieutenant of the *Syren*, in which ship he came home. In 1754 he sailed again for the East Indies, as commander of the *Hardwicke* Indiaman, in which he was present at the attack of the *Geriah*, under Sir Cha. Watton. But war breaking out between France and Great Britain, in 1758, he accompanied Mr. Ives, who published the history of the voyage over land, to offer his service in the line of his profession. November 20, 1759, he was first lieutenant of the *Mars*, in the victory obtained by Sir E. Hawke over the *Confians*. In June 1761, he was promoted to the rank of master and commander; and, in February 1762, he sailed, as acting captain of the *Alarm* frigate, to the West Indies, and was at the taking of Martinico. Shortly after this, he took an armed sloop of 18 guns, and another of 12 guns. June 3, on his passage with the British fleet, destined for Havannah, by the superior failing of the *Alarm*, he came up with, and, after an hour's engagement, took two Spanish ships of war, one of 22 guns (nine-pounders) and 180 men, the other of 18 guns and 80 men; in the action several balls passed through his hat, and he was wounded in the knee: there were fourteen men killed in the *Alarm*, and twenty-six wounded. During the arduous service at the reduction of the Havannah, Capt. Alms was entrusted, by the commander in chief, on many important occasions; but it remains one of those unaccountable neglects in the fortune of many deserving officers, that he was not appointed a post-captain till 1765; from which time, till September 1780, Capt. Alms enjoyed, with his family at Chichester, every pleasure from domestic attachment, till he was appointed to the *Monmouth*, of 64 guns, in which ship he sailed under commodore Johnstone for the East Indies. The spirited manner in which he fought the *Monmouth*, in Port Praya Bay, was an introduction to what M. Suffrein afterwards experienced from him in the obstinate engagements between the two fleets in India. The ships which were destined for Madras proceeded, under his command, to join Sir Edward Hughes; and, after braving uncommon hardships from the unfavourable season, it was accomplished on the 15th of February. The active and resolute spirit of the French admiral is yet recent in the mind of every one.

The most conspicuous share which Capt. Alms had in any action was on the memorable 12th of April. He was this day second to Sir Edward Hughes. Suffrein bore down with an intention, it was thought, to board the British admiral; which Capt. Alms perceiving, luffed up the *Monmouth*, raked his enemy, and frustrated his manœuvre; though he had now to sustain a terrible fire from Suffrein and his two seconds, which continued until the *Monmouth's* main and mizen masts fell overboard. Suffrein, whose ship had sustained prodigious damage, observing the situation of his antagonist, sheered off, while the shattered *Monmouth* continued her fire as long as her shot could reach him. On the smoke clearing away as the firing ceased, Capt. Alms found himself far to windward, set his fore-fail, which was all he had, and boldly fired at the French line as he passed to join the British fleet. In this dreadful conflict with the enemy, the *Monmouth's* colours, being twice shot away, were nailed to the stump of the mizen-mast, never to be struck; the ship having seven guns dismounted, forty-five men killed, and 102 wounded. The captain himself had two wounds in the face from splinters, two musket-balls went through his hat, his hair was set on fire, his coat torn between the shoulders, and one of the skirts shot away; the *Monmouth's* wheel was twice cleared, and only two, with himself remained on the quarter-deck. Capt. Alms died at Chichester, June 8, 1791, in his sixty-fourth year.

ALMUCAN'TARS, ALMACAN'TARS, or ALMICAN'TARS, f. [from *almocantharat*, Arab.] Circles parallel to the horizon, conceived to pass through every degree of the meridian; serving to shew the height of the sun, moon, or stars, &c. and are the same as the parallels of altitude.

ALMUCANTAR-STAFF, f. was an instrument formerly used at sea to observe the sun's amplitude at rising or setting, and thence to determine the variation of the compass, &c. The instrument had an arch of fifteen degrees, made of smooth wood.

ALMUDHE'BIS, f. in the Arabian astrology, a kind of dignity or pre-eminence accruing to a planet in some place, either from its disposition or benign aspect.

ALMUGEA, f. in astrology, denotes a certain configuration of the five planets, in respect of the sun and moon, correspondent to that which is between the hours of those planets and the sun's and moon's hours. Thus, Saturn will be in the almugea of the sun when distant from him the space of five signs in succession, or in the almugea of the moon when he is at the same distance, only contrary to the succession of the sign.

ALMU'THEN, f. in the Arabian astrology, the planet which has the disposal of a place, that is, surpasses the rest in the number and efficacy of dignities, regard being had to the essential points, viz. exaltation, terms, trigon, and phases. This is otherwise called **ALMUSTEULI**.

ALMU'CIUM, f. a kind of cover for the head, worn chiefly by monks and ecclesiastics. It was of a square form, and seems to have given rise to the bonnets of the same shape still retained in universities and cathedrals.

ALMUG-TREE, f. A tree mentioned in Scripture. Of its wood were made musical instruments, and it was used also in rails, or in a stair-case. The rabbins generally render it *coral*, others *ebony*, *brazil*, or *pine*. In the Septuagint it is translated *wrought wood*, and in the Vulgate *ligna thyria*. But coral could never answer the purposes of the almugium; the pine-tree is too common in Judea to be imported from Ophir; and the thyrium, or citron-tree, much esteemed by the ancients for its fragrance and beauty, came from Mauritania. By the wood *almugim*, or *algunim*, or simply *gummim*, taking *al* for a kind of article, may be understood oily and gummy sorts of wood, and particularly the trees which produce gum ammoniac, or gum arabic; and is, perhaps the same with the shittim-wood mentioned by Moses.—And the navy also of Hiram, that brought gold from Ophir, brought in from Ophir great plenty of *almug-trees* and precious trees. 1 *Kings*, x. 11.

ALMUNE'CAR, f. a sea-port town in the kingdom of Granada,

Granada, seated on the Mediterranean, with a good harbour, defended by a strong castle, thirty miles south of Alhama. Lat. 36.30. N. lon. 3.45. W.

AL'NAGE, or AULNAGE, *f.* [from *aune*, or *alne*, Fr. an ell.] The measuring of woollen manufactures with an ell. As a proof of the goodness of that commodity, a seal was invented and affixed as a mark that the commodity was made according to the statute; but, it being now possible to purchase these seals, they are affixed, whenever the vender pleases, to all cloths indiscriminately, to the great prejudice of our woollen manufactures.

AL'NAGER, AL'NEGER, or AUL'NEGER, *f.* q. d. "measurer by the ell," signified a sworn public officer, who, by himself or deputy, was to look to the allize of woollen-cloth made throughout the land, i. e. the length, width, and work, thereof; and to the seals for that purpose ordained. The office of king's aulnager seems to have been derived from the statute of Richard I. A. D. 1197; but this office was abolished by the statute 11 and 12 Wm. III. cap. 20.

ALNE, a river in Cumberland, which runs into the Tyne below Kirk-Haugh; another in Northumberland, which runs into the German ocean at Aylmouth; and another in Warwickshire, which runs into the Arrow at Round-Alne.

AL'NEY, a little island near the city of Gloucester, famous for the single combat fought on it, between Edmund Ironside and Canute the Dane, for the whole kingdom, in fight of both their armies, in which the latter being wounded, he proposed an agreement; accordingly the kingdom was divided between them; the south part falling to Edmund, the north to Canute.

AL'NI EFFIGIE, *f.* in botany. See CRATÆGUS and MESPILUS.

ALNIFO'LIA, *f.* in botany. See CLETHRA.

ALNI FRUC'TU, *f.* in botany. See CONOCARPUS and THEOBROMA.

AL'NIGHT, *f.* [from *all* and *night*.] A service which they call *alnight*, is a great cake of wax, with the wick in the midst; whereby it cometh to pass, that the wick fetcheth the nourishment farther off. *Bacon*.

AL'NUS, *f.* in botany. See BETULA, CONOCARPUS, and RHAMNUS.

ALNUS, in the ancient theatres, that part which was most distant from the stage.

ALN'WICK, is the county-town of Northumberland, situated on the north side of a hill, near the river Alne, over which is a stone bridge, at the distance of about thirty-four miles north from Newcastle. The bridge, though belonging to the public, was re-built by the late duke of Northumberland, in a handsome Gothic stile; he also built another beautiful bridge, of one arch, a little lower down. These two bridges serve as boundaries to the fine lawns that surround the castle, which is one of the principal seats of the great ancient family of Percy, earls of Northumberland.

The town of Alnwick, being a great thoroughfare to Berwick, is populous, and in general well built. It has a large town-house, where the quarter-sessions and county-courts are held, and members of parliament are elected. It has also a spacious square for the market, which is held every Saturday; and for the fairs, which are five in a year, viz. Palm Sunday eve, May 12, last Monday in July, first Tuesday in October, and the Saturday before Christmas.

Alnwick appears to have been formerly a fortified town, by the vestiges of a wall still visible in many parts, and three gates, which remain almost entire. Handsome shamblers, with piazzas in the front and at one end, have been built by his grace, ornamented with the different crests and badges of the Percy family. The town-hall has a tower, like that of a church, with a clock. It is governed by four chamberlains, who are chosen once in two years out of a common-council consisting of twenty-four.

The castle is situated on the south side of the river Alne, opposite the town, on an elevation that gives great dignity

to its appearance, and in ancient times rendered it a most impregnable fortress. From some Roman mouldings found under the present walks, it is believed to have been founded in the time of the Romans, although no part of the original structure is now remaining. The dungeon, or keep of the present castle, was evidently founded in the Saxon times, as it appears to have been a very strong fortress immediately after the Norman conquest: for, in the reign of king William Rufus, it underwent a remarkable siege from Malcolm III. king of Scotland, who lost his life before it, as did also prince Edward his eldest son. The most authentic account of this event, seems to be that given in the ancient chronicle of Alnwick-abbey; of which a copy is preserved in the British Museum. This informs us that the castle, although too strong to be taken by assault, being cut off from all hopes of succour, was on the point of surrendering, when one of the garrison undertook its rescue by the following stratagem: He rode forth completely armed, with the keys of the castle tied to the end of his spear, and presented himself in a suppliant manner before the king's pavilion, as being come to surrender up the possession: Malcolm too hastily came forth to receive him, and suddenly received a mortal wound. The assailant escaped by the fleetness of his horse through the river, which was then swollen with rains. Prince Edward, Malcolm's eldest son, too incautiously advancing to revenge his father, received a mortal wound, of which he died three days after. The spot where Malcolm was slain, was distinguished by a cross, which has been restored by the late dukes of Northumberland, who was lineally descended from this unfortunate king, by his daughter queen Maud, wife of king Henry I. of England. In the following century, another king of Scotland was taken prisoner besieging this castle. This was William III. commonly called the Lion; who, having formed a blockade for some days, was surprised by a party of English, and taken prisoner early in the morning of July 12, 1174. This castle, like many others in the north, was anciently ornamented with figures of warriors, distributed round the battlements, and the present proprietors have allowed them to be continued, and have supplied some that had been destroyed, to shew what they once were. From length of time, and the shocks it had sustained in ancient wars, this castle was become quite a ruin, when, by the death of Algernon duke of Somerset, in 1750, it devolved, together with all the estates of this great barony, &c. to the late duke of Northumberland; who immediately set to repair the same, and with the most consummate taste and judgment restored and embellished it, as much as possible, in the true Gothic style; so that it may deservedly be considered as one of the noblest and most magnificent models of a great baronial castle. Nothing can be more striking than the effect at first entrance within the walls from the town, when, through a dark gloomy gateway of considerable length and depth, the eye suddenly emerges into one of the most splendid scenes that can be imagined; and is presented at once with the great body of the inner castle, surrounded with fair semi-circular towers, finely swelling to the eye, and gaily adorned with pinacles, figures, battlements, &c. The impression is still farther strengthened by the successive entrance into the second and third courts, through great massy towers, till the stranger is landed in the inner court, in the very centre of this great citadel. Here he enters to a most beautiful stair-case, of a very singular yet pleasing form, expanding like a fan: the cornice of the ceiling is enriched with a series of 120 escutcheons, displaying the principal quarterings and inter-marriages of the Percy family. The chapel fills all the upper space of the middle ward; and here the highest display of Gothic ornaments, in the greatest beauty, has been very properly exhibited; and the several parts of the chapel have been designed after the most perfect models of Gothic excellence. The great east window is taken from one of the finest in York-minster. The ceiling is borrowed from one of King's college, in Cambridge; and

the walls are painted after the great church in Milan. Alnwick is 306 miles north-by-west of London, thirty north of Newcastle, and twenty-six south of Berwick. Lat. 55. 24. lon. 1. 10.

ALO'A, in Grecian antiquity, a festival kept in honour of Ceres by the husbandmen, and supposed to resemble our harvest home.

ALO'E, *f.* [from *αλος*, Gr. the sea.] In botany, a genus of the hexandria monogynia class, ranking in the natural order of lilia, or liliaceæ. The generic characters are—Corolla: one-petalled, erect, sexfid, oblong; tube gibbous; border spreading, small; nectareous at bottom. Stamina: filaments awl-shaped, as long as the corolla or longer, inserted into the receptacle; antheræ oblong, incumbent. Pistillum: germ ovate; style simple, the length of the stamens; stigma obtuse, trifid. Pericarpium: an oblong capsule, three-furrowed, three-celled, and three-valved. Seeds: several, angular.—*Essential Character.* Corolla erect, with an expanded mouth, and a nectareous base; filaments inserted into the receptacle.

Species. 1. Aloe dichotoma, or smooth-stem'd tree aloe: branches dichotomous, leaves sword-shaped, serrate. Native of the Cape of Good Hope.

2. Aloe perfoliata, or perfoliate aloe: stem-leaves toothed embracing sheathing, flowers in corymbs drooping peduncled subcylindrical. Of this species there are sixteen varieties noticed by different authors. The leaves are about four inches broad at their base, where they are near two inches thick; they have a few indentures on their edges; are of a beautiful green colour, and when young are spotted with white. The flower-stem rises near three feet high, and the flowers stand in a slender loose spike, with very short peduncles, and hang downwards; they are of a bright yellow colour, and the stamens stand out beyond the tube. This, though generally known in the shops by the name of Barbadoes aloe, is very common in the other islands of America, where the plants are propagated on the poorest land, to obtain the hepatic aloes, which are brought to England, and used chiefly for horses.

Preparation of Aloes in the Island of Barbadoes. In the month of March, when the plants are a year old, the labourers carry a parcel of tubs and jars into the field, and each takes a slip or breadth of it, and begins by laying hold of a bunch of the blades, as much as he can conveniently grasp with one hand, while with the other he cuts it just above the surface of the earth, as quickly as possible, (that the juice may not be wasted,) and then places the blades in the tub, bunch by bunch, or handful by handful. When the first tub is thus packed quite full, a second is begun (each labourer having two); and, by the time the second is filled, all the juice is generally drained out of the blades in the first tub. The blades are then lightly taken out, and thrown over the land by way of manure, and the juice is poured out into a jar. The tub is then filled again with blades, and so, alternately, till the labourer has produced his jar full, or about four gallons and a half of juice, which is often done in six or seven hours, and he has then the remainder of the day to himself, it being his employer's interest to get each day's operation as quickly done as possible. Although aloes are often cut in nine, ten, or twelve, months, after being planted, they are not in perfection till the second or third year: and they will be productive for a length of time, as ten or twelve years, or even for a much longer time, if good dung, or manure of any kind, is strewed over the field once in three or four years, or oftener if convenient. The aloe-juice will keep for several weeks without injury. It is therefore not boiled, till a sufficient quantity is provided, to make it an object for the boiling-house. In the large way, three boilers, either of iron or copper, are placed to one fire, though some have but two, and the small planters only one. The boilers are filled with the juice; and as it ripens, or becomes more inspissated, by a constant but regular fire, it is ladled forward from boiler to boiler, and fresh juice is added to that farthest from the

fire, till the juice in that nearest the fire (by much the smallest of the three, and commonly called by the name of tatch as in the manufactory of sugar) becomes of a proper consistency to be skipped, or ladled out into gourds, or other small vessels used for its final reception. The proper time to skip, or ladle, it out of the tatch, is when it is arrived at what is termed a refin height, or when it cuts freely or in thin flakes, from the edges of a small wooden slice, that is dipped from time to time into the tatch for that purpose. A little lime-water is used by some aloe-boilers, during the process, when the ebullition is too great. As to the sun-dried aloes, (which are most approved for medicinal purposes,) very little is made in Barbadoes. The process is however very simple, though extremely tedious. The raw juice is either put into bladders, left quite open at top, and suspended in the sun, or in broad shallow trays of wood, pewter, or tin, exposed also to the sun, every dry day, until all the fluid parts are exhaled, and a perfect refin formed, which is then packed up for use, or for exportation.

The Succotrine aloe, from whence the best sort of aloe for use in medicine is produced, has long, narrow, succulent, leaves, which come out without any order, and form large heads. The stalks grow three or four feet high, and have two, three, or four, of these heads, branching out from it: the lower leaves spread out on every side, but the upper leaves turn inward toward the centre; the flowers grow in long spikes, upon stalks about two feet high, each standing upon a pretty long footstalk; they are of a bright red colour tipped with green, appearing generally in the winter season.

3. Aloe arachnoides, or cobweb aloe: stemless, leaves three-cornered, cusped, ciliate; flowers in a sort of spike, upright cylindrical.

4. Aloe margaritifera, or pearl aloe: stemless, leaves three-cornered cusped papillose, flowers in racemes drooping cylindrical. The pearl aloe is of humble growth, and the leaves come out on every side (without order) near the ground; they are thick, triangular at their ends, and closely studded with white protuberances, whence the name. There is a smaller sort which has been long preserved in the English gardens. These flower in several seasons of the year.

5. Aloe verrucosa, or warted or pearl-tongue aloe: stemless, leaves sword-shaped sharp papillose distich, flowers in racemes reflex club-shaped. The flowers of this kind grow on pretty tall stalks, and form loose spikes, each hanging downward: they are of a beautiful red colour, tipped with green. This sort produces off-sets in plenty, and flowers at different seasons of the year.

6. Aloe carinata, or keel-leaved aloe: stemless, leaves acinaciform papillose, flowers in racemes drooping curved.

7. Aloe maculata, or spotted aloe. Native of the Cape of Good Hope; flowers in August.

8. Aloe lingua, or tongue aloe. Tongue aloe grows with its leaves near the ground, which are about six inches in length. The flowers are in slender loose spikes, each hanging downwards, of a red colour at bottom, and green at the top. There is a variety of this, with leaves much more spotted.

9. Aloe plicatilis, or fan aloe: almost stemless, leaves tongue-shaped even distich, flowers in racemes pendulous cylindrical. Fan aloe grows to the height of six or seven feet, with a strong stem, toward the upper part of which are produced two, three, or four, heads, composed of long, compressed, pliable, leaves, of a sea-green colour, entire, and ending obtusely; these are placed in a double row, lying over each other with their edges the same way. The flowers are produced in short loose spikes, are of a red colour, and appear at different times of the year.

10. Aloe variegata, or partridge-breast aloe: almost stemless, leaves in three ranks painted channelled, angles cartilaginous, flowers in racemes, cylindrical. This is a low plant, seldom rising above eight inches high. The leaves are triangular, and turn back at their extremity: they

ALOE.

The Barbadoes Aloe.

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J. Pyle sculp.

they are fleshy and entire, their edges being very slightly serrated: they are curiously veined and spotted, somewhat like the feathers on a partridge's breast. The flowers grow in very loose spikes, upon stalks about one foot high; they are of a fine red colour, tipped with green.

11. Aloe viscosa, or upright triangular aloe: subcaulescent, leaves imbricate in three ranks ovate, flowers in racemes drooping cylindrical. Grows near a foot high, and is furnished with triangular leaves, from the ground upward; these are of a dark green colour, and are placed in form of a triangle; the flowers grow thinly on very slender peduncles, they are of a herbaceous colour, and their upper part turns backward.

12. Aloe spiralis, or spiral aloe: subcaulescent, leaves imbricate in eight ranks ovate, flowers in racemes curved back. Grows somewhat like the eleventh, being beset with leaves from the bottom, but they are rounder, and end in sharp points; the flowers also grow upon taller stems, which branch out, and produce long close spikes. A variety of this has been raised from seeds, which is much larger, the leaves thicker, and the stem taller.

13. Aloe retusa, or cushion aloe: stemless, leaves in five ranks deltoid. Cushion aloe has very short, thick, succulent, leaves, which are compressed on their upper side like a cushion, from whence it had the name. This grows very close to the ground, and puts out suckers on every side: the flowers grow on slender stalks, and are of a herbaceous colour.

14. Aloe spicata, or spiked aloe: flowers in spikes horizontal bell-shaped, stem-leaves flat embracing toothed. It much resembles the second species, but is very different in the spike and figure of the flowers. The flower is full of a purple honey juice, and the best and purest hepatic aloe is obtained from this species.

Medical Qualities and other Uses. The inspissated juice of the various species of aloe is a hot irritating purgative. Three sorts of it are used in the shops, viz. the *aloe fœcotrina* as it is called in the materia medica, which is the *aloe vera* of Miller. It is gentler and purer than the others, and is generally the only kind used in medicine. It is distinguished from the other kinds by having little or no smell: it is the basis of most of the empirical pills, as Anderson's, &c. &c. Succotrine aloes may be given in considerable doses, as a scruple or half a dram at a time; and is a very good purge. It is particularly useful in phlegmatic habits, as it is a good aperient and deobstruent. The tincture called *tinctura sacra*, or *hiera picra*, is a solution of it in wine. It may be given as a purgative from one to two ounces or more, or may be taken as an alterant in smaller doses, and continued till it has induced a lax habit, or soluble state of the bowels. It is an excellent medicine in languid phlegmatic habits; warming the solids, cleansing the primæ viæ, and attenuating viscid juices in the remoter parts. The hepatic aloes is said by some to be preferable (as the basis of a common purge) to the succotrine, as not stimulating so much. The London college however use only the succotrine. The pills called *pil. rufi*, and the *pil. rudii*, are both aloetics, and are extremely serviceable medicines. Spanish liquorice is said to be the most efficacious ingredient of all others, in covering the ill taste of aloes. Equal parts of aloes and Spanish liquorice, dissolved in water, is said to be one of the most pleasant and useful aloetic purges of all others. The medicine called *elixir aloes* is a liquid pil. rufi: and it may be taken in doses of from twenty drops to a tea-spoonful. *Elixir proprietatis* is the same medicine, with the ingredients in a somewhat different proportion; a dose of which is from twenty drops to a tea-spoonful, twice a day. As the droffy resinous part of aloe is not soluble in water, it has been found, when combined with other mixtures, an excellent preservative to ship's bottoms against the worm, to which ships trading to the East or West Indies are particularly subject. One ounce of aloes is sufficient for two superficial feet of plank; about twelve pounds for a vessel of fifty tons burthen, and three hundred pounds

for a first-rate man of war. It may be incorporated with six pounds of pitch, one pound of Spanish brown or whiting, and a quart of oil; or with the same proportion of turpentine, Spanish brown, and tallow. Such a coat will preserve a ship's bottom eight months, and the expence of a first-rate ship will be about 18l. The same composition may be used in the hot countries for preserving rafters, &c. from the wood-ant.—The Hottentots hollow out the trunk of the first species to make quivers for their arrows. And several of them are used for hedges.

Propagation and Culture. The soil in which these plants thrive best, is one half fresh light earth from a common (and, if the turf be taken from it and rotted, it is much better); the rest should be white sea-sand or road-sand and sifted lime-rubbish, of each of these two a fourth part; mix them together six or eight months at least before the compost be used, observing to turn it over often in the time. The middle of July is a very proper season to shift these plants; at which time you may take them out of the pots, and with your fingers open the roots, and shake out as much of the earth as possible, taking off all dead or mouldy roots, but do not break or wound the young fresh ones: then fill the pot about three parts full of the above-mentioned earth, putting a few stones in the bottom of the pot, to drain off the moisture; and, after placing the roots of the plant in such a manner as to prevent their interfering too much with each other, put in as much of the same earth as to fill the pot almost to the rim, and observe to shake the plant, so as to let the earth in between the roots; and then with your hand settle it close to the roots of the plant, to keep it steady in the pot; then water them gently, and set them abroad in a shady place, where they may remain for three weeks, giving them gentle waterings, if the weather should prove hot and dry. Toward the end of September, in a dry day, remove them into the house again, observing to give them as much free open air as possible while the weather is warm; but, if the nights are cool, you must shut up the glasses, and give them air only in the day; and, as the cold increases, you must not open the glasses, but observe to give them gentle waterings often, till the middle of October, when you must abate watering according to the heat of the house in which they are kept. For those plants which are placed in a stove will require to be watered at least once a week, most part of the winter; whereas those which are kept in a green-house, without artificial heat, should not be watered oftener in winter than once a month. When these hardier sorts of aloes are placed abroad in summer, they should have but little water given them; and, if much rain should fall during the time they are abroad, they should be screened from it: for, when they imbibe much wet in summer, they frequently rot the following winter, especially if they are not kept in a moderate warm air. Therefore, those who choose to treat these plants hardly, should be cautious of their receiving too much moisture. The tender sorts, as the viscosa, ferox, and cobweb, aloes, should constantly remain in the stove, or be removed in summer to an airy glass-case, where they may have free air in warm weather, but be protected from rain and cold. With this management the plants will thrive and increase, and such of them as usually flower may be expected to produce them in beauty at their seasons. The hardier sorts thrive much better when they are exposed in summer, and secured from the cold and rain in winter, than if they are treated more tenderly. For, when they are placed in a stove, they are kept growing all the winter, whereby they are drawn up weak; and, although they will flower oftener when they have a moderate share of heat, yet in two or three years the plants will not appear so slightly as those which are more hardily treated. Most of these aloes are increased by offsets, which should be taken from the mother plant at the time when they are shifted, and must be planted in very small pots, filled with the same earth as was directed for the old plants; but if, in taking the suckers off, you observe that part which joined to the mother

root to be moist; you must let them lie out of the ground in a shady dry place six or eight days to dry before they are planted, otherwise they are very subject to rot. After planting, let them remain in a shady place (as was before directed in shifting the old plants) for a fortnight, when you should remove the tender kinds to a very moderate hot-bed, plunging the pots therein, which will greatly facilitate their taking new root; but observe to shade the glasses in the middle of the day, and to give them a great share of air. Toward the middle of August, begin to harden these young plants, by taking off the glasses in good weather, and by raising them at other times with props, that the air may freely enter the bed, which is absolutely necessary for their growth, and to prepare them to be removed into the house, which must be done toward the end of September, and they must then be managed as was before directed for the old plants. The African aloes, for the most part, afford plenty of suckers, by which they are increased; but those few that do not, may be, most of them, propagated by taking off some of the under leaves, laying them to dry for ten days or a fortnight, as was directed for the offsets; then plant them in the same soil as was directed for them, putting that part of the leaf which adhered to the old plant, about an inch, or an inch and a half, (according to the size of the leaf,) into the earth, giving them a little water to settle the earth about them; then plunge the pots into a moderate hot-bed, observing to screen them from the violence of the sun, and give them gentle refreshings with water once a week: the best season for this is in June, that they may push out heads before winter.

Cultivation of the Aloe in the Island of Barbadoes. The lands within two or three miles of the sea, which are subject to drought, and are so stony and shallow as not to admit of the planting sugar-canes with any prospect of success, are generally found to answer best for the aloe-plant. The stones, at least the larger ones, are first picked up, and either packed in heaps upon the most shallow barren spots, or laid round the field as a dry fence. The land is then lightly ploughed, and very carefully cleared of all noxious weeds, lined at one foot distance from row to row, and the young plants set, like cabbages, at about five or six inches from each other. This regular mode of lining and setting the plants, is practised only by the most exact planters, in order to facilitate the weeding of them, by hand, very frequently: because, if they are not kept perfectly clean, and free from weeds, the produce will be very small. They will bear being planted in any season of the year, even the driest, as they will live on the surface of the earth, for many weeks, without a drop of rain.

ALOE, *f.* [אַלֹּה, Heb. as it is supposed.] A precious wood used, in the East, for perfumes, of which the best sort is of higher price than gold, and was the most valuable present given by the king of Siam, in 1686, to the king of France. It is called *tambac*, and is the heart or innermost part of the aloe-tree; the next part to which is called *calembac*, which is sometimes imported into Europe, and, though of inferior value to the *tambac*, is much esteemed. The part next the bark is termed, by the Portuguese, *pao d'aquila*, or eagle-wood; but some account the eagle-wood not the outer part of the *tambac*, but another species. Our knowledge of this wood is yet very imperfect.

ALOE AFRICANA, *f.* in botany. See **CRASSULA**.

ALOE AMERICANA, *f.* in botany. See **AGAVE**.

ALOE PURPUREA, *f.* in botany. See **DRACÆNA**.

ALOE UVARIA, *f.* in botany. See **ALETRIS**.

ALOE YUCCÆ FOLIIS, *f.* in botany. See **YUCCA**.

ALOE'TICAL, *adj.* Consisting chiefly of aloes.

ALOE'TIC, *f.* Any medicine which chiefly consists of aloes.

ALOE'US, in fabulous history, a giant, son of Titan and Terra, whose wife Iphimedia was ravished by Neptune, and had two sons by him, Othus and Ephialtes. Aloeus educated them as his own, and hence they have been called Alouides.

ALO'FT, *adv.* [*lofter*, Dan. to lift up; *loft*, air, Icelandic; so that *aloft* is, into the air.] On high; above; in the air. A word used chiefly in poetry:

For I have read in stories oft,
That love has wings, and soars aloft.

Suckling.

ALOFT, *prep.* Above:

The great luminary
Aloft the vulgar constellations thick,
That from his lordly eye keep distance due,
Dispenses light from far.

Milton.

ALO'GIANS, *f.* in church-history, a sect of ancient heretics, who denied that Jesus Christ was the Logos, and consequently rejected the gospel of St. John. The word is compounded of the privative α and $\logos$, q. d. *without logos or word*. Some ascribe the origin of the name, as well as of the sect, of Alogians, to Theodore of Byzantium, by trade a currier; who having apostatized under the persecution of the emperor Severus, to defend himself against those who reproached him therewith, said, that it was not God he denied, but only man. Whence his followers were called in Greek $\alpha\lambda\omicron\gamma\omicron\iota$, because they rejected the word. But others, with more probability, suppose the name to have been first given them by Epiphanius in the way of reproach. They made their appearance toward the close of the second century.

A'LOGOS, a name given by the Egyptians to Typhon.

ALOGO'TROPHY, *f.* [of $\alpha\lambda\omicron\gamma\omicron\varsigma$, unreasonable, and $\tau\rho\phi\eta$, food, Gr.] A disproportionate nutriment, when one part of the body is nourished more or less than the other.

ALO'IDES, two formidable giants in Homer, who were the largest and handfomest men that were ever seen. At nine years of age they were thirty-six cubits high, and nine thick; and they grew every year a cubit in thickness, and an ell in height. Their prodigious bulk rendered them so proud, that they undertook to dethrone Jupiter; but they were taken prisoners by Mars, who bound them in chains. They were afterwards delivered by Mercury; but at length were thrown into Tartarus by Jupiter. See **ALOEUS**.

A'LOGY, *f.* [$\alpha\lambda\omicron\gamma\omicron\varsigma$, Gr.] Unreasonableness; absurdity.

ALO'NE, *adj.* [*alleen*, Du. from *al* and *een*, or one; that is, *single*.] Without another.—God, by whose *alone* power and conservation we all live, and move, and have our being. *Bentley*.—Without company; solitary.—Eagles we see fly *alone*, and they are but sheep which always herd together. *Sidney*.

Better be *alone*, than in ill company. This proverb contains very wholesome advice; for ill company is not only very tedious and troublesome while we partake of it, but often fatal in the consequences, whereas a good man is *nunquam minus solus quam cum solus*.

ALONE, *adv.* This word is seldom used but with the word *let*, if even then it be an adverb. It implies sometimes an ironical prohibition, forbidding to help a man who is able to manage the affair himself:

Let us *alone* to guard Corioli,
If they set down before 's; 'fore they remove,
Bring up your army.

Shakespeare.

To forbear; to leave undone.—His client stole it, but he had better have *let it alone*; for he lost his cause by his jest. *Addison*.

ALONG, *adv.* [*au longue*, Fr.] At length.—Through any space measured lengthwise.—A firebrand carried *along* leaveth a train of light behind it. *Bacon*.—Throughout; in the whole: with *all* prefixed.—Solomon, *all along* in his Proverbs, gives the title of fool to a wicked man. *Tillotson*.—Joined with the particle *with*; in company; joined with.—Religious zeal is subject to an excess, and to a defect, when something is mingled with it which it should not have; or when it wants something that ought to go *along with* it. *Sprat*.—Sometimes *with* is understood:

Command

Command thy slaves: my free-born soul disdains
A tyrant's curb, and reſtve breaks the reins.
Take this *along*; and no diſpute ſhall riſe
(Though mine the woman) for my raviſh'd prize. *Dryden.*

Forward; onward. In this ſenſe it is derived from *allons*,
French:

Come then, my friend, my genius, come *along*,
Thou maſter of the poet and the ſong. *Pope.*

ALOO'F, *adv.* [*all off*, that is, *quite off*.] At a diſtance;
with the particle *from*. It generally implies a ſmall diſtance,
ſuch as is within view or obſervation. Applied to
perſons, it often inſinuates caution or circumſpection. In
a figurative ſenſe, it is uſed to import art or cunning in
converſation, by which a man holds a principal queſtion
at a diſtance. It is uſed metaphorically of perſons that
will not be ſeen in a deſign; and it is applied to things not
properly belonging to each other:

Love's not love,
When it is mingled with regards that ſtand
Aloof from th' entire point. *Shakeſpeare.*

A'LOPE, the daughter of Cercyon, who had a child
by Neptune, called Hippothoon. It is alſo the name of
one of the Harpies.

ALOPE'CE, **ALOPE'CIA**, an iſland placed by Ptolemy
at the mouth of the Tanais, and called the iſland Tanais:
now, l'île des Renards. Alſo an iſland of the Boſphorus
Cimmerius; and another in the Ægean Sea, over-againſt
Smyrna.

ALOPE'CIA, *f.* [*from αλωπεξ*, a fox, becauſe a fox
is ſubject to a diſtemper which reſembles it.] Baldneſs,
the falling off of the hair; called alſo *capillorum deſluvium*.
Athrix, *Depilis*, *Phalacroſis*; when particularly on the ſci-
puit, *Calvities* and *Calvitium*: which Galen ſays, is owing to
a defect of moiſture. When the bald part is ſmooth and
winding, like the track of a ſerpent, it is called *ophiasis*;
but the general name of all the different appearances of
bald places is *area*, which name is taken from the area in
a garden, a ſpot on which not any thing grows; though
Blanchard ſays, that the hair falls off areatim, by ſhed-
ding; whence, in general, this diſeaſe is called *area*.

Theſe diſorders ſeem to have been more common among
the ancients than they are in our days. Celfus ſays, that
the alopecia comes at any age, but the ophiasis only affects
infants; and Sennertus obſerves, that they both are com-
mon to all ages, though they are moſt frequently met with
in childhood, and often ſucceed the tinea, achores, and ſavi.
The cauſe is a faulty humour that deſtroys the roots
of the hair, and that ſometimes only perverts the humour
that nourishes them, in which caſe the hair turns white,
yellow, &c. according to the different quality of the mor-
bid humour. Galen ſays, that eating muſhrooms may
cauſe that bad quality in the humours which produce theſe
diſorders; and alſo that malignant and contagious diſeaſes
of various kinds may produce the ſame effect.

The alopecia ſpreads itſelf on the beard, as well as on
the hairy ſcalp, and is irregularly formed. The ophiasis
uſually begins at the back part of the head, and creeps
about the breadth of two fingers, till it hath extended its
two heads to both the ears, and ſometimes to the forehead,
till both heads meet in one. The ophiasis ſeems to be
more malignant than the alopecia, ſince that in it not only
the roots of the hair, but alſo the cuticle is corroded as far
as the roots reach; the ſkin alſo changes its colour, and
is ſometimes pale; at others, darker coloured; and, if
pricked, a ſerous blood iſſues out. Theſe diſorders differ
from the tinea: in the latter the excoriations and ex-
ulcerations are deeper, and often the hair does not grow
again. In infants theſe diſorders commonly go off as age
advances; but in adults, the cure, eſpecially of the ophiasis,
is very difficult. If the part does not grow red by friction,
a cure is vainly attempted; but, in proportion as a redneſs

appears readily on rubbing the part, the cure may be ex-
pected to be eaſy and ſoon effected. If a leproſy is the
cauſe, the caſe is incurable. The beſt prognosſtic is when
hairs begin to puſh out on the edges of the areas.

As to the cure, if any other diſeaſe attends, begin by
removing it; which done, it often falls out that the alo-
pecia, &c. depending thereon, is removed alſo. Before
the hair falls off, if ſigns of the approaching diſeaſe at-
tend, gentle repellents and corroborants may be uſed; but
if the diſeaſe is formed, repellents muſt be omitted; the
head muſt be ſhaved, then waſhed with ley in which is in-
fuſed the abrotanum and ſuch-like herbs, after which let
the part be rubbed with a flannel or other coarſe cloth
until the ſkin grows red; this done, applications of muſ-
tard, white lily roots, nitre, tar, the aſhes of ſouthern-
wood, may be directed; or, waſh the head every night at
going to bed with a ley prepared by boiling the aſhes of
vine-branches in red wine. A powder made by reducing
hermodactyls to fine flour, is alſo recommended for the
ſame purpoſe. In caſes where the baldneſs is total, a
quantity of the ſineſt burdock-roots are to be bruised in a
marble mortar, and then boiled in white wine until there
remains only as much as will cover them. This liquor,
carefully ſtrained off, is ſaid to cure baldneſs, by waſhing
the head every night with ſome of it warm. A ley made
by boiling aſhes of vine-branches in common water is alſo
recommended with this intention. A freſh-cut onion,
rubbed on the part until it be red and itch, is likewiſe
ſaid to cure baldneſs. A multitude of ſuch remedies are
every where to be found in the works of Valeſcus de Ta-
ranta, Rondeletius, Holcricus, Trincavellius, Celfus, Se-
nertay, and other practical phyſicians.

ALOPECU'RO-VERONICA, *f.* in botany. See **MEN-
THA**.

ALOPECU'ROS, *f.* in botany. See **BETONICA**.

ALOPECU'RUS, *f.* [*αλωπεκος ουρα*, fox-tail.] In bo-
tany, a genus of the triandria digynia claſs, ranking in the
natural order of gramina or graſſes. The generic charac-
ters are—Calyx: glume one-flowered, two-valved; valves
ovate-lanceolate, concave, compressed, equal, connate at
the baſe. Corolla: one-valved; valve ovate-lanceolate,
concave, the edges united at the baſe, a little ſhorter than
the calyx; awn twice as long, with a bent joint, inſerted
into the back of the valve near the baſe. Stamina: fila-
ments three, capillary, flatliſh at the baſe, longer than the
calyx: antheræ forked at each end. Piſtillum: germ
roundiſh; ſtyles two, capillary, united at the baſe, longer
than the calyx; ſtigmas villous. Pericarpium: none. Co-
rolla inveſting the feed. Seed ovate, covered.—*Eſſential
Character*. Calyx: two-valved. Corolla: one-valved.

Species. 1. *Alopecurus Indicus*, or Indian fox-tail
grafs: ſpike cylindrical; involucre ſetaceous, ſuſciculate,
two-flowered; peduncles villous. Native of the Eaſt Indies.

2. *Alopecurus bulbosus*, or bulbous fox-tail grafs:
culm erect, ſpike cylindrical, root bulbous. Mr. Hudſon
affirms, that this, planted in watery places, becomes the
ſame with ſtote fox-tail, No. 5. According to him, there-
fore, it is only a variety, ariſing from the difference of ſoil.

3. *Alopecurus pratensis*, or meadow fox-tail grafs:
culm ſpiked, erect; glumes villous, corollas awnleſs. The
meadow fox-tail grafs is a native of moſt parts of Europe,
from Italy, through France, Germany, Holland, Great
Britain, to Denmark, Norway, Sweden, and Ruſſia: alſo
in Siberia. It is moſt abundant in moiſt meadows, where
the ſoil is good; neither very wet nor dry grounds agree
with it. Ray affirms, that it is extremely common all over
England: in many counties it is by no means the predo-
minant grafs; and in ſome places it is even ſcarce. About
London, in the beſt paſtures, it is certainly very common.
It is one of the earlieſt of the graſſes, producing the ſpike
in April or May, with the vernal grafs and the ladies'
ſmock. It frequently flowers twice in one ſeaſon, and
therefore ſhould ſeem to be proper for ſuch lands as will
admit of a ſecond crop being taken. It undoubtedly poſ-
ſeſſes

lesses the three great requisites of quantity, quality, and earliness, in a superior degree to any other: and therefore is highly deserving of cultivation on lands that are proper for it. The seed of this valuable grass may be collected without much difficulty, for it does not quit the chaff, and the spikes are very prolific.

4. *Alopecurus agrestis*, or field fox-tail grass: culm spiked, erect; glume smooth, calyx surrounded at bottom by a ring. This is readily distinguished from the meadow fox-tail grass, to which it bears most resemblance, by the great length and slenderness of its spikes, tapering to a point, and usually of a purple colour. It is marked as pereunial by Linnæus, Hudson, and in the Kew catalogue; by Leers, Curtis, and others, as annual. The flowering stalk is a foot or eighteen inches high, upright, except that it is crooked at bottom; it has three or four joints, which are smooth, and purple. The leaves are about three inches long, and from a sixth to a quarter of an inch broad, roughish on the upper surface only, with a blunt membrane (ligula) at the base. This grass is a weed in cultivated ground; it is also frequent by way-sides, on banks and the borders of fields, but rarely in pastures. It varies in the size both of the plant and spike, as well as in the colour of the latter, which is sometimes of a pale green or whitish, without any purple; when in full flower it bends a little. It has acquired the name of mouse-tail grass in English, and *mysuroides* in Latin, from the great length and slenderness of the spike, resembling the tail of a mouse. Its inferiority in every respect to fox-tail grass is so manifest, that it would answer no purpose to make experiments, with any hopes of bringing it into cultivation. It flowers early, continues flowering till autumn, and comes into bloom remarkably quick after being sown.

5. *Alopecurus geniculatus*, or flote fox-tail grass: culm spiked, infracted, corollas awnless; (awns concealed within the calyx.) This species is easily known in its common state, by pools and in the wet parts of meadows, by the frequent joints of the culm or stem, changing their direction at an angle, and thus appearing as if it were broken. It frequently puts out roots under water from the joints, and thus spreads itself; the leaves floating on the surface. From the deep purple colour of the spikes, it is called in some places black-grass. It sometimes occurs in dry pastures, and then, according to Mr. Curtis, it grows more upright, the spike becomes much slenderer, and the base of the stalk swells out into a kind of bulb. It flowers in June. Cattle eat it readily, but it is not a profitable grass.

6. *Alopecurus hordeiformis*, or barley-like fox-tail grass: raceme simple, flowers intrinched with awns. This is an Indian grass. It has the appearance of *hordeum murinum*, or barley-grass. The height is about a foot; the leaves are flat and channelled.

7. *Alopecurus monspeliensis*, or bearded fox-tail grass: panicle subspiked, calyxes rugged, corollas awned. It grows wild in marshes and wet pastures. Annual, flowering in June and July.

8. *Alopecurus panicus*, or hairy fox-tail grass: panicle subspiked, glumes villous, corollas awned. The whole plant is soft, and only five or six inches high. It grows on dry soils. Annual, flowering in July. Mr. Hudson joins the two last under the name of *alopecurus aristatus*, or bearded fox-tail grass. He thinks that the difference of size may arise only from situation.

Propagation and Culture. See GRASS.

A'LOPEX, *f.* in zoology, a species of the canis, with a straight tail and black tip. It is commonly called the *field fox*.

ALO'SA, *f.* The shad, or mother of herrings, a species of the clupea. See CLUPEA.

ALOS'T, a town in Flanders, seated on the river Dender, in the midway between Brussels and Ghent. Lat. 49. 55. N. lon. 4. 10. E.

ALO'UD, *adv.* Loudly; with a strong voice; with a great noise:

Strangled he lies! yet seems to cry aloud,
To warn the mighty and instruct the proud;
That of the great, neglecting to be just,
Heav'n in a moment makes an heap of dust. *Waller.*

ALOW, *adv.* In a low place; not aloft:

And now *alow*, and now aloft they fly,
As borne through air, and seem to touch the sky. *Dryden.*

AL'PHA, *f.* The first letter of the Greek alphabet, answering to our *a*. As a numeral it stands for one, or the first of any thing. It is particularly used, among ancient writers, to denote the chief or first man of his class or rank. In this sense the word stands contradistinguished from *beta*, which denotes the second person. Plato was called the *Alpha* of the wits: Eratosthenes, keeper of the Alexandrian library, whom some called a *Second Plato*, is frequently named *Beta*.

ALPHA is also used to denote the beginning of any thing. In which sense it stands opposed to *omega*, which denotes the end. And these two letters were made the symbol of Christianity; and accordingly were engraven on the tombs of the ancient Christians, to distinguish them from those of idolaters.—I am *alpha* and *omega*, the beginning and the ending, saith the Lord, which is, and which was, and which is to come, the Almighty. *Revelations.*

AL'PHABET, *f.* [*Fr. alfabeto*, Ital. *alfabeto*, Sp. of *alphabetum*, Lat. q. d. alpha, αλφα, beta, βετα, Gr. of אָלֶף, Heb. he taught, whence אָלֶף, a leader or first of a company.] The order of the letters, or elements of speech. The number of letters is different in the alphabets of different languages. The English alphabet contains 24 letters; to which if we add *j* and *v* consonant, the sum will be 26: the French contains 23; the Hebrew, Chaldee, Syriac, and Samaritan, 22 each; the Arabic, 28; the Persian, 31; the Turkish, 33; the Georgian, 36; the Coptic, 32; the present Russian, 41; the Greek, 24; the Latin, 22; the Slavonic, 27; the Dutch, 26; the Spanish, 27; the Italian, 20; the Ethiopic and Tartarian, each 202; the Shanfcrit, 50; the Indians of Bengal, 21; the Barmese, 19. The Chinese have, properly speaking, no alphabet, except we call their whole language by that name; their letters are words, or rather hieroglyphics, amounting to about 80,000. The Americans had no letters when that country was discovered by the Spaniards. The Acaanibas engrave a representation of their memorable events and epochs on stones and metals; their songs supply the rest. In Peru, and Chili, to keep an account of their goods and chattels, and to preserve the memory of their particular affairs, the Indians have recourse to certain knots of wool, which, by the variety of their colours and ties, serve instead of characters and writing. The knowledge of these knots, which they call *quipos*, is one of their great sciences; but which is always kept as a secret, and never revealed to the children till the fathers think themselves at the end of their days.

It has been a matter of considerable dispute whether the method of expressing our ideas by *letters*, be really a human invention; or whether we ought to attribute an art so exceedingly useful to an immediate revelation from the Deity; an enquiry which we shall fully investigate under the article LANGUAGE, to which it properly belongs.

In effect, alphabets were not contrived with design, according to the just rules of reason and analogy; but have been successively framed, altered, &c. as occasion offered. And hence many grievous complaints as to their deficiencies, and divers attempts to establish new and more adequate ones in their places. Bishop Wilkins charges all the alphabets extant with great irregularities, with respect both to the order, number, figure, power, &c. As to the order, it appears inartificial, precarious, and confused; because the vowels and consonants are not reduced into classes, with such orders of precedence and subsequence as their natures will bear. Even the Hebrew order is not free from this imperfection. As to number, they are both redundant and deficient. Redundant either by allotting several

several letters to the same power and sound, as in the Hebrew *u* and *v*, and the ordinary Latin *e* and *k*, *f* and *ph*; or by reckoning double letters among the simple elements of speech, as in the Hebrew *y*, the Greek *z* and *ψ*, the Latin *q* (*cu*), *x* (*cs*), and the *j* consonant, or *jod*. Deficient in divers respects, especially in regard of vowels, of which there are seven or eight kinds commonly used, tho' the Latin alphabet only takes notice of five, whereof *i* and *u*, according to our English pronunciation, are not properly vowels, but diphthongs. Add to this, that the difference among vowels, in respect of long and short, is not sufficiently provided for. The ancients, we know, used to express a long vowel by doubling its character, as *amaabam*, *naata*, *ree*, *seedes*, *sanctissimis*; though the vowel *i*, instead of being doubled, was frequently lengthened, as *Ædilis*, *pliso*, *vivus*. The ways used in English for lengthening and abbreviating vowels, viz. by adding *e* mute to the end of a syllable in order to prolong it, and doubling the following consonants for the shortening of a vowel, as *wane wann*, *ware warr*, &c. or else by inserting some other vowel for the lengthening of it, as *meat met*, *read red*, &c. are all improper, because the sign ought ever to be where the sound is. As to their powers, again, these are not always fixed to the same signification: the vowels, for instance, are generally acknowledged to have each of them several sounds. Thus the power of the vowel *e* is expressed in writing no less than six different ways, viz. by *e*, as in *he*, *me*, *she*; by *ee*, in *three*, *free*; by *ie*, in *field*, *yield*, *chief*; by *ea*, in *near*, *dear*, *hear*; by *eo*, in *people*; by *i*, in *privilege*. So is the power of the vowel *a*; as in *all*, *aul*, *aw*, *fault*, *caught*, which are only various ways of writing the same long vowel; besides the other distinct ways of expressing the same vowel when used short. The power of *o* is written five ways: *o*, as in *to*, *who*, *move*; *oe*, as in *doe*; *oo*, in *moon*, *noon*; *ou*, in *could*, *would*; *wo*, in *two*; and *fo* of the rest. Nor are the consonants of more determinate powers; witness the different pronunciation of the same letter *c* in the same word *circo*, and of *g* in *negligence*. To say no more, the letters *c*, *f*, and *t*, are used alike to denote the same power; and the letter *f* is commonly used for *z*; and, which is yet worse, some letters of the same name and shape are used at one time for vowels, and at another for consonants, as *j*, *v*, *w*, *y*. From this confusion in the power of letters there arise divers irregularities; as, that some words are distinguished in writing which are the same in pronunciation, as *cesso* and *fesso*, &c. and others are distinguished in pronunciation which are the same in writing. Hence also the Latin *male* is a dissyllable, and the English *male* a monosyllable. The names also in most alphabets are very improperly expressed by words of divers syllables, *alpha*, *beta*, &c. in which respect the Roman and English alphabets, which only name the letters by their powers, have greatly the advantage over the rest. Lastly, their figures are not well concerted; there being nothing in the characters of the vowels answerable to the different degrees of apertion; nor in the consonants analogous to the agreements or disagreements thereof.

The learned author of *Hermes* informs us, that to about twenty plain elementary sounds we owe that variety of articulate voices which have been sufficient to explain the sentiments of such an innumerable multitude as all the past and present generations of men. Mr. Sheridan says, that the number of simple sounds in our tongue are twenty-eight; while Dr. Kenrick insists, that we have only eleven distinct species of articulate sounds, which even by contraction, prolongation, and composition, are increased only to the number of sixteen; every syllable or articulate sound in our language being one of the number. Bishop Wilkins and Dr. William Holder speak of thirty-three distinct sounds.

After the decomposition of language into the elementary sounds, the next step towards the notation of it by alphabetical characters, would be the delineation of a separate mark or letter to represent each sound; which marks, though few in number, would admit of such a variety of arrange-

ments and combinations, as might be capable of producing that infinity of articulate sounds which compose language. The ingenious Wachter, in his *Natura et Scriptura Concordia*, p. 64, endeavours to shew, that ten marks or characters are sufficient for this purpose. His scheme is as follows:

Genus.	Figura.	Potestas.
Vocal	○	a. e. i. o. u.
Guttural	○ 	k. e. ch. q. g. h.
Lingual	∠	l.
Lingual	∟	d. t.
Lingual	⌒	r.
Dental	□	f.
Labial	3	b. p.
Labial	⌢	m.
Labial	≡	s. ph. v. w.
Nasal	∧	n.

If this be the case, then the most simple alphabet, which consisted only of thirteen letters, must have been abundantly sufficient to answer all the purposes of mankind, and much of our twenty-four letter alphabet may appear superfluous. That able mathematician Tacquet has calculated the various combinations of the twenty-four letters, even without any repetition, to amount to no fewer than 620,448,401,733,239,439,360,000; while Clavius makes them only 5,852,616,738,497,664,000. Either of these numbers, however, is infinite to the human conceptions, and much more than sufficient to express all the sounds that ever were articulated by man. As there are more sounds in some languages than in others, it follows of course, that the number of elementary characters or letters must vary in the alphabets of different languages. The following is the scheme of the English alphabet, as given by Mr. Sheridan in his *Rhetorical Grammar*, p. 9.

Number of simple sounds in our tongue, 28.

³ a	¹ a	² e	³ e	² o	³ o	¹ i	¹ i	² u
hall	hat	hate	beer	note	noose	bet	fit	but
w short oo				y short ee				

- 19 Consonants, { eb ed ef eg ek el em en ep er es
et ev ez eth eth ezh ing.
- 2 Superfluous, c, which has the power of *ch*, or *cs*;
q, that of *ek* before *u*.
- 2 Compound, j, which stands for *edzh*;
x, for *ks* or *gz*.
- 1 No letter, h, merely a mark of aspiration.

Consonants divided into Mutes and Semivowels.

- 6 Mutes, eb ed eg ek ep et.
3 Pure Mutes, ek ep et.
3 Impure, eb ed eg.
- 13 Semivowels, { ef el em en er es ev ez eth eth
or Liquids. } eth ezh ing.
- 9 Vocal, el em en er ev ez eth ezh ing.
- 4 Aspirated, ef es eth eth.

Divided again into

4 Labial,	eb ep ev ef.
Dental,	ed et eth etj ez efs ezh esh.
4 Palatine,	eg ek el er.
3 Nasal,	em en ing.

Mr. Sheridan observes, that our alphabet is ill calculated for the notation of the English tongue, as there are many sounds for which we have no letters or marks: and there ought to be nine more characters or letters to make a complete alphabet, in which every simple sound ought to have a mark peculiar to itself. The reason of the deficiency is, that the Roman alphabet was formerly adopted for the notation of the English language, though by no means suited to the purpose.

Many authors are of opinion, that letters derive their forms from the positions of the organs of speech in their pronunciation. Van Helmont has taken great pains to prove, that the Chaldaic characters are the genuine alphabet of nature; because, according to him, no letter can be rightly sounded without disposing the organs of speech into an uniform position with the figure of each letter; and, in support of this system, he has anatomised the organs of articulation.

The learned bishop Warburton, however, ascribes the origin of alphabetical writing to hieroglyphics, or to a series of objects or figures so delineated as to represent the ideas of the human mind. And that, when philosophy advanced, and learned men wrote, the exact delineation of hieroglyphic figures becoming too tedious and too voluminous, they then, by degrees, perfected another character, which he calls the cunning hand of hieroglyphics; these, being at first formed only by the outlines of each figure, became at length a kind of marks, which led to the construction of letters, and consequently to the formation of an alphabet.

Mr. Nelme, on the contrary, has endeavoured to shew, that all elementary characters or letters derive their form from the line and the circle. His alphabet consists of 13 radical letters, four diminished, and four augmented. The radicals are L, O, S, A, B, C, D, N, U, I, E, M, R. H, according to him, is derived from A; P from B; T from D; and F from U; these are called diminished letters. The augmented ones are, Z from S; G from C; W from U; and Y from I. He proves that his characters are very similar to those of the ancient Etruscans: but all characters are composed either of lines and circles of the former, and of parts of the latter. Mr. Gebelin again, deduces them from hieroglyphic representations; and has given several delineations of human figures, trees, &c. in confirmation of this hypothesis.

One of the most simple alphabets has been formed by making two perpendicular and two horizontal lines:

a	b	c
d	e	f
g	h	i

Thus, From which may be deduced

nine different characters or letters. Thus,

a	b	c	d	e	f	g	h	i

Nine more may be made by adding a point to each, and as

k	l	m

many more as

n	o	p

q	r	s

tion of any language, by adding two or more points to each character. Though these square characters are not calculated for dispatch; yet they may be made as expeditiously, or more so, than the Tartar, the Bramin, the Cashmirian, or many others. Writing composed of these characters, is at first sight somewhat like the Hebrew. Mr. Dow, author of the History of Hindostan, lately formed a new language and alphabet. This language, and the characters formed for its notation, were so easy, that a female of his acquaintance acquired the knowledge of

them in three weeks, and corresponded with him therein during their intimacy.

TO ALPHABET, *v. a.* To range in the order of the alphabet.

ALPHABETICAL, or ALPHABETIC, *adj.* [*alphabetique*, Fr.] In the order of the alphabet; according to the series of letters.

ALPHABETICALLY, *adv.* In an alphabetical manner; according to the order of the letters.

ALPHÆNIX, white barley-sugar, to which is given an extraordinary name, to render it more valuable. This sugar, which is thought good for colds, is made of common sugar, which is boiled until it becomes easy to crack, when they pour it upon a marble table, greased with oil of sweet almonds, and mould it into various figures with a brass crotchet. It is easily falsified with starch.

ALPHE'A, a name of Diana in Elis, given her when the river Alpheus endeavoured to ravish her without success.

ALPHEG, [of *alle*, all, and *segan*, Sax. to enjoin *q. d.* a man fit for all things; one that can do any thing; Jack of all trades.] a Christian name of a man.

ALPHERY (Mikipher), born in Russia, and of the imperial line. When that country was torn to pieces by intestine quarrels, in the latter end of the 16th century, and the royal house particularly was so severely persecuted with impostors, this gentleman and his two brothers were sent over to England, and recommended to the care of Mr. Joseph Bidell, a Russian merchant. Mr. Bidell, when they were of age fit for the university, sent them all three to Oxford, where, the small pox unhappily prevailing, two of them died. The surviving brother entered into holy orders; and in 1618 had the rectory of Wooley in Huntingdonshire. Here he did his duty with great cheerfulness and alacrity; and, although he was twice invited back to his native country by some who would have ventured their utmost to have set him on the throne of his ancestors, he chose rather to remain with his flock, and to serve God in the humble station of a parish-priest. Yet in 1643, he underwent the severest trials from the rage of the fanatics; who, not satisfied with depriving him of his living, insulted him in the most barbarous manner; for having procured a file of musqueteers to pull him out of his pulpit, as he was preaching on a Sunday, they turned his wife and small children into the street, into which also they threw his goods. The poor man in this distress raised him a tent under some trees in the churchyard, over against his house, and lived in great distress until the restoration put him in possession of his living again. He returned on this occasion to Huntingdonshire, where he did not stay long; for being upwards of 80, and withal very infirm, he could not perform the duties of his function. Having, therefore, settled a curate, he retired to Hammersmith, where shortly after he died.

ALPHESIBOE'A, the daughter of Phlegius, a priest of Bacchus. She married Alcmeon, and received the famous necklace of Eriphyle for a nuptial present; but, being divorced some time after, she prevailed on her brothers to revenge the affront, who murdered her husband.

ALPHE'US, or ALPHEIUS, a noted and large river of the Peleponnesus; which, rising in Arcadia, and running in a south-west course, pours into the Sinus Chelonica, about ten miles to the south of Olympia. The poets fable strange things of this river; particularly, that, out of love to the nymph *Arethusa*, it runs under the sea to Sicily, and bursts out at the fountain of that name in Syracuse. Its waters were reckoned good in the leprosy, which is called *Alphos* by the Greeks; and hence the name *Alpheus*.—Pausanias adds, that the Eleans had a law, which condemned any woman to death that should either appear at the Olympic games, or even cross this river during that solemnity: and the Eleans add, that the only woman who transgressed it, had disguised herself in the habit of a master or keeper of these games, and conducted her son thither; but, when she saw him come off victorious, her joy made

made her forget her disguise, so that her sex was discovered. She was pardoned; but from that time a law was made that the keepers should appear there naked. Hercules made use of this river to cleanse the stables of Augeas.

AL'PHING, is a very considerable village and church-town, situate about a mile from Exeter on the Plymouth road; this place is of late years greatly augmented and improved in buildings; and a genteel resort, being in every respect esteemed a healthy and pleasant retreat.

ALPHI'TOMANCY [of *αλφίτον*, Gr. bran or meal, and *μαντεία*, divination.] A sort of divination by barley meal.

ALPHI'TON, a hasty-pudding. Thus the Greeks call it, but the Roman name is *polenta*; it is made of barley meal moistened with water, wine, mum, or any other liquor. The soldiers had it in common use.

ALPHON'SIN, in surgery, an instrument for extracting bullets out of gun-shot wounds. This instrument derives its name from the inventor Alphonfus Ferrier, a physician of Naples. It consists of three branches, which are closed by a ring. When closed and introduced into the wound, the operator draws back the ring towards the handle, upon which the branches opening take hold of the ball; and then the ring is pushed from the haft, by which means the branches grasp the ball so firmly as to extract it from the wound.

ALPHON'SINE TABLES, are astronomical tables compiled by order of Alphonfus king of Castile. In the compiling of these it is thought that prince himself assisted.

ALPHON'SUS the Tenth, king of Leon and Castile, was surnamed The Wise, on account of his attachment to literature; and is now more celebrated for having been an astronomer than a king. He was born in 1203; succeeded his father Ferdinand the Third in 1252; and died in 1284, consequently at the age of 81.—The affairs of the reign of Alphonfus were very extraordinary and unfortunate. He understood astronomy, philosophy, and history, as if he had been only a man of letters. "What can be more surprising," says Mariana, "than that a prince, educated in a camp, and handling arms from his childhood, should have such a knowledge of the stars, of philosophy, and the transactions of the world, as men of leisure can scarcely acquire in their retirements? There are extant some books of Alphonfus on the motions of the stars, and the history of Spain, written with great skill and incredible care." In his astronomical pursuits he discovered that the tables of Ptolemy were full of errors; and thence he conceived the first of any the resolution of correcting them. For this purpose, about the year 1240, and during the life of his father, he assembled at Toledo the most skilful astronomers of his time, Christians, Moors, or Jews, when a plan was formed for constructing new tables. This task was accomplished about 1252, the first year of his reign. They were printed in 1483, at Venice, by Radolt, an edition extremely rare: there are others of the dates of 1492, 1521, 1545, &c.

We must not omit a memorable saying of Alphonfus, which has been recorded for its boldness and pretended impiety; namely, "that, if he had been of God's privy council when he made the world, he could have advised him better." Mariana however says only in general, that Alphonfus was so bold as to blame the works of Providence, and the construction of our bodies. The Jesuit's words are curious: "Emanuel, the uncle of Sanchez (the son of Alphonfus), in his own name, and in the name of other nobles, deprived Alphonfus of his kingdom by a public sentence: which that prince merited, for daring severely and boldly to censure the works of divine Providence, and the construction of the human-body, as tradition says he did. Heaven most justly punished the folly of his tongue."

AL'PHUS, *f.* [*αλφός*, from *αφαινω*, an old word for *to change*, because it changes the colour of the skin.] A disorder of the same species of that sort of white leprosy called *vitiligo*, and which is divided into the *alpus*, *melas*, and

leuce, called also *albara*; in the *alpus* the skin is white and roughish, not all over, but in spots, sometimes the patches are broad; it has the same origin as the lepra, and bears the same analogy to the leuce as the scabies to the lepra: the first is superficial, chiefly affecting the skin: the second sinks deeper into the flesh: but these are all disorders that only differ in their degrees of inveteracy. See MEDICINE, LEPROSY.

AL'PINE, [*alpino*, It. of *alpinus*, Lat.] Pertaining to the mountains called the Alps.

ALPI'NI (Prospero), a famous physician and botanist, born in the Venetian territory, in 1553. He travelled in Egypt to acquire a knowledge of exotic plants, and was the first who explained the fructification and generation of plants by the sexual system. Upon his return to Venice, in 1586, Andrea Doria, prince of Melfi, appointed him his physician: and he distinguished himself so much in this capacity, that he was esteemed the first physician of his age. The republic of Venice, in 1593, appointed him to the professorship of botany at Padua; and he had a salary of 750 florins. He discharged this office with great reputation; but his health became very precarious, and he died the 5th of February 1617, in the 64th year of his age; and was buried, without any funeral pomp, in the church of St. Anthony.—Alpini wrote the following works in Latin: The physic of the Egyptians, in four books, printed at Venice, 1591. A treatise concerning the plants of Egypt, 1592. A dialogue concerning balsams, 1592. Seven books concerning the method of forming a judgment of the life or death of patients, 1691. Thirteen books concerning methodical physic, Padua, 1611; Leyden, 1719. A disputation held in the school at Padua, concerning the Raphaniticum, Padua, 1612, and 1629. Of exotic plants, in two books, Venice, 1699. He left several other works, which have never been printed; particularly, The fifth book concerning the physic of the Egyptians, and five books concerning the natural history of things observed in Egypt, adorned with a variety of draughts of plants, stones, and animals.

ALPINIA, *f.* [so called after Prosper Alpinus, a famous physician and botanist, who travelled into Egypt between 1580 and 1584, and practised medicine at Cairo.] In botany, a genus of monandria monogynia class, in the natural order of scitamineæ. The generic characters are—Calyx: perianth one-leaved, tubulose, three-toothed: leaflets equal, erect, acute. Corolla: monopetalous, tubulose: tube cylindraceous, short: border three-parted; parts nearly equal, oblong. Nectary connate with the tube of the corolla, two-parted: the lower part, forming the lower lip, is larger and longer than the parts of the corolla, broadish, spreading, often divided. Stamina: filament proper, none; but along the upper division of the nectary, forming the upper lip, which is flattish, and the length of the corolla, grows a large anther, either deeply bifid, or entire. Pistillum: germ inferior, oblong. Style filiform, often inserted into the fissure of the anther. Stigma incrassate, obtuse. Pericarpium: capsule oval, three-celled, three-valved, crowned with the permanent calyx. Seeds: some, ovate, angular, covered with a sort of berried aril. *Essential Character*.—Calyx, three-toothed, equal, tubulose. Corolla, three-parted, equal. Nectary, two-lipped; the lower lip spreading.

Species. 1. *Alpinia racemosa*: raceme terminating spiked, flowers alternate, lip of the nectary trifid, leaves oblong acuminate. 2. *Alpinia occidentalis*: raceme radical compound erect, nectary emarginate, capsules three-celled, leaves lanceolate-ovate very smooth. They are both natives of the West-Indies.

Propagation and Culture. Being a native of hot climates, it must be preserved in a stove, and the pot plunged into a tub of water. The leaves decay every winter, and are pushed out from the roots every spring, like the *maranta*. It may be increased by parting the roots, when the leaves decay.

ALPINIA SPICATA. See COSTUS.

ALPIS'TE, or ALPIA, a sort of seed used to feed birds with, especially when they are to be nourished for breeding. The alpis'te seed is of an oval figure, of a pale yellow, inclining to an isabel colour, bright and glossy.

ALPS, *f.* an extensive range of exceeding high mountains, which separate Italy from Gaul and Germany. The word is also used as an appellative, to denote any mountains of considerable altitude or extent. Thus, the mountains of the moon, those of Sierra Leona, the peak of Teneriffe, and mount Atlas, are called the *African Alps*. The Altaic chain, and Werturian mountains, are styled the *Asiatic Alps*. The Andes, and the Allegany or Appalachian mountains, are the *Alps* of north and south *America*. The Pyrenean mountains are called the *Spanish Alps*; and the mountains of Wales, the cliffs of Albion, and the Highlands of Scotland, are frequently dignified with the title of *British Alps*, *Scottish Alps*, &c.

The Alps, properly so called, are the most stupendous, and form the principal belt or chain of primitive mountains, in Europe. They begin at the Mediterranean, and, stretching northward, separate Piedmont and Savoy from the adjacent countries; whence directing their course to the east, they form the boundary between Switzerland and Italy, and terminate near the extremity of the Adriatic Sea, to the north-east of Venice. These venerable mountains extend themselves in the form of a crescent; and, as they branch different ways, they are distinguished by different names. From Savona, to the springs of the Varus, they are called the *Maritime Alps*, the highest peak of which is named the Col de Tende. These extend from south to north, between Gaul to the west and Genoa to the east, beginning at Monaco on the Mediterranean; then running out through the east of the county of Nice, and between that and the marquisate of Saluzzo, terminate at mount Viso, between Dauphine and Piedmont. Hence to Suva run the *Alpes Cottiae*, or *Cottian Alps*; mountains extremely high, separating Dauphine from Piedmont, and extending from mount Viso to mount Cenis, between the *Maritime Alps* to the south, and the *Graia* to the north. The *Alpes Graia*, or *Grecian Alps*, so called from the passage of Hercules, begin from mount Cenis, where the *Cottian* terminate; and run out between Savoy and the Tarentese to the west, and Piedmont and the Duché d'Aouste to the east, quite to the Great St. Bernard, where the *Pennine Alps* begin. They are also called by some *Graius Mons*; which extend from west to east, between St. Bernard and the Adula, or St. Gothard; and thus they run out between the Vales to the north, and the Milanese to the south. From these are continued the *Rhetian Alps*, to the head of the river Piave; a part of which are the *Alps Tridentinae*, to the north of Trent. They consist of that chain from which flows the river Adige, or Athesis, and whose inhabitants were anciently called Rhæti. To these join the *Morician Alps*, reaching to Doblach in Tyrol, to the north of the river Tajamento: thence begin the *Alpes Carnica* or *Carnician Alps*, extending to the springs of the Save: and the last, called *Alpes Pannonica*, and *Julia*, extend to the springs of the Kulpe. Over these rugged and inhospitable mountains Hannibal forced his way from Carthage, when he invaded the Roman empire. He ascended the hills to the south of Martigny, through a narrow defile of near six miles, to the top of the first ledging of the mountains; which was then the only channel of communication between Gaul and Italy. His army was composed of infantry, cavalry, and elephants; and he was attended by a train of draught-horses and wheel-carriages, for drawing stores. Mr. Whitaker, who has lately published the course of Hannibal's passage over the Alps, says, these carriages were assuredly the same with the cars of Ireland, and the Highlands at this day, then used by the Gauls and Spaniards, and peculiarly calculated for mountainous roads. This author, in detailing Hannibal's perilous expedition, very ingeniously investigates the famous disputed point, of that undaunted commander's overcoming, by the joint agency of fire and vinegar, the prodigious obsta-

cle to his farther progress, from the sudden and perpendicular termination of the rocky road, in consequence of a recent earthquake, of which his guides had no information. The means by which Hannibal is said to have surmounted this formidable obstruction, namely, by pouring vinegar on the rocks, heated by burning large piles of wood on them, by which they mouldered away, has been much ridiculed; but, as Mr. W. observes, ridiculed only by folly and ignorance. He fully credits the account left us by the ancients, and supports it not only by arguments drawn from historical evidence, but from the effects of chemistry; and thus, with great probability, at least, he appears to have established this hitherto much controverted fact. M. Beaumont, principal engineer to his Sardinian majesty, having lately published his Travels over the Alps, we have, from his elegant and ingenious work, collected the following brief descriptions of the most sublime and striking scenes those romantic regions afford.

The *Maritime Alps* are a ridge of mountains about six hundred miles in extent. The highest peak, as we before observed, is the Col de Tende, over which is one of the three grand passages to Italy; but which can never be crossed without much difficulty, and at times not without imminent danger. The roads, however, which have been lately constructed for miles together upon arches, through narrow defiles, on the brink of vast precipices, and impending over frightful and impetuous torrents, reflect the highest credit on the king of Sardinia; by whose order, and at whose expence, these vast works have been undertaken and executed, for the accommodation of his subjects. But the attention of the curious traveller is most particularly directed to that part of the road over the Col de Brans, near the village of Tuet; it being, as it were, wonderfully supported for about two miles on arcades thrown here and there on the projecting peaks of the lateral rocks, hanging over a tremendous precipice at least fifteen hundred feet deep.

The cold of the Col de Tende is more intense than it is on mount Cenis, though the latter is more elevated above the level of the sea; for which M. Beaumont accounts, by shewing that the degree of cold, experienced on the tops of mountains, is less in proportion to their absolute elevation than to their height above the surrounding valleys. Owing to this extreme height of the Col de Tende, an intensity of cold is produced, occasioning vast accumulations of snow, which sometimes, detaching themselves from the side of the mountain, sweep all before them.

The prospect from the whole of this enormous range of mountains is extremely romantic, but more especially towards the north-west. One of the most celebrated is the Grande Chartreuse, where is a monastery founded by St. Bruno about the year 1084. From Echelles, a little village in the mountains of Savoy, to the top of the Chartreuse, the distance is six miles. Along this course, the road runs winding up, for the most part not six feet broad. On one hand is a stupendous rock, with woods of pine-trees hanging over head; on the other a prodigious precipice almost perpendicular; at the bottom rolls a torrent, that, sometimes tumbling among the fragments of stone which have fallen from on high, and sometimes precipitating itself down vast descents with a noise like thunder, rendered yet more tremendous by the echo from the mountains on each side, concurs to form one of the most solemn, the most romantic, and most astonishing, scenes in nature. To this description may be added the strange views made by the crags and cliffs, and the numerous cascades which throw themselves from the very summit down into the vale. On the top of the mountain is the convent of St. Bruno, which is the superior of the whole order. The inhabitants consist of 100 fathers, with 300 servants, who grind their corn, press their wine, and perform every domestic office, even to the making of their clothes. In the Album of the fathers is an admired alcaic ode, written by the late ingenious Mr. Gray when he visited the Chartreuse, and which has since been published among his works.

The *Pennine Alps*, and glaciers of Savoy, are also justly reckoned among the most stupendous works of Nature. Here immense masses of ice, lodged upon the gentler declivities of the Alps, exhibit representations beyond conception fantastic and picturesque. In the journey to the valley of Chamouni, we have a magnificent prospect of a chain of mountains, equally inaccessible, and covered with ice; and above the rest that of Mount Blanc, whose top appears to reach, and even pierce, the highest region of the clouds. The chain upon which this mountain looks down like a giant, is composed of masses of rocks, which terminate in spikes or spires, called the *Needles*, and which are ranged like tents in a camp. Their sides appear lighter and more airy, from the ornament of several hollow breaks and furrows fretted in the rock itself, as well as from the different streaks and panes of ice and snow, which, without changing the general character of their form, or the majesty of their appearance, give them a picturesque variety. Lower down, the eye surveys with ravishment the gills of ice, and the several glaciers, extending almost into the plain, whilst this appears like an artificial garden, embellished with the mixture of a variety of colours. We have a picturesque opposition to this chain, which is formed by innumerable mountains at the distance of near 50 leagues, between whose tops we have a glimpse of those several plains which they environ.

Near Chamouni is the Glacier de Bois, or Valley or Sea of Ice; to attain which it is necessary to ascend the Montanverd, or Green Mountain, so called from its verdure. It is impossible to describe the beauty of this enormous glacier, or the sensations excited on a view of it. No better idea can be conveyed to the mind than by imagining a stormy sea suddenly surprized by a frost. The mountains which surround this frozen valley are, 1st, Mount Charmos on the right; 2d, Mount Mallet in the back ground 3d, Periadès; 4th, the Great Jorra of an extraordinary height; 5th, l'Aiguille du Moine; 6th, that of Dru, which is opposite to a little hermitage, where people commonly stop to dine on the provisions they carry with them. This Montanverd is also very curious, being half covered with ice and snow, and, in intermediate spaces, with excellent pastures, where cattle feed.

Although it be difficult to ascertain the length and breadth of the sea of ice, as objects appear nearer on high mountains than in valleys, where the air is more dense, yet it may fairly be conjectured to be three quarters of a league broad and five leagues long; that is to say, the space which the eye comprehends from Montanverd: for the sea of ice may extend about twelve leagues. A more curious and at the same time a more dreadful scene than this cannot be conceived, at once presenting the image of the frozen sea and the verdure of the temperate zone. It is possible to descend from the Montanverd on the sea of ice, and even to cross it, but the dangers are many on account of the large crevices which it is necessary to step over, that are more than a hundred feet deep; however, M. Beaumont passed safely over them. It is a matter of much surprize, on coming to this place, to find the waves, which at some distance appear inconsiderable, to be more than eighty or an hundred feet in height.

From hence there is a very steep and narrow path, through a forest of firs and larches, which takes about an hour to descend, in order to return to a place where there is a little wooden bridge to cross over the Arveron; when another most astonishing object presents itself, an entire mountain of ice, formed by the fall of the glacier, seen from the Montanverd, which descends into the valley. High mountains of granite surround these glaciers, and form, by their irregular strata, superb cascades, mixing their waters with the Arveron, which issues from a most beautiful grotto above an hundred feet high, composed entirely of ice.—The wonderful effects of masses of ice contrasted with the impending woods and rich pastures that crown this grand and uncommon scene, added to the frightful noise so frequently heard of enormous bodies of

it breaking off from the mountain and dashing themselves to pieces in the Arveron, must create an admiration and surprize more readily felt than expressed; and raises in our minds an anxious wish, that, before our mortal journey be brought to an end, we could explore the wonders of the *Pennine Alps*, and participate in that awful and philosophic pleasure which must be excited amid such august and romantic scenes.

ALPS, LOWER, a department of France, including part of the late province of Provence, is so called from its vicinity to the mountains of the same name.

ALPS, UPPER, a department of France, including part of the late province of Dauphiny.

ALPUXAR'RAS, or ALPAXARES, mountains of Spain, in the province of Granada, on the coast of the Mediterranean sea. They are about seventeen leagues in length and eleven in breadth, reaching from the city of Velez to Almeria. They are inhabited by Moors, who are the remains of the dispersion and ruin of their empire. They embraced the Christian religion; but preserve their own manner of living, and their language, though much corrupted. Here is a rivulet between Pitros and Portugos, which dyes linen that is dipped in it black in an instant. Near this rivulet is a cavern, from which proceeds so malignant a steam, that it destroys such animals as come near it. The Moriscos cultivate the soil extremely well, and plant fruit-trees; some of which grow to a prodigious height and thickness, and give the mountains a very agreeable aspect.

ALQUIE'R, a liquid measure, used in Portugal to measure oil, two of which make an almond. See ALMOND.

ALQUIFOU', or ARQUIFOU', is a sort of lead-ore, which, when broken, looks like antimony. It is used by the potters to give a green varnish to their works, and thence is called *potter's ore*. It is met with in Cornwall, &c. The potters mix a small portion of manganese with the alquifou, and then the varnish or glazing on their ware is of a blackish hue.

ALRE'ADY, *adv.* At this present time, or at some time past; opposed to futurity; as, *Will he come soon? He is here already. Will it be done? It has been done already.*

Methinks, *already* I your tears survey,
Already hear the horrid things they say,
Already see you a degraded toast,
And all your honour in a whisper lost!

Pope.

ALRE'DUS, ALURED, or ALUREDUS, of Beverley, one of the most ancient and best English historians. He wrote in the reign of Henry I. It is generally believed that he was educated at Cambridge, and that he afterwards became one of the canons and treasurer of St. John's at Beverley. And we learn in a note of Bishop Tanner's, that, for the sake of improvement, he travelled through France and Italy; and that at Rome he became domestic chaplain to Cardinal Othobonie. He died in the year 1129; leaving behind him the following works: 1. The *Annals of Alured of Beverley*, Oxford, 1726. It contains an abridgement of our history from Brutus to Henry I. written in good Latin; and with great accuracy. 2. *Libertates ecclesie S. Johannis de Beverlac*, &c. a manuscript in the Cotton library. It is a collection of records relative to the church of Beverley, translated from the Saxon language.

ALRES'FORD, Hants, i. e. the Ford of Alre, so called from the river of that name, now generally called the river Itchen, which rises not far from this place, and unites four considerable streams within the liberty of Alresford. It is situate 20 miles from Southampton, and seven and a half from Winchester, and lies in the great road from those two places to London, from which it is distant 57 miles and a quarter. It stands exactly in the center of the capital towns of the four adjoining counties of Wilts, Berks, Surry, and Sussex, being 31 miles from Salisbury on the west, same distance from Reading on the N. E. and from Guildford on the east, and Chichester on the

the S. E. It is divided into two parishes, viz. Old and New Alresford; but these are united in one rectory, which also comprehends the parish of Meidstead. The church of Old Alresford is the mother church; those of New Alresford and Meidstead being only chapelries annexed. The church of Old Alresford was taken down in the year 1753, and has since been re-built: it is now a very neat structure, with a beautiful tower, in which are six musical bells.—Alresford is governed by a bailiff and eight burgeses, and formerly sent one member to parliament; but the charter of this town is now said to be lost. It has been twice nearly all consumed by fire. Its market is held on Thursdays for corn; it has three fairs, viz. Holy Thursday; July 5; and the first Thursday after the 10th of October, at which time a large market for sheep commences, and continues every Thursday till Christmas. Here is a good free grammar school, founded in the year 1698, by Henry Perryn, Esq. of Old Alresford, and well endowed.

ALS, *adv.* [*als*, Dutch.] Also; likewise: a word now out of use.

ALSA, a river of Carniola, now the Aupa; running by Aquileia, with a short course from north to south, into the Adriatic; where Constantine, the son of Constantine the Great, fighting against Constans his brother, lost his life.

ALSA'CE UPPER, and LOWER, late provinces of France, now included in the department of the Upper and Lower Rhine, are bounded on the east by the Rhine, on the south by Switzerland, on the west by Lorraine, and on the north by the palatinate of the Rhine. It was formerly a part of Germany, but was given to France by the treaty of Munster. It is one of the most fruitful and plentiful provinces of Europe, abounding in corn, wine, wood, flax, tobacco, pulse, fruits, &c. The mountains which divide it from Lorraine are very high; and generally covered with fir, beech, oak, and horn-beam. Those on the side of Switzerland are less high; and furnished with all sorts of wood, as well for fuel as building. The country itself is diversified with rising hills and fertile vales, besides large forests; but that between the rivers Ill, Hart, and the Rhine, as far as Straßburgh, is inferior to the rest. In High Alsace there are mines of silver, copper, and lead. They however work none but those of Giromany, from which are annually drawn 1600 marks of silver, each mark being eight ounces; and 24,000 pounds of copper. There are iron-works in several parts of Alsace, and particularly at Betford. There is a mineral spring at Sultzbach, near Munster, in High Alsace; which is in great reputation for the palsy, weakness of the nerves, and the gravel.—The inhabitants of Alsace are honest and good-natured, but wedded to their own manners and customs. The fruitfulness of their country renders them indolent and inactive; for the Swiss make their hay and reap their corn, as well as manage the vintage of High Alsace, which sends a great deal of money out of the province. The common language of the country is the German; but the better sort of people speak French.

AL'SEN, an island of Denmark in the lesser Belt, or entrance into the Baltic sea, between Sleswick and Funen. It is remarkable for producing large crops of aniseeds, a carminative much used in seasoning the food and mixing with the bread all over the Danish dominions. Lat. 55. 12. N. lon. 10. 12. E.

ALS'FIELD, a town of Germany, in the landgraviate of Hesse Cassel, ten miles north-west of Marburg, and 35 south of Hesse Cassel. It is an ancient town, and well built; and the inhabitants were the first of this country who embraced the Reformation. Lat. 50. 40. N. lon. 9. 5. E.

ALS'HASH, a beautiful city in Buckharia, supposed to be the same with that which is now called *Taschant*, the capital of the eastern part of Turkestan, possessed by the Kassats. It is situated on the river *Sihân*, now *Sir*, and had a well-watered garden for every house; but was ruined by Jenghiz Khan, who took the city, and caused a great number of its inhabitants to be massacred.

ALS'HEDA, a parish of Sweden, in the province of Smaland, where a gold mine was discovered in 1738.

AL'SINA, *f.* in botany. See THELIGONUM.

ALSINAN'THEMUM, *f.* in botany. See ARENARIA.

ALSINAS'TRUM, *f.* in botany. See COSTUS and ELATINE.

ALS'INE, *f.* [*αλος*, *lucus*, a grove.] In botany, a genus of the pentandria trigynia class, ranking in the natural order of caryophylleae. The generic characters are—Calyx: perianth five-leaved; leaflets concave, oblong, acuminate. Corolla: of five equal petals, longer than the calyx. Stamina: filaments capillary; antherae roundish. Pistillum: germ subovate; styles filiform; stigmas obtuse. Pericarpium: an ovate, one-celled, three-valved capsule, covered with the calyx. Seeds: very many, roundish.—*Essential Character.* Calyx, five-leaved; petals, five, equal; capsule, one-celled, three-valved.

Species. 1. *Aline media*, or common chickweed: petals bipartite, leaves ovate-cordate. Common chickweed is so generally known, that it seems scarcely necessary to describe it; we may observe, however, that the number of filaments in the flower is very uncertain from three to ten. In gardens or on dunghills it quickly sheds abundance of seeds, and becomes a troublesome weed; but, being annual, it may be destroyed with little trouble, if it is never suffered to feed. The diversity of soils in which it grows causes it to put on different appearances, which may mislead the unwary botanist. It is distinct however from the cerastiums, which it most resembles, in having the petals shorter than the leaves of the calyx: and from all the plants related to it, in having the stalk alternately hairy on one side only. When the flowers first open, the peduncles are upright; as the flowers go off they hang down; and when the seeds ripen they again become erect. It is commonly given as food to chickens and small birds; boiled, it exactly resembles spinach. Swine are very fond of it; and it is eaten by many insects. As a medicine, it contains no active principle, but is frequently applied to swellings either alone or in poultices. Flowers upright, and open from nine to noon; but if it rains they do not open. After rain they become pendent, but in a few days rise again. Chickweed is a remarkable instance of the sleep of plants; at night the leaves approach in pairs, so as to inclose between their upper surfaces the tender buds; and the two upper leaves but one, at the end of the stalk, are furnished with longer petioles than the others, so that they can close upon the terminating pair, and protect the end of the branch. It is found wild in most parts of the world.

2. *Aline fegetalis*: petals entire, leaves awl-shaped.

3. *Aline mucronata*: petals entire, short; leaves setaceous; calyxes awned. These two are natives of France, and Switzerland.

ALSINE. See ANDROSACE, ARENARIA, BUFONIA, CALLITRICHE, CAMPANULA, CENTUNCULUS, CERASTIUM, CORRIGIOLA, CUCUBALUS, DRABA, FRANKENIA, GLAUX, GLINUS, GYPSOPHILA, HOLOSTEUM, ISNARDIA, LINUM, LEMOSELLA, LYCHNIS, MOHRINGIA, MOLLUGO, MONTIA, NAMA, OLDENLANDIA, PEPLIS, PHARNACEUM, SAGINA, SAMOLUS, SIBTHORPIA, SILENE, SPERGULA, STELLARIA, TRIENTALIS, VERONICA.

ALSINE AFFINIS. See ANDROSACE.

AL'SINES FACIE. See THELIGONUM.

ALSINEFOR'MIS. See MONTIA.

ALSINEL'LA. See SAGINA.

ALSINOIDES. See BUFONIA and MONTIA.

ALSIRAT, *f.* in the Mahometan theology, denotes a bridge laid over the middle of hell, finer than a hair, and sharper than the edge of a sword, over which people are to pass, after their trial, on the day of judgment. To add to the difficulty of the passage, Mahomet assures, that the alsi-rat, narrow as it is, is beset with briars and thorns; none of which, however, will be any impediment to the good, who shall fly over it like the wind; Mahomet and his muskulu-men lead the way; whereas the wicked, by the narrowness

narrowness of the path, the entangling of the thorns, and extinction of the light which directed the former to paradise, will soon mislead their footing, and tumble headlong into the great abyss which is gaping beneath to receive them.

AL'SIUM, a city of ancient Etruria, occupying, according to Cluverius, the spot on which *Pala* now stands. We are told by Dionysius Halicarnassensis, that Alsiuni was built by the Aborigines, long before the Tyrrhenians invaded Italy. In this case it must have been founded not long after the dispersion in the days of Peleg. Its founder is said to have been one *Alafus*, *Alefus*, or *Alifu*; whom some conjecture to have been Alifan, or Elisha, the son of Javan, mentioned in scripture.

AL'SO, *adv.* In the same manner; likewise. *Also* is sometimes nearly the same with *and*, and only conjoins the members of the sentence.—God do so to me, and more *also*. 1 *Samuel*, xiv. 44.

AL'SOP (Anthony), a divine and poet, was educated at Westminster-school, and thence elected to Christ-church, Oxford, where he took the degree of M. A. in March, 1696, and of B. D. in December, 1706. On his coming to the university, he was very soon distinguished by dean Aldrich, and published "Fabularum Ætopicarum Dilectus," Oxon. 1698, 8vo, with a poetical dedication to lord viscount Scudamore, and a preface, in which he took part against Dr. Bentley, in the famous dispute with Mr. Boyle. He passed through the usual offices in his college to that of censor, with considerable reputation; and for some years had the principal noblemen and gentlemen belonging to the society committed to his care. In this employment he continued till his merit recommended him to Sir Jonathan Trelawney, bishop of Winchester, who appointed him his chaplain, and soon after gave him a prebend in his own cathedral, together with the rectory of Brightwell, in the county of Berks, which afforded him ample provision for a learned retirement, from which he could not be drawn by the repeated solicitations of those who thought him qualified for a more public character and a higher station. In 1717, an action was brought against him by Mrs. Elizabeth Astrey, of Oxford, for a breach of a marriage-contract; and a verdict obtained against him for 2000*l.* which probably occasioned him to leave the kingdom for some time. His death, which happened June 10, 1726, was occasioned by his falling into a ditch that led to his garden-door. A quarto volume was published in 1752, under the title of "Antourii Alsopi, Ædis Christi olim Alunni Odarum libri duo." Four English poems of his are in Doddsley's collection, one in Peart's, several in the early volumes of the Gentleman's Magazine, and some in "The Student."

AL'SOP (Vincent), an eminent divine, was educated in St. John's college, in Cambridge, where he took the degree of master of arts. He received deacon's orders from a bishop; after which he went down into Rutlandshire, and settled at Oakham, where he became a dissenter, and received ordination in the presbyterian way. He afterwards settled at Wilbee, in the county of Northampton, whence he was ejected in 1662, for nonconformity. After this, he ventured to preach sometimes at Oakham, and at Wellingborough, where he lived, and was once six months in prison for praying by a sick person. A book he wrote against Dr. Sherlock made him well known to the world, and induced Mr. Cawton, a very eminent nonconformist in Westminster, to recommend him to his congregation for his successor. On this he quitted Northamptonshire and came to London, where he preached constantly, and wrote several pieces, which were extremely well received by the public. His living in the neighbourhood of the court exposed him to many inconveniences; but these ended with the reign of Charles II. when Mr. Alsop's son, who had engaged in treasonable practices, was freely pardoned by king James. After this our divine went frequently to court, and is supposed to be the person who drew the presbyterian's address to that prince for his general indulgence. After the revolution, Mr. Alsop gave

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many public testimonies of his affection for the government. The remainder of his life he spent in the exercise of his ministry, and was one of the lecturers at Pinner's hall. He lived to be a very old man, and his memory will be always preserved by his own learned and elegant writings. Of these the most remarkable, besides his sermons, are, 1. *Antifozzo*; in vindication of some great Truths opposed by Dr. William Sherlock, 8vo, 1675. 2. *Melius Inquirendum*; in answer to Dr. Goodman's Compensate Inquiry, 8vo, 1679. 3. The Mischief of Impositions; in answer to Dr. Stillingfleet's Mischief of Separation, 1680. 4. A Faithful Reproof to a False Report, with reference to the Differences among the United Ministers in London, 8vo.

AL'STON-MOOR, Cumberland, is seated on a hill, upon the borders of Northumberland, at the bottom of which runs the river Tyne, with a stone bridge over it. The country round is extremely mountainous, but romantic and pleasant. The parish is but of small extent; but, by reason of the lead mines, is uncommonly populous. It is a market town, 320 miles distant from London. The leases of the land were originally let by indentures from Henry Hilton, of Hilton, in the county palatine of Durham, Esq. then lord of the manor; they bear date in the year 1611; but did not commence or hold till 1621, and from thence for a thousand years then to come. They are held under a yearly rent stipulated in each respective lease, and at the end of every twenty-one years pay a grassam or fine. The lands are now held under the commissioners and governors of Greenwich hospital: the royalty being a forfeited estate from the earl of Derwentwater, who was lord of the manor. The rents and fines are paid according to the old leases, at St. Martin's annually, at the capital messuage called Lowbycon, where the commissioners by their steward hold a court twice a year to call over the tenants, which is done by the bailiff; and the steward at such times enrolls new tenants, fixes constables, market-viewers, &c. &c. The lead mines are let by the commissioners on leases for twenty-one years, at 1-5th duty, by which, upon an average each year, one with another, they receive not less than 10,000*l.* net profit, which is paid to the receivers by their agent disposing or generally smelting the ore; the receivers have twelve-pence per pound for collecting the money. The governor and company at London, generally called the quaker's company, for smelting down lead with pit-coal and sea-coal, are the chief mine-adventurers. The town has a plentiful market on Saturday; and fairs the first Thursday in May and first Thursday in October.

ALSTONIA, *f.* [from Charles Alston, M. D. Professor of Materia Medica and Botany, at Edinburgh.] In botany, a genus of the polyandria monogynia class. The generic characters of which are—Calyx: perianthium inferior, imbricate; scales ovate, very obtuse, concave; the inner ones gradually larger, forming as it were a quadripartite or quinque-partite calyx. Corolla: one-petalled, shorter than the calyx; tube short; border spreading, divided into eight or ten parts: divisions equal, in a double row, alternately interior and exterior: obovate, obtuse, quite entire. Stamina: filaments very many, inserted into the tube very short, imbricate, very smooth; the outer ones longer, linear, attenuated at the tip: antheræ orbiculate, furrowed. Pistillum: germ superior, ovate, small; style simple, length of the corolla, filiform, erect; stigma capitate-obovate.—*Essential Character*. Corolla, one-petalled, eight or ten-cleft; clefts alternated.

There is only one species, which is called *Alstonia theaeformis*. This shrub was found by Mutis, in South America. It is very smooth, and has the air of the bohea tea, in the leaves, flowers, &c. The dried leaves chewed give a greenish colour to the saliva, and have the taste of the Chinese tea.

ALSTROEMERIA, *f.* [from Baron Alstroemer, of Sweden; who, in his travels through Europe, sent many plants to Linnaeus.] In botany, a genus of the hexandria monogynia class, ranking in the natural order of lilia or

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lilia &c.

liliacæ. The generic characters are—Corolla: six-petalled, sub-bilabiate; the three outer petals wedge-shaped, retuse, mucronate; the inner which are alternate with the others, lanceolate; the two lower ones tubulous at the base. Stamina: filaments awl-shaped, bending down, unequal; antheræ oblong. Pistillum: germ inferior, hexangular, truncate; style bending down, filiform, the length of the stamens; stigmas three, oblong, bifid. Pericarpium: a roundish, six-ribbed, mucronate, capsule, three-celled and three-valved, valves concave, contrary to the dissepiment. Seeds: very many, globose, covered with raised points, subumbilicate at the tip.—*Essential Character*. Corolla, of six petals, subbilabiate; the two lower petals tubulose at the base. Stamina, bending down.

Species. 1. *Alstroemeria pelegrina*, or spotted-flowered *Alstroemeria*: stem erect, corollas bell-shaped, straight, leaves linear-lanceolate, sessile. The flowers are whitish, most beautifully stained and veined with purple and red. It flowers from June to October.

2. *Alstroemeria pulchella*: stem erect, corollas reflex-spreading, acute; leaves sessile; pedicles shorter than the involucre. In appearance and structure very like the former; but the leaves narrower, and the stem terminated by an irregular involucre, of larger petiolate leaves.

3. *Alstroemeria ligta*, or striped-flowered *alstroemeria*: stem erect, leaves spatulate-oblong, peduncles of the umbel longer than the involucre, corolla two-lipped. This species is remarkable for the largeness of the flowers, and for their fragrantcy, in which they are scarcely inferior to mignonette. It flowers in February and March.

4. *Alstroemeria salilla*: stem twining, leaves petiolate, lanceolate, acuminate, umbel branching, peduncles longer than the involucre, bracted and loose. 5. *Alstroemeria multiflora*: stem twining, leaves petiolate, lanceolate, acuminate, umbel simple; peduncles shorter than the bractes; petals alternate, truncate. 6. *Alstroemeria ovata*: stem twining, leaves lanceolate, lanuginose on the upper surface, lucid on the lower; corollas tubular. These species are all found in South America.

Propagation and Culture. These are stove plants, and, where they can be obtained, may be propagated by parting the roots in autumn. The first is found to be much more hardy than the third, and may be treated as a greenhouse plant; it will however flower and ripen its seeds better under the glass of a hot-bed frame, where air is freely admitted. This is more usually raised from seeds, sown in the spring, in a pot of light earth, on a gentle hot-bed, either of dung or tan.

ALD'WOLD, [of *alle*, all, and *wealdan*, Sax. to govern, q. d. to govern all; or of *alle*, all, and *Weald*, his territories, consisting mostly of woods and forests.] A king of the Northumbrians.

ALT, *f*. in music, a term applied to the high notes in the scale.

ALTA'IC CHAIN, a range of mountains which bounds Asia on the south. It begins at the vast mountain Bogdo, passes above the head of the Irtsch, and then takes a course rugged, precipitous, clothed with snow, and rich in minerals, between the Irtsch and Ob; then proceeds by the lake Telezkoi, the rise of the Ob; after which it retires, in order to comprehend the great rivers which form the Jenesei, and are locked up in these high mountains; finally, under the name of the Sainnes, is uninterruptedly continued to the lake of Baikal. A branch insinuates itself between the sources of the rivers Onon and Ingoda, and those of Ichikoi, accompanied with very high mountains, running without interruption to the north-east, and dividing the river of Amur, which discharges itself into the east, in the Chinese dominions, from the river Lena and lake Baikal. Another branch stretches along the Olecma, crosses the Lena below Jakoutsk, and is continued between the two rivers Tongouska to the Jenesei, where it is lost in woody and morassy plains. The principal chain, rugged with sharp-pointed rocks, approaches and keeps near the shores of the sea of Ockhozt, and, passing by the four-

ces of the rivers Outh, Aldan, and Maia, is distributed in small branches, which range between the eastern rivers which fall into the Icy Sea; besides two principal branches, one of which, turning south, runs through all Kamtschatka, and is broken, from the cape Lopatka, into the numerous Kurile isles, and to the east forms another marine chain, in the islands which range from Kamtschatka to America; most of them, as well as Kamtschatka itself, distinguished by fierce volcanoes, or the traces of volcanic fires. The last chain forms chiefly the great cape Tschut-iki, with its promontories and rocky broken shores.

ALTAMONT, a very handsome town of Italy, in the kingdom of Naples, and in Calabria Citerior, fifteen miles north-west of Basiliano. Lat. 39.40. N. lon. 16.22. E.

ALTAMURA, a town of Naples, in the territory of Bari, with the title of a principality, seated on the foot of the Apennine mountains. Lat. 41.0. N. lon. 16.54. E.

ALTAR, *f*. [*alta ara*; *Fest*, or from *al*, God, and *tar*, described, q. d. a place by God's appointment. It is observed by Junius, that the word *altar* is received, with Christianity, in all the European languages; and that *altare* is used by one of the fathers, as appropriated to the Christian worship, in opposition to the *ara* of gentilism.] The place where religious offerings are laid. The table in Christian churches where the communion is administered.

Before temples were in use, altars were erected sometimes in groves, sometimes in the highways, and sometimes on the tops of mountains; and it was a custom to engrave upon them the name, ensign, or character, of the deity to whom they were consecrated. In the great temples of ancient Rome there were ordinarily three altars: the first was placed in the sanctuary, at the foot of the statue of the divinity, upon which incense was burnt, and libations offered; the second was before the gate of the temple, and upon it they sacrificed the victims; and the third was a portable altar, upon which were placed the offering and the sacred vessels.

Besides these uses of altars, the ancients swore upon them, and swore by them, in making alliances, confirming treaties of peace and other solemn occasions. Altars also served as places of refuge to all those who fled to them, whatever crime they had committed.

Altars are doubtless as ancient as sacrifices themselves; consequently their origin is not much later than that of the world; Gen. chap. iv. Some attribute their origin to the Egyptians; others to the Jews; others to the patriarchs before the flood. Some carry them as far back as Adam, whose altar is much spoken of by Jewish, and even Christian, writers. Others are contented to make the patriarch Enoch the first who consecrated a public altar. Be this as it will, the earliest altars we find any express testimony of are those erected by Abraham.

Altars, in the patriarchal times, were very rude. The altar which Jacob set up at Beth-el was nothing but a stone, which served him instead of a bolster; that of Gideon, a stone before his house: and the first which God commanded Moses to erect was probably of earth or unpolished stones, without any iron; for, if any use was made of that metal, the altar was declared impure. The principal altars of the Jews were, *The altar of incense*; that of *burnt offering*; and the *altar, or table, for the shew-bread*. The altar of incense was a small table of shittim-wood, covered with plates of gold, of one cubit in length, another in width, and two in height. At the four corners, were four kinds of horns, and all round a little border or crown over it. This was the altar hidden by Jeremiah before the captivity; and upon it the officiating priest offered, every morning and evening, incense of a particular composition. The altar of burnt-offerings was made of shittim-wood, and carried upon the shoulders of the priests by staves of the same wood overlaid with brass. In the time of Moses, this altar was five cubits square and three high; but in Solomon's temple it was much larger, being twenty cubits square and ten in height. It was covered with brass; and at each corner was a horn or spire, wrought out of the same

same wood with the altar, to which the sacrifices were tied. Within the hollow was a grate of brass, on which the fire was made; through it fell the ashes, and were received in a pan below. At the four corners of the grate were four rings and four chains, which kept it up at the horns. This altar was placed in the open air, that the smoke of the burnt-offerings might not fully the inside of the tabernacle. The altar, or table, for the shew-bread, was likewise of shittim-wood, covered with plates of gold, having a little border round it, adorned with sculpture. It was two cubits long, one wide, and one and a half in height. Upon this table, which stood in the holy of holies, were put, every Sabbath day, twelve loaves, with salt and incense. The Jewish altars, after their return from the captivity, and the building of the second temple, were in some respects different from those described above. That of burnt-offering was a large pile, built of unhewn stone, thirty-two cubits square at the bottom, and twenty-four square at the top. The ascent was by a gentle rising, thirty-two cubits in length, and sixteen in breadth.

In the primitive Christian church, the altars were only of wood; as being frequently to be removed from place to place. But the council of Paris, in 509, decreed that no altar should be built but of stone. At first there was but one altar in each church; but the number soon increased; and, from the writings of Gregory the Great, who lived in the sixth century, we learn, that there were sometimes in the same church twelve or thirteen. In the cathedral of Magdeburg, there are forty-nine altars.

The altar is sometimes sustained on a single column, as in the subterraneous chapels of St. Cecilia, at Rome, &c. and sometimes by four columns, as the altar of St. Sebastian of Crypta Arcuaria; but the customary form is, to be of a massive stone-work, sustaining the altar-table. These altars bear a resemblance to tombs: to this purpose, we read in church-history, that the primitive Christians chiefly held their meeting at the tombs of the martyrs, and celebrated the mysteries of religion upon them; for which reason, it is a standing rule to this day in the church of Rome, never to build an altar, without inclosing the relics of some saint in it.

ALTAR-CLOTH, f. The cloth thrown over the altar in churches.

ALTAR-THANE, or ALTARIST, f. in old law books, an appellation given to the priest or parson of a parish, to whom the altarge belonged.

ALTARGE, f. [*altaragium*, Lat.] In law, comprehends not only the offerings made upon the altar, but also all the profit which accrues to the priest by reason of the altar, *obventio altaris*. Out of these, the religious assigned a portion to the vicar; and sometimes the whole altarge was given to him by the endowment. In some places, the word altarge hath been adjudged to extend to small tithes of divers kinds; but this can only be, where there is a special custom to support it. *Burb. 79.*

AL TA'YEFF, a town of Hejaz, a district of Arabia Felix. It is situated about 60 miles east of Mecca, behind mount Gazwan, where the cold is more intense than in any other part of the district, but the air is very wholesome. Its territory abounds in fountains, and produces excellent raisins. The town is surrounded with a wall, but is not very large.

ALTDORF, a large handsome town in Switzerland, and the chief of the canton of Uri. It is situated below the lake of the four cantons, in a plain, at the foot of a mountain, whose passages are difficult, and serve instead of fortifications. It has four churches and two convents; St. Martin's church and that of the Holy Cross are the finest. The town-house and the arsenal are also worth seeing. Lat. 46.50. N. lon. 8.30. E.

ALTE'A, a sea-port town of Valencia, in Spain. It is seated on the Mediterranean, forty-two miles south-east of Valencia, and 112 south-by-east of Madrid. Lat. 38.34. N. lon. 0.15. E.

ALTE'NA, a sea-port of Germany, in the duchy of

Holfstein in Lower Saxony. It is a modern town, built by the king of Denmark, and was burnt by the Swedes in 1712; but has since been beautifully re-built. It is commodiously situated on the Elbe, in the neighbourhood of Hamburg; and being a free port, and the staple of the Danish East-India company, it enjoys a very lucrative trade, and an extensive commerce. Lat. 53.51. N. lon. 10.0. E.

ALTENBERG, an ancient town of Germany, situated on the river Pleiss, with a good castle placed on a rock, in Misnia, in the circle of Upper Saxony. It was formerly an Imperial city, but at present belongs to the house of Saxony. Here is a college which has always been in a flourishing condition. In 1705, there was a nunnery founded for women of a high rank, who are Protestants. Lat. 50.59. N. lon. 15.8. E.

ALTENBURG, a small fortified town of Hungary, in the territory of Moson, near the Danube, about fifty-five miles from Vienna. Lat. 48.15. N. lon. 35.30. E.

ALTENBURG, or OWAR, a small but strong town of Hungary, seated in a marsh, near the Danube, and surrounded with deep ditches. It is fifteen miles south of Presburgh, forty south-east of Vienna, and sixty-five south-west of Buda. Lat. 44.0. N. lon. 17.56. E.

To ALTER, v. a. [*alterer*, Fr. from *alter*, another, Lat.] To change; to make otherwise than it is. *To alter*, seems more properly to imply a change made only in some part of a thing; as, *To alter* a writing, may be, to blot or interpolate it; to *change* it, may be, to substitute another in its place. With *from* and *to*; as, Her face is *altered from* pale *to* red.—Acts appropriated to the worship of God, by his own appointment, must continue so, till himself hath otherwise declared: for who dares *alter* what God hath appointed? *Stillingsfleet*.—To take off from a persuasion, practice, or sect.—For the way of writing plays in verse, I find it troublesome and slow; but I am no way *altered* from my opinion of it, at least with any reasons which have opposed it. *Dryden*.

To ALTER, v. n. To become otherwise than it was; as, The weather *alters* from bright to cloudy.

ALTERABLE, adj. [*alterable*, Fr.] That which may be altered or changed by something else; distinct from changeable, or that which changes; or may change itself.—Our condition in this world is mutable and uncertain, *alterable* by a thousand accidents, which we can neither foresee nor prevent. *Rogers*.

ALTERABLENESS, f. The quality of being alterable, or admitting change from external causes.

ALTERABLY, adv. In such a manner as may be altered.

ALTERAGE, f. [*from alo*.] The breeding, nourishing, or fostering, of a child.—In Ireland they put their children to fosterers: the rich sell, the meaner fort buying, the *alterage* of their children; and the reason is, because, in the opinion of the people, fostering has always been a stronger alliance than blood. *Sir John Davies*.

ALTERANT, adj. [*alterant*, Fr.] That which has the power of producing changes in any thing.

ALTERATION, f. [*from alter*; *alteration*, Fr.] The act of altering or changing.—*Alteration*, though it be from worse to better, hath in it inconveniences, and those weighty. *Hooker*.—The change made:

So he, with difficulty and labour hard,

Mov'd on:

But he once past, soon after, when man fell,

Strange *alteration*! Sin, and Death, again

Following his track, (such was the will of heav'n!)

Pav'd after him a broad and beaten way.

Milton.

ALTERATIVES, f. Medicines that are supposed to make a change in the blood, particularly from a morbid to a sound state, without any manifest operation or evacuation; and the term is also employed for medicines suited to clear the blood from certain impurities supposed to remain in it. Whatever other general operations may be proper

proper to any medicines, all of them may be used as alteratives, and the most powerful alteratives are evacuates, given in diminished doses, if repeated at proper intervals; by administering them thus, or mixed with such alteratives as the case may indicate; though the discharge they promote, when given in full doses, is not increased, they pass into the blood, and the secretions are promoted whereby the faulty natural excretions are regulated.

ALTERCA'TION, *f.* [*altercation*, Fr. *altercor*, Lat.] Debate; controversy; wrangle.—Our whole life is little else than a perpetual wrangling and *altercation*; and that, many times, rather for victory and ostentation of wit, than a sober and serious search of truth. *Hakewill*.

ALTE'RN, *adj.* [*alternus*, Lat.] Acting by turns, in succession each to the other:

And God made two great lights, great for their use
To man; the greater to have rule by day,
The less by night, *altern*. *Milton*.

ALTE'RNACY, *f.* Action performed by turns.

ALTE'RN-BASE, *f.* in trigonometry, a term used in contradistinction to the true base. Thus in oblique triangles, the true base is either the sum of the sides, and then the *difference* of the sides is called the *altern-base*; or the true base is the difference of the sides, and then the *sum* of the sides is called the *altern-base*.

ALTE'RNATE, *adj.* [*alternus*, Lat.] Being by turns; one after another; reciprocal.—Friendship consists properly in mutual offices, and a generous strife in *alternate* acts of kindness. *South*.

Hear how Timotheus' various lays surprise,
And bid *alternate* passions fall and rise!
While, at each change, the son of Lybian Jove
Now burns with glory, and then melts with love. *Pope*.

ALTE'RNATE, *f.* That which happens alternately; vicissitude:

And rais'd in pleasure, or repos'd in ease,
Grateful *alternates* of substantial peace,
They bless the long nocturnal influence shed
On the crown'd goblet, and the genial bed. *Prior*.

ALTE'RNATE, in heraldry, is said in respect of the situation of the quarters. Thus, the first and fourth quarters, and the second and third, are usually of the same nature, and are called *alternate quarters*.

ALTE'RNATE, in botany, when the leaves or branches of plants arise higher on opposite sides alternately.

ALTE'RNATE ANGLES, in geometry, are the internal angles made by a line cutting two parallels, and lying on the opposite sides of the cutting line; the one below the first parallel, and the other above the second.

TO ALTE'RNATE, *v. a.* [*alternare*, Lat.] To perform alternately. To change one thing for another reciprocally.—The most high God, in all things appertaining unto this life, for sundry wise ends, *alternates* the disposition of good and evil. *Grew*.

ALTE'RNATELY, *adv.* In reciprocal succession, so that each shall be succeeded by that which it succeeds, as light follows darkness and darkness follows light.—The rays of light are, by some cause or other, *alternately* disposed to be reflected or refracted for many vicissitudes. *Newton*.

Unhappy man! whom sorrow thus and rage
To different ills *alternately* engage. *Prior*.

ALTE'RNATENESS, *f.* The quality of being alternate, or of happening in reciprocal succession.

ALTE'RNATION, *f.* The reciprocal succession of things.—The one would be oppressed with constant heat, the other with insufferable cold; and so the defect of *alternation* would utterly impugn the generation of all things. *Brown*.

ALTE'RNATION is also used to express the different changes or alterations of orders in any number of things proposed. This is also called *permutation*, &c. and is easily found by a continual multiplication of all the numbers,

beginning at unity. As suppose two things *a* and *b*; these may be placed either thus *ab* or *ba*, that is, two ways, or 1×2 . If there be three things, *a*, *b*, *c*, then the third thing *c*, may be placed three different ways with respect to each of the two positions (*ab* and *ba*) of the other two things, it may stand either before them, or between them, or after them both, that is, it may stand either first, second, or third; and therefore with three things there will be three times as many changes as with two, that is, $1 \times 2 \times 3$, or six changes with three things. Again, if there be four things, *a*, *b*, *c*, *d*, then the fourth thing *d*, may be placed in four different ways with respect to each of the six positions of the other three; for it may be set either first, or second, or third, or fourth, in the order of each position; consequently, from four things there will be four times as many alternations as there are from three things; and therefore $1 \times 2 \times 3 \times 4 = 24$, is the number of changes with four things. And so on, always multiplying the last-found number of alternations by the next number of things; or to find the number of changes for any number of things, as *n*, multiply the series of natural numbers 1, 2, 3, 4, 5, &c. to *n*, continually together, and the last product will be the number of alternations sought; so $1 \times 2 \times 3 \times 4 \times 5 \dots n$, is the number of changes in *n* things. So if, for example, it were required to find how many changes may be rung on 12 bells; it would be $1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9 \times 10 \times 11 \times 12 = 479001600$, the number of changes. Now supposing there might be rung 10 changes in one minute, that is, 10×12 or 120 strokes in a minute, or two strokes in each second of time; then, according to this rate, it would take upwards of 91 years to ring over all these changes on the 12 bells only. Also, if but two more bells were added, making 14 bells; then, at the same rate of ringing, it would require about 16575 years to ring all the changes on 14 bells but once over. And, if the number of bells were 24, it would require more than 1170000000000000 years to ring all the different changes upon them!

ALTE'RNATIVE, *f.* [*alternatif*, Fr.] The choice given of two things; so that, if one be rejected, the other must be taken:

A strange *alternative*——
Must ladies have a doctor, or a dance? *Young*.

ALTE'RNATIVELY, *adv.* In alternate manner; by turns; reciprocally.—An appeal *alternatively* made may be tolerated by the civil law as valid. *Ayliffe*.

ALTE'RNATIVENESS, *f.* The quality or state of being alternative; reciprocation.

ALTE'RNITY, *f.* [from *altern*.] Reciprocal succession; vicissitude; turn; mutual change of one thing for another; reciprocation.—They imagine that an animal of the vastest dimensions, and longest duration, should live in a continual motion, without the *alternity* and vicissitude of rest, whereby all other animals continue. *Brown*.

ALTHÆ'A, *f.* [*αλθαία*, from *αλθαειν*, Gr. to heal.] In botany, a genus of the monadelphia polyandria class, ranking in the natural order of columniferae. The generic characters are—Calyx: perianthium double; outer smaller, one-leafed, unequally novemfid; divisions very narrow; inner semiquinquefid, divisions broader, sharper. Corolla: five-petalled, united at the base, obcordate, præmorse, flat. Stamina: filaments many, inserted into the corolla; antheræ subreniform. Pistillum: germ orbiculate; style cylindrical, short; stigmas many (twenty), fetaceous, the length of the style. Pericarpium: consists of arils not jointed, forming a flat ring about a columnar receptacle; they are deciduous, and open on the inside. Seed: one, flat-kidney-shaped in each aril.—*Essential Character*. Calyx double; outer nine-cleft. Arils many, one-seeded.

Species. 1. *Althæa officinalis*, or common marsh-mallow: leaves simple, downy. Common or officinal marsh-mallow grows naturally in salt marshes, and on the banks of rivers and ditches in Cambridgeshire, Norfolk, and Suffolk;

Suffolk; on the sea-shores of Cornwall; in Holland, France, Italy, Siberia, &c. It has a perennial root, and an annual stalk, growing erect, to the height of four or five feet, and putting out a few lateral branches. The leaves are soft, angular, and alternate. The flowers are axillary, shaped like those of the mallow, but smaller and of a pale colour. These appear in June or July, and the seeds ripen in September. The outer calyx is frequently cleft into seven parts. Capsules about twenty, rounded-kidney-shaped, triangular-flattened, closed on every side, tomentose on the back, coriaceous, not gaping. Common receptacle central, in the middle, swelling globularly, and grooved, but ending at top in a long conical point. Seeds smooth and brown. The whole plant, particularly the root, abounds with a mild mucilage, which is emollient in a much greater degree than common mallow. The root boiled is much used as an emollient cataplasm, and an infusion of it is very generally prescribed in all cases wherein mild mucilaginous substances are useful, as a pectoral, and in complaints of a gravelly nature. The infusion is much superior to the syrup which is kept in the shops.

2. *Althæa cannabina*, or hemp-leaved marsh-mallow: lower leaves palmate, upper digitate. This species has a woody stem, which rises to the height of four or five feet, and puts out many side branches. The leaves are alternate. The flowers are axillary, not so large as those of the common marsh-mallow, but of a deeper red colour, and the calyx much larger. This sort seldom flowers the first year, unless the summer prove warm; but, when the plants live through the winter, they will flower early the following summer, and produce good seeds. It grows naturally in Hungary, Istria, Austria, Carniola, Italy, the south of France, &c. by wood sides.

3. *Althæa hirsuta*, or hairy marsh-mallow: leaves trifid, hairy-hispid, smooth above; peduncles solitary, one-flowered. A low plant, the branches trailing on the ground. The leaves and stalks are beset with strong hairs; the flowers are axillary, smaller than those of the common sort, and have purplish bottoms. The leaves are deeply cut into three parts, and have long petioles. The stalks are woody, but seldom last more than two years. It grows wild in Spain and Portugal, Italy, Austria, Carniola, Germany, Switzerland, and France.

4. *Althæa Ludwigii*, or Ludwig's marsh-mallow: leaves lobed, naked on both sides, peduncles collected, one-flowered.

5. *Althæa Narbonensis*, or Narbonne marsh-mallow: leaves tomentose on both sides; the lower five-lobed; the upper three-lobed; peduncles solitary, one-flowered. It was first discovered by the abbé Pourret, near Narbonne; is also found in Spain; and it flowers in August and September.

6. *Althæa corymbosa*: leaves simple, cordate or angular, smooth, peduncles and calyxes hairy, flowers in corymbs. 7. *Althæa racemosa*: leaves simple, cordate, ovate, serrate, scabrous on the upper surface, raceme terminating, erect. Natives of Jamaica.

Propagation and Culture. The marsh-mallow may be propagated fast enough, either by seeds, or parting the roots. The seeds should be sown in the spring; but the best time for parting the roots is in autumn, when the stalks decay. It will thrive in any soil or situation, but in moist places will grow larger than in dry land. The plants should not be nearer together than two feet; for the roots spread wide.

ALTHÆA, *f.* in botany. See *HERMANNIA*, *HIBISCUS*, *LAVATERA*, *MALVA*, *MELOCHIA*, *NAPÆA*, *SIDA*, and *WALTHERIA*.

ALTHÆA FRUTEX, *f.* in botany. See *HIBISCUS*.

ALTHÆA, in profane history, the daughter of Thestius and Eurythemis, who married Oeneus, king of Calydonia, and was mother of Meleager. This young prince being obliged to go to war with her two brothers, and having slain them, Althæa, out of despair for their death, burnt a log of wood, on the preservation of which the life

of her son depended; but she afterwards died of grief, See *MELEAGER*.

ALTHÆMENES, a son of Crateus, who exiled himself to avoid becoming a patricide; yet at length killed his father unknowingly, for which, on his entreating the gods, the earth opened and swallowed him up. See *CRATEUS*.

ALTHOUGH, *conj.* [from *all* and *though*.] Notwithstanding; however it may be granted; however it may be that.—We all know, that many things are believed, *although* they be intricate, obscure, and dark: *although* they exceed the reach and capacity of our wits; yea, *although* in this world they be no way possible to be understood. *Hooker*.

ALTIGRADE, *adj.* [from *altus* and *gradior*, Lat.] Rising on high.

ALTILOQUENCE, *f.* [from *altus* and *loquor*, Lat.] High speech; pompous language.

ALTIMETRY, *f.* [from *alta*, high things, and *metior*, Lat. to measure.] The art of taking or measuring altitudes or heights, whether accessible or inaccessible, generally performed by a quadrant. See *GEOMETRY*.

ALTIN, *f.* a money of account in Muscovy, worth three *copecks*; one hundred of which make a ruble, worth about 4s. 6d. sterling.

ALTIN, a lake in Siberia, from whence issues the river Ob, or Oby, in N. lat. 52. 0. E. lon. 85. 55. This lake is called by the Russians *Teloſkoi Oſero*, from the Teleſi, a Tartarian nation, who inhabit the borders of it, and who give it the name of *Altin-Kul*. By the Calmucs it is called *Altinmor*. It is near ninety miles long and fifty broad, with a rocky bottom. The north part of it is sometimes frozen so hard as to be passable on foot, but the southern part is never covered with ice. The water in Altin lake, as well as in the rivers which run through the adjacent places, only rises in the middle of summer, when the snows on the mountains are melted by the heat of the sun.

ALTINCAR, *f.* among mineralists, a species of factitious salt used in the fusion and purification of metals. The altincar is a sort of flux powder. Divers ways of preparing it are given by Libavius.

ALTING (Henry), professor of divinity at Heidelberg and Groningen, was born at Embden in 1583, of a family which had been long conspicuous in Friseland. His father, Menſo Alting, was the first, who, with two others, preached the reformation in the territory of Groningen, about the year 1566, under the tyrannical government of the duke of Alva; and the first that preached in the great church of Groningen, after the reduction of that town by the States General in 1594. Henry was chosen, in 1605, preceptor to the three young counts of Nassau, Solms, and Izenberg. After various difficulties, he settled at Groningen, where he continued till his death, August 25, 1644. Most of his works were never published; those which have been are the following: *Notæ in decadem Problematum J. Behm*, 1618. *Loci communes Explicatio Catechesos Palatinæ*, 1646, in 3 vols. *Exegetis Augustanæ confes.* 1647. *Methodus Theologiæ*, 1650. It appears from the catalogue of his works annexed to his life, that the *Medulla Hist. Prophanæ*, published by Dr. Pareus, was composed by Alting. The most remarkable piece among Alting's MSS. is, the ecclesiastical History of the Palatinate, from the reformation to the administration of John Casimir.

ALTING (James), son of the former, was born at Heidelberg in 1618. He travelled into England in 1640, where he was ordained by the learned Dr. Prideaux, bishop of Worcester. He afterwards accepted of the professorship of Groningen, vacant by the death of Gomarus; but his situation was rendered very disagreeable by the continual disputes which he had with his colleague Sam. des Maets, who favoured the school-divinity. He died in 1697. He recommended the edition of his works to Menſo Alting (author of *Notitia German. Infer Antiquæ*, fol. Amst. 1679); but they were published in 5 vols. folio, with his life, by Mr. Bekker of Amsterdam. They contain vari-

ous analytical, exegetical, practical, problematical, and philosophical tracts, which shew his industry and knowledge.

ALTISONANT, or **ALTISONOUS**, *adj.* [*altisonus*, Lat.] High sounding; pompous or lofty in sound.

ALTITUDE, *f.* [*altitudo*, Lat.] Height of place; space measured upward. The elevation of any of the heavenly bodies above the horizon. Situation with regard to lower things. Height of excellence; superiority. Height of degree; highest point.

ALTITUDE, in geometry, is the third dimension of body, considered with respect to its elevation above the ground; and is otherwise called its height when measured from bottom to top, or its depth when measured from top to bottom. See **GEOMETRY**.

ALTIVOLANT, *adj.* [*altivolans*, Lat. from *altus* and *volo*.] High flying.

ALT'KIRCH, a town in the department of the Upper Rhine, on the river Ille, forty-five miles south-west of Strasbourg. Lat. 47. 40. N. lon. 7. 20. E.

ALT'MORE, a town of Ireland, in the county of Tyrone, and province of Ulster, situated in lat. 54. 34. N. lon. 7. 2. W.

ALT'MULL, a river of Germany, which has its source in Franconia, and falls into the Danube at Kelheim, twelve miles above Ratisbon.

ALT'ON, Hants, is a pleasant healthy town, on the great western road from London, through Farnham, to Southampton and the Isle of Wight. It consists of three streets, the principal of which is wide and modern built. It has a small, but neat, church; and the river Wye runs through the town. Here is a charity-school for twenty boys, who are classically educated. The new navigation from Basingstoke, to Weybridge in Surrey, where it unites with the Thames, is within eight miles of this town. An increasing manufacture is carried on here by Mr. Waring, of barratrees, valentia, tabinets, satin-denims, and a variety of other worsted articles, dyed in the wool and esteemed for their superior quality. The white yarn trade is likewise carried on to a considerable extent. Alton has also, within these few years, made considerable advances in the growth of hops, which is still increasing, much to the advantage of its inhabitants. It has a market on Saturdays, and two annual fairs; one on the Saturday preceding the first of May, the other on the twenty-ninth of September. The country round this town is remarkably fertile and populous, having an excellent neighbourhood.

ALTON, or **AVELTON**, a village in Staffordshire, five miles north of Uttoxeter, famous for the ruins of a castle, formerly a seat of the Bertram de Verdun family, for many generations, which some would have to be built before the Norman conquest; but Dr. Plott is pretty certain that it was erected by Theobald de Verdun, in the beginning of the reign of Edward II. A great part of the walls are still standing, but they are in a very ruinous condition. It appears from its advantageous situation to have been a place of great strength; and was destroyed, as it is said, by Oliver Cromwell.

AL'TO ET BASSO, *f.* in law, signifies the entire submission (for high and low) of all differences to arbitration.

ALTO-RELIEVO. See **RELIEVO**.

ALTO-REPIENO, in music, the tenor of the great chorus, which sings and plays only now and then in some particular places.

AL'TOGETHER, *adv.* [from *all* and *together*.] Completely; without restriction; without exception.—If death and danger are things that really cannot be endured, no man could ever be obliged to suffer for his conscience, or to die for his religion; it being *altogether* as absurd to imagine a man obliged to suffer as to do impossibilities. *South*.—Conjunctly; in company. This is rather *all together*:

Cousin of Somerset, join you with me,
And *altogether* with the duke of Suffolk,
We'll quickly hoist duke Humphry from his seat.

Shakespeare.

ALT'TORF, a town of the circle of Franconia, in Germany. It has a physic-garden, with upwards of 2000 different plants; a theatre for dissections, which has many curiosities in the anatomical way; and a handsome library. It is subject to the house of Brandenburg; and is seated on the confines of Bavaria, fifteen miles from Nuremberg. Lat. 47. 46. N. lon. 9. 35. E.

ALT-RANS'TADT, a town in Saxony, famous for the treaty between Charles XII. king of Sweden and Augustus elector of Saxony, in 1706, wherein the latter regained the kingdom of Poland.

ALT'TRINCHAM, Cheshire, (by many called Altringham,) is an inland town in the parish of Bowden, eight miles from Manchester, nine from Stockport, seven from Knutsford, twelve from Northwich, and twelve from Warrington. There is a market held on Tuesday weekly, and three fairs in the year, held on the 29th of April, 5th of August, and 22d of November. The earl of Stamford, whose seat of Dunham Massey is about two miles from the town, is lord of the manor, and holds a court-leet twice a year. In the earl of Stamford's park are many stately trees, in which the herons yearly build their nests; and there are on the estate about 100,000 timber-trees. The principal manufactory in the town is worsted yarn, and worsted and hair shags; the cotton manufactory being at present in its infancy here. There are two large pieces of building here for picking and spinning cotton. There is a turnpike-road through Altringham from Manchester to Knutsford, Northwich, and Warrington. The duke of Bridgewater's navigable canal from Manchester to Runcorn passes through one part of the town; and the inhabitants are well supplied with coal at reasonable rates from his grace's mines at Worsley, about ten miles from hence.

ALT'ZEG, a town of Germany in the Lower Palatinate, the capital of a territory of the same name, with an old castle. Lat. 49. 44. N. lon. 7. 25. W.

ALVA DE TORMES, a considerable town in Spain, in the kingdom of Leon, and territory of Salamanca, with a very handsome castle. It is seated on the north bank of the river Tormes. Lat. 41. 0. N. lon. 6. 1. W.

AL'VAH, *f.* the wood wherewith Moses sweetened the waters of Marah, Exod. xv. 25. The name of this wood is not found in Scripture; but the Mahometans give it that of *alvah*, and pretend to trace its history from the patriarchs before the flood. Josephus, on the contrary, says, that Moses used the wood which he found next lying before him.

ALVA'RES DE LUNA, or, as some call him, **ALVARO**, the favourite of John II. king of Castile, was famous for the prodigious ascendancy he gained over this prince, and for the punishment which at length overtook him. He was natural son of Don Alvaro de Luna, lord of Canete in Arragon, and of a woman infamous for unbounded lust. He was born in 1388, and named Peter; but antipope Benedict XIII. who was charmed with his wit, tho' yet a child, changed Peter to Alvares. He was introduced to court in 1408, and made a gentleman of the bed-chamber to king John, with whom he grew into the highest favour. In 1427 he was obliged to retire: the courtiers exerted all their endeavours to ruin him: they complained, that a man of no military skill, of no virtues whatever, should, by mere artifice and dissimulation, be advanced to the highest authority; and they could not bear, that, by the assistance of a few upstart men, whom he had raised and fixed to his interest, he should reign as absolutely as if he were king.

They prevailed against him, and Alvares was banished from court a year and an half: but this was the greatest affliction imaginable to the king; who shewed all marks of distress the moment he was removed from his presence, and now thought and spoke of nothing but Alvares. He was therefore recalled; and, being invested with his usual authority, revenged himself severely upon his enemies, by persuading the king to banish them. Of the forty-five years he spent at court, he enjoyed for thirty of them so

entire

entire an ascendancy over the king, that nothing could be done without his express orders; nay, it is related by Mariana, that the king could not change an officer or servant, or even his clothes or diet, without the approbation of Alvares. In short, he wanted nothing to complete his grandeur but the name of king: he had all the places in the kingdom at his disposal; he was master of the treasury, and by bounties had gained the hearts of the subjects, that the king, though his eyes now were opened, and his affections sufficiently turned against him, durst not complain. But the day of reckoning was approaching, and at length he was seized; yet not directly, openly, and violently, but with some of that management which upon a similar occasion was formerly employed by Tiberius against Sejanus. During his confinement, he made several attempts to speak to the king in person; but, not being able to effect this, he sent the following letter, from which, as well as from the rest of Alvares' history, all court-favourites may draw abundant matter for edification and instruction. "Sir, It is five-and-forty years since I was admitted into your service. I do not complain of the rewards I have received: they were greater than my merits or expectation, as I shall not deny. There was but one thing wanting to complete my happiness; and that was, to have fixed proper limits in time to this great fortune of mine. While, instead of choosing retirement, after the example of the greatest men, I still continued in the employment, which I thought not only my duty, but necessary for your interest, I fell into this misfortune. It is very hard that I should be deprived of liberty, when I have risked life and fortune more than once to restore it to you. Grief prevents me from saying more. I know that the Deity is provoked against me by my sins; but it will be sufficient for me, if his anger is appeased by the calamities I now suffer. I can no longer bear that prodigious mass of riches, which it was wrong in me to have heaped together. I should willingly resign them, but that every thing I have is in your power; and I am denied the opportunity of shewing mankind, that you have raised a person to the height of greatness, who can condemn wealth as well as procure it, and give it back to him from whom he received it. But I desire you in the strongest terms, that, as I was obliged, by the lowness of the treasury, to raise 10,000 or 12,000 crowns by methods I ought not to have taken, you will restore them to the persons from whom they were extorted. If you will not grant this on account of the services I have done, yet I think it necessary to be done from the reason of the thing."

This letter, however, produced no effect in his favour: Alvares was tried, and condemned to lose his head. After condemnation, he was removed to Valladolid; and carried upon a mule to the market-place, in the middle of which a large scaffold was erected. Mounting the scaffold, he gave his hat and signet to his page, saying, "These are the last gifts you will ever receive from me." He then submitted himself to the axe with the utmost intrepidity. Dr. Geddes relates, that he was executed on the 4th of June, others the 5th of July, 1453.

ALUDEL, *f.* [from *a* and *lutum*; that is, without lute.] Aludels are subliming pots used in chemistry, without bottoms, and fitted into one another, as many as there is occasion for, without luting. At the bottom of the furnace is a pot that holds the matter to be sublimed; and at the top is a head, to retain the flowers that rise up.

The process of sublimation differs from distillation in the nature of its product, which instead of becoming condensed in the fluid assumes the solid state, and the form of the receivers may of course be very different. The receivers for sublimates are of the nature of chimneys, in which the elastic products are condensed and adhere to their internal surface. It is evident that the head of an alembic will serve very well to receive and condense such sublimates as are not very volatile. The earlier chemists, whose notions of simplicity were not always the most perfect, thought proper to use a number of similar heads, one above the

other, communicating in succession by means of a perforation in the superior part of each, which received the neck of the capital immediately above it. These heads differing in no respect from the usual heads of alembics, excepting in their having no nose or beak, and in the other circumstances here mentioned, were called aludels. They are seldom now to be seen in chemical laboratories, because the operations of this art may be performed with greater simplicity of instruments, provided attention be paid to the heat and other circumstances.

ALVEA'RIMUM, *f.* in anatomy, the bottom of the *concha*, or hollow of the outer ear.

ALVEARIUM also signifies a bee-hive. The word is formed of *alveus*, "a channel or cavity;" in allusion to the *alveoli* or cells in bee-hives. Some ancients use also the word *alvearium* for a bee-house, more usually called among us *apiary*.

ALVEARIUM is sometimes also used figuratively, to denote a collection; in which sense *alvearium* amounts to much the same with what we otherwise call *thesaurus*, *cornucopia*, or the like. Vinc. Boreus has published an *alvearium* of law.

ALVE'OLUS, *f.* in natural history, the name of the waxen cells in bee-hives. Also the name of a sea-fossil of a conic figure, composed of a number of cells like bee-hives, joined into each other with a pipe of communication.

ALVEOLUS, in anatomy, the sockets in the jaws wherein the teeth are fixed. Some writers speak of teeth growing without alveoli. Pliny mentions a person who had a tooth in his palate. Eustachius relates, that he saw a man who at sixty had a tooth growing out of the middle of his fauces. Haller gives an instance of a person whose teeth were of a piece with his jaws, without any insertion into alveoli.

ALVE'US, *f.* Medicinally, is applied to many tubes or canals, through which some fluid flows, particularly to ducts which convey the chyle from the receptacle thereof to the subclavian vein.

ALVIDU'CA, *f.* [of *alvus*, the paunch, and *duco*, Lat. to lead.] Loosening medicines.

A'LUM, *f.* [*alumen*, Lat.] A crystallizable salt composed of vitriolic acid united with argillaceous-earth. It has an austere, sweetish, and strongly-astringent taste, which seems to proceed chiefly from a portion of the vitriolic acid which is necessary to its solubility in water and crystalline form, though it be more than requisite to produce neutralization, as judged by the test of turnsole and blue paper, which it reddens. A considerable number of instances may be exhibited in chemistry where a superabundance of one of the two principles in compound salts is necessary to produce the finest crystals, and the most permanent combination. If the excess of acid in alum be taken away, all the taste, the solubility, and the original properties, of the salt, are lost.

One hundred parts of crystallized alum require, in a mean heat, about fourteen times its weight of water to dissolve it; but boiling water dissolves one third more than its own weight of this salt, most of which consequently separates by cooling. If crystallized alum be exposed to a gradual heat, it first becomes fluid by a kind of aqueous fusion, in which its own water of crystallization is the principal agent; the remaining mass, after most of the water has been expelled, grows opaque, swells, foams, and at length remains quiet, spongy, and friable. Ignition drives off some of its superabundant acid. The quantity of earthy basis in alum may be determined by precipitation with fixed or volatile alkali. In this way, however, there is a source of inaccuracy arising from the insolubility of the alum, which takes place as soon as its superabundant acid has combined with the alkali. At this period, a portion of the neutral combination of clay and vitriolic acid falls down without further decomposition. Long-continued digestion in an alkaline lixivium is necessary to separate the whole of the acid. The volatile alkali is preferable in clearing the base of alum, because it would unite to fixed alkalies. The most commodious method of obtaining

taining pure argillaceous earth consists in precipitating it in this manner from alum. In this way Bergman found one hundred parts of crystallized alum to contain forty-four of water, eighteen of clay, and consequently thirty-eight of vitriolic acid, and probably water, which could not be made to quit the acid.

Alum is produced, but in very small quantity, in the native state; and this is mixed with heterogeneous matters. It effloresces in various forms, upon ores during calcination, but it seldom occurs crystallized. The greater part of this salt is factitious, being extracted from various minerals called alum ores, such as, 1. Sulphurated clay, which constitutes the purest of all aluminous ores, namely, that of la Tolfa, near Civita Vecchia, in Italy. It is white, compact, and as hard as indurated clay; from whence it is called *petra aluminaris*. It is tasteless and mealy: one hundred parts of this ore contain above forty of sulphur and fifty of clay, a small quantity of fixed vegetable alkali, and a little iron. Bergman says it contains forty-three of sulphur in one hundred, thirty-five of clay, and twenty-two of siliceous earth. This ore is first torrefied to decompose the sulphur, whose vitriolic acid re-acts on the clay, and forms the alum.

2. The pyritaceous clay, which is found at Schwemsal, in Saxony, at the depth of ten or twelve feet, is a black and hard, but brittle, substance, consisting of clay, pyrites, and bitumen. It is exposed to the air for two years, by which means the pyrites are decomposed, and the alum is formed. The alum ores of Hesse and Liege are of this kind; but they are first torrefied, which is said to be a disadvantageous method.

3. The *sluists aluminaris* contains a variable proportion of petroleum and pyrites intimately mixed with it. When these last are in a very large quantity, this ore is rejected as containing too much iron. Professor Bergman very properly suggests, that by adding a proportion of clay this ore may turn out advantageously for producing alum; but if the petrol is considerable it must be torrefied. The mine of Becket in Normandy, and those of Whitby in Yorkshire, are of this species.

4. Volcanic aluminous ore: such is that of Solfaterra, near Naples. It is in the form of a white saline earth, after it has effloresced in the air; or else it is in a stony form.

5. Bituminous alum ore is called shale, and is in the form of a *sluist*, impregnated with so much oily matter of bitumen as to be inflammable. It is found in Sweden, and also in the coal-mines at Whitehaven, and elsewhere.

6. Alum might also be extracted from many species of pyrites; but is in general so contaminated with iron, as scarcely to pay the expences of the operation.

The preparation of alum consists in rendering the ores aluminous in the first place, and next in dissolving and purifying the salt. Most of the alum ores contain clay and sulphur, which last requires to be converted into vitriolic acid before it can form the aluminous combination. For this purpose exposure to the air and occasional watering is effectual, and is in many places used: but it is less expeditious than the conversion of the sulphur into vitriolic acid by actual combustion. The chief difficulty of the process is, that the sulphur must be gradually and sufficiently burned without expelling it by too great a heat, which would be likewise attended with a fusion of the earthy parts that would render them capable of resisting the subsequent action of the water. After the ore has been, partly by calcination, and partly by spontaneous efflorescence, reduced to such a state as that it can be made into a paste by the hand, it is fit for boiling, which is usually performed in large leaden caldrons. In many manufactories a cold elixation is performed, until the saline solution is saturated; after which it is boiled until it be sufficiently strong for crystallization. This should not be too much loaded, because otherwise it would begin to deposit crystals by cooling before its earthy impurities had subsided. Some take the floating of a newly-laid egg as a token of the boiling being finished; a rough method in-

deed, as well because the part above the liquor may be very different, and likewise because the specific gravity of eggs soon changes. The specific gravity of a fluid which just prevents a new-laid egg from sinking is about 1.081.

The *lixivium*, sufficiently concentrated by evaporation, is conveyed through channels into coolers, where, in about an hour, it is freed, by deposition, from the grosser heterogeneous particles; it is then put into either stone or wooden receptacles. In eight or ten days the *lixivium*, commonly called *magistral water*, flows into another vessel, leaving behind a number of crystals, generally small and impure, which inerust the bottom and sides of the vessel. These are collected, and washed from the impurities which adhere externally with cold water: the impurities remaining in the reservoir after washing are kept by themselves. The washed crystals are then put into the boiler used for purifying them, and are dissolved in a quantity of water so small as barely to suspend the salt when boiling hot. The alum liquor is then poured into large strong wooden casks, whose staves and hoops are all numbered that they may be more readily put together. In these the alum gradually shoots into large crystals about the sides; the liquor in the middle is then let off by a cock in the bottom, and the vessel turned upside down for the more effectual draining of the remaining fluid. Lastly, the crystals are dried in a stove, and packed up in casks for sale.

In order to obtain the alum more pure at the second crystallization, some additions are employed in many of the manufactories, such as alkalies, lime, or urine. It is even asserted that good crystals of this salt cannot be obtained without such additions. We have not any clear account what it is that these additions perform. Urine is thought to be useful only by virtue of the volatile alkali it contains. It is thought that these additions engage with a superabundant acid, which from the decomposition of alum by alkaline substances does not seem to be the only use. As this proceeding is attended with advantage in the treatment of many kinds of aluminous ley, it seems not unlikely but that it may decompose vitriols and other metallic salts which might interrupt the crystallization of the alum, and at the same time render it impure. Thus martial vitriol, a salt frequently abounding in the alum ores after efflorescence, would be converted into calx of iron and selenite by the addition of lime; both which substances would fall down, on account of their very sparing solubility in that quantity of water which is sufficient to suspend the alum. So likewise the addition of pot-ash, or the vegetable alkali, would produce calx of iron and vitriolated tartar, the latter of which requires a very considerable quantity of water to dissolve it. It is scarcely necessary to pursue these observations, as they would require to be varied according to the nature of the impurities in the ley, and other circumstances, among which the disposition to form triple combinations, which exhibits itself where a variety of principles are suspended in the same solvent, is not one of the least considerable.

In such cases (as it is ascertained that the alum is rendered more soluble, and consequently less crystallizable, by a superabundance of vitriolic acid) the most obvious and profitable remedy seems to be that of Bergman, who advises the addition of clay, which, at the same time that it prevents the noxious superabundance, increases the quantity of alum. This should be added at the very first, when the *lixivium* is put into the boiler. All the *lixivium* may then be reduced to a tenacious mass, and formed into cakes, which may be exposed to the open air under a shed.

In this situation the iron of the vitriol becomes more perfectly calcined by the action of the air, so as to retain its acid much less forcibly; which likewise, by its stronger attraction, is disposed to unite with the clay. Calcination accelerates this effect; but it must be cautiously employed for fear of expelling the acid. In all these manipulations, it is evident that much may be gained or lost in the treatment of alum ores, according as the skill and intelligence

gence of the manufacturer may lead him to employ such processes as are best suited to their contents.

Alum is used in large quantities in many manufactories. It is extensively useful in the art of dyeing. When added to tallow, it renders it harder. Printers' cushions, and the blocks used in the calico manufactory, are rubbed with burnt alum to remove any greasiness which might prevent the ink or colour from sticking. Wood sufficiently soaked in alum does not easily take fire; and the same is true of paper impregnated with it, which is fitter to keep gunpowder, as it also excludes moisture. Paper impregnated with alum is useful in whitening silver, and silvering brass without heat. Alum mixed in milk helps the separation of its butter. If added in a very small quantity to turbid water, in a few minutes it renders it perfectly limpid, without any bad taste or quality; whilst the vitriolic acid does not precipitate so soon, nor so well, the opaque earthy mixture that renders it turbid, and gives to it a very sensible acidity. It is used in making the pyrophorus, in tanning, and many other manufactories; particularly in the art of dyeing, in which it is of the greatest and most important use, by cleansing and opening the pores on the surface of the substance to be dyed, rendering it fit for receiving the colouring particles (by which the alum is generally decomposed), and at the same time making the colour fixed. Alum constitutes the basis of crayons, which generally consist of the earth of alum finely powdered, and tinged for the purpose.

Alum is prepared in England, and many other parts of the world, and was formerly distinguished by various names. The rock alum is supposed to derive its name from an ancient city in Syria, called Roccho, at present Edeffa, where one of the earliest manufactories was carried on. The Roman alum has been considered as the best sort. It has a rosy-coloured tinge, which arises from about $\frac{1}{10}$ of its weight of a rose-coloured earth, the nature of which was not ascertained by Bergman, though he found that the goodness of the alum does not depend upon it. This alum is not preferred to other good alum by our manufacturers. Plumé alum is a name given to two very different substances. The one appears to be true alum produced by the desiccation of aluminous waters, which transude through grottos and caverns, and leave this salt behind in feathery crystals; but this is seldom met with. The other substance to which this name has been given, is the fibrous asbestos, which contains no alum; but from half to three-fourths of its weight of siliceous earth, from one-eighth to one-third of mild magnesia, and the rest calcareous earth, with a minute proportion of clay, and sometimes iron.

Medicinally, alum is used as a powerful astringent; as such it is prescribed to preserve the gums, also to restrain uterine hæmorrhages, and check the fluor albus; but, though in these sort of fluxes it is highly commended, it is rarely and with great caution to be admitted in dysenteries, particularly in the beginning. Though celebrated as an astringent in some cases, it is no less extolled in the cholick and other painful disorders of the bowels, attended with obstinate constipation. See Percival's *Essays Med. and Exp.* vol. ii. The doses in these cases are from five to twenty grains, and may be repeated every four, eight, or twelve hours; and, when duly persisted in, proves gently laxative, mitigates the pain, abates flatulence, mends the appetite, and strengthens the organs of digestion. Alum is powerfully tonic, and it is reasonably supposed to contribute to the relief of pain in the intestines, by blunting the morbid sensibility of their nerves. As the mineral acids do, it coagulates the blood and juices. In robust habits, after due bleeding and purging, it cures agues; either of the following usual forms may be given in a morning fasting, until the desired relief is obtained. Dr. Cullen thinks it ought to be employed with other astringents in diarrhœas. In active hæmorrhages it is not useful, though a powerful medicine in those which are passive. It should be given in small doses, and gradually increased.

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It has been recommended in the diabetes, but tried without success; though joined with nutmeg it has been more successful in intermittents, given in a large dose an hour, or a little longer, before the approach of the paroxysm. In gargles, in relaxations of the uvula, and other swelling of the mucous membrane of the fauces, divested of acute inflammation, it has been used, and advantageously; also in every state of the cynanche tonsillaris. It is also preferable to white vitriol, or acetated ceruss, in the ophthalmia membranarum, from two to five grains dissolved in an ounce of water. Cullen's *Mat. Med.*

R Nuc. mosch. major. alum. rup. ana gr. 45. f. pulv. in tres partes divid. cujus cap. i. oman. mane jejuno. Vel.
R Cort. Peruv. subtil. pulv. 3 i. feri alum. 3 vi. m. haust. mane jejun. fumend.

The Roman alum is counterfeited with common alum coloured; but break it, and the counterfeit will be found pale within, while the true is of a deeper red.

ALUM-MINES are said to have been first found in Italy, in the year 1460; and in 1506 king Henry VII. made a monopolising grant of this commodity to Augustine Chigi, a merchant of Sienna. In the year 1608, the manufacture of alum was first invented, and successively practised in England, meeting with great encouragement in Yorkshire, where it was first made, from Lord Sheffield, and other gentlemen of that county. King James I. by advice of his ministry, assumed the monopoly of it to himself, and therefore prohibited the importation of foreign alum; and in 1625 the importation of it was further prohibited by the proclamation of Charles I.

ALUM-WORKS, places where alum is prepared, and manufactured in quantities for sale. They differ from alum-mines, as in the former an artificial alum, and in the latter natural alum, is produced.

ALUMINOUS, *adj.* Relating to alum, or consisting of alum.—The tumour may have other mixture with it, to make it of a vitriolic or aluminous nature. *Wifeman.*

ALUMINOUS WATERS, are those that are impregnated with the particles of that salt; and they make a species of these called mineral or medicinal waters. What gives efficacy to these waters, is said to be an acid aluminous mineral salt, preying on and dissolving a slight mixture of iron, and being mixed with other materials; hence become they deobstruent, and so beneficial to hypochondriac and cachectic patients; and not astringent, or incrassating, as the idea of their being solely impregnated with alum would induce us to conclude.

ALUN'TIUM, or ALONTIUM, anciently a town in the north of Sicily, situated on a steep eminence, at the mouth of the Chydus; said to be as old as the war of Troy. Now in ruins; from which arose the hamlet of St. Philadelphia, in the Val di Demona. The inhabitants were called *Haluntini*.

ALU'TA MONTANA, *f.* This is one of the names of the coriaceous asbestos, or mountain cork. It is easily distinguished by its elasticity and lightness, for it floats a long time on water. Its colour is either white, yellow, brown, green, or black; and its texture resembles those substances from which it has received its names: 100 parts of it contain from 56 to 62 of silex; from 22 to 26 of mild magnesia; from 10 to 12 of mild calcareous earth; from 2 to 2.8 of argil; and about 3 of iron.

ALUTATION, *f.* Tanning of leather.

ALVUS, *f.* in anatomy, a term used for the belly in general, but more frequently applied to the bowels.

ALWA'DII, a sect of Mahometans who believe all great crimes to be unpardonable. The Alwadii stand in opposition to the Morgii. They attribute less efficacy to the true belief in the salvation of men than the rest of the Mussulmans.

ALWAYS, *adv.* [It is sometimes written *alway*, compounded of *all* and *way*; *eallewaga*; Sax. *tuttavia*, Ital.] Perpetually; throughout all time: opposed to *sometime*, or to *never*.—That, which sometime is expedient, doth not *always* to continue. *Hooker.*

Man never is, but *always* to be, blest.

Pope.

Constantly; without variation: opposed to *sometimes*, or to *now and then*.—He is *always* great, when some great occasion is presented to him. *Dryden*.

AL'WYN, [of *alle*, all, and *win*, Sax. a victor, q. d. one who won all at disputing.] An eminent English Saxon, tutor to Charles the Great.

ALY'PUM, *f.* in botany. See GLOBULARIA.

ALYS'MOS, *f.* [*alyce*, from *αλυσω*, to be uneasy or anxious.] Hippocrates uses it to express that uneasiness that is attendant on acute diseases, which makes the patients toss about, so that they cannot rest long in the same posture. *Durctus* distinguishes between the *αλυσμος ανεμετος* and the *αλυσμος ναυτιδης*. The first is caused by an oppression of the vital powers, the latter by sickness in the stomach; but of this alysmos there are reckoned four sorts. It is also called *diaporema*—*aporia*.

The first and second of which are without, the third and fourth with, fever; and thus accounted for: 1. By something uneasy in the stomach; hence an irregular contraction of the heart, a difficult passage of the blood through the lungs; and consequently this anxiety. Uneasiness of the stomach by sympathy, as from a stone in the kidneys, &c. produces this disorder.

2. By vapours or spasms in the stomach, or other viscera of the belly, as in the cholera morbus, hysteria, &c.

3. From a difficulty in the passage of the blood through the lungs, which may be from a spasmodic stricture in the smaller vessels, in which case the blood is thrown by gluts into the larger. In inflammatory fevers, this symptom is attended with a low pulse, oppression in the breast, and difficult breathing.

4. It happens when a stricture of the vena porta prevents a free circulation of the blood in the lower belly. In this case there is great weight and oppression of the hypochondria. This often ends in a polypus; and so, by consequence, death, or a gangrene in the liver; whence a fatal putrid diarrhoea.

ALYSSOIDES, *f.* in botany. See ALYSSUM.

ALYSSON, *f.* in botany. See ALYSSUM, CLYPEOLA, DRABA, MARRUBIUM, MYAGRUM, and VERONICA.

ALYSSUM, *f.* [*αλυσσω*, Gr. to be mad.] In botany, a genus of the tetradynamia filiculosa class, of the natural order of filiquosae. The generic characters are—Calyx: perianthium four-leaved, oblong; leaflets ovate-oblong, obtuse, convergent, deciduous. Corolla: four-petalled, cruciform; petals flat, shorter than the calyx, very spreading; claws the length of the calyx. Stamina: filaments six, the length of the calyx; two opposite a little shorter, marked with a toothlet; antherae from erect, spreading. Pistillum: germ subovate; style simple, the length of the filaments, longer than the germ; stigma obtuse. Pericarpium: a subglobose emarginate silicle, with a style the length of the silicle, two-celled; partitions elliptic, valves elliptic hemispherical. Seeds: fixed to filiform receptacles, issuing forth at the end of the silicle, few orbicular. The petals in some species are emarginate, in others entire. The silicle in some is belying, in others compressed. The essential character consists in the shorter filaments having a toothlet inserted at the base within.

Species. 1. Undershrubs. 1. *Alyssum spinosum*, or thorny madwort: the old racemes thorny, naked. This species has woody branches, which rise about two feet high, and are armed with small spines. The leaves are hoary, lanceolate, and thinly placed on the stalks without any order. The flowers grow in small clusters at the extremities of the branches. It grows naturally in Italy, Spain, and the south of France.

2. *Alyssum halimifolium*, or sweet madwort: stems procumbent, perennial, leaves lance-linear, acute, quite entire. Spreads itself upon the ground, and never rises to any height. At the extremities of its branches it produces very pretty tufts of small white flowers, of which the plant is seldom destitute for six or seven months succe-

sively. It is a native of the southern countries of Europe; and was cultivated in 1722 in Chelsea garden.

3. *Alyssum faxatile*, or yellow madwort: stems shrubby panicled, leaves lanceolate, very soft, repand; petals entire. This is a low plant, with a fleshy stalk, which seldom rises more than one foot high, but divides into many smaller branches, which grow near the ground, so that a single plant will spread to a considerable distance. The flowers are produced in loose panicles at the extremity of every branch, and are of a bright yellow colour. They appear at the end of April, or beginning of May, and, if the season be moderate, will continue three weeks in beauty. This is a small, showy, hardy, plant, and not disposed to over-run others; it is very suitable to embellish rock-work, grows in Candia and Austria, and frequently flowers a second time in autumn.

4. *Alyssum alpestre*, or Italian madwort: stems under-shrubby, diffused, leaves roundish, hoary, calyxes coloured. This species is found on the mountains of Provence, towards Italy; also on Mont Cenis, &c.

II. Herbaceous. 5. *Alyssum hyperboreum*, or northern madwort: leaves hoary, toothed, stamens four-forked. It is found in North America.

6. *Alyssum incanum*, or hoary madwort: stem erect, leaves lanceolate, hoary, quite entire, flowers in corymbs, petals bifid. Grows to the height of two feet, having woody stalks, which divide into several branches toward the top. At the extremity of every shoot the flowers are produced in round bunches; they are small and white. It grows naturally in the south of France, Spain, and Italy, Germany, Austria, Sweden, &c. chiefly on rocky or gravelly soils, and is perennial.

7. *Alyssum minimum*, or least madwort: stems diffused, leaves linear, downy, filicles compressed. An annual plant, and grows wild in Spain.

8. *Alyssum calycinum*, or calycine madwort: stamens all toothed, calyxes permanent. This is also annual, and found wild in Austria, Carniola, France, Germany, and Switzerland.

9. *Alyssum montanum*, or mountain madwort: stems diffused, leaves sub lanceolate, dotted, and echinate. This grows naturally upon rocks in Burgundy and some other parts of France, about Basil, in Germany, Austria, Carniola, &c. and is perennial.

10. *Alyssum campestre*, or field madwort: stamens guarded with a pair of bristles, calyxes deciduous. Is very like the eighth in stem, leaves, and petals, but is more decumbent and has lance-ovate leaves. It is annual, and grows in France, Germany, and Switzerland.

11. *Alyssum clypeatum*, or buckler-podded madwort: stem erect, filicles sessile, oval, compressed-flat, petals pointed, linear. This species grows naturally in Spain and Portugal. Tournefort gathered it on mount Libanus.

III. Silicles inflated, or calyxes oblong, closed. 12. *Alyssum sinuatum*, or sinuate-leaved madwort: stem herbaceous, leaves lance-deltoid, filicles inflated. It is annual or biennial, and grows wild in Spain, by way-sides; also in the islands of the Archipelago, but is hardy enough to live in the open air in England, in a dry soil, and a warm situation.

13. *Alyssum Creticum*, or Cretan madwort: stem shrubby, leaves lanceolate, a little toothed, downy, filicles inflated, globular. The flowers grow in small clusters at the extremities of the branches. It seldom continues longer than two years in England; and, in a warm dry situation, will live in the open air. It is found in Spain and Candia.

14. *Alyssum Gemonense*, or Gemonia madwort: stem herbaceous, branches divaricated, root-leaves obovate, rather downy, filicles inflated. This species was first discovered by Pietro Arduini, in September 1759, on the mountain della Fontana, near Gemonia, in the district of Forlì, in Italy, in the clefts of rocks. It flowers in May and June.

15. *Alyssum utriculatum*, or bottle madwort: stem herbaceous,

baceous, erect, leaves smooth, lanceolate, quite entire, filicles inflated. This was found by Tournefort in the Levant: it also grows in the vineyards of Savoy. It is a hardy and beautiful perennial, flowering from April to June, at which time it begins to form its curiously-inflated pods. Like the seventeenth, it is well adapted to the decorating of walls or rock-work. Cultivated in 1739 by Mr. Miller.

16. *Alyssum vesicaria*, or bladder madwort: leaves linear toothed, filicles inflated, angular, acute. 17. *Alyssum deltoideum*, or deltoid-leaved madwort: stems undershrubby, prostrate, leaves lance-deltoid, filicles shaggy. Both these were found by Tournefort in the Levant.

Propagation and Culture. All the species may be propagated by seed, and most of them by slips and cuttings. The seeds should be sown in a border of light earth in April. Cuttings or slips should be planted in April or May; shaded in the heat of the day, and gently refreshed with water. In rich ground they seldom live through the winter in England; but in a dry, poor, rubbishy, soil, or on old walls, they will abide the cold, and last much longer. See *CARDAMINE*, *CLYPEOLA*, *DRABA*, *MYAGRUM*, *PELTARIA*, *STACHYS*, *SUBULARIA*, *SISYMBRIUM*.

ALYTAR'CA, *f.* [*αλυτάρχη*, Gr.] A priest of Antioch, in Syria, who, in the games instituted in honour of the gods, presided over the officers who carried rods to clear away the crowd and keep order. In the Olympic games, the alytarches had the same command, and obliged every person to preserve order and decency.

ALYXA'THOE, a nymph, and mother of Æscus by Priam, by whom she was greatly beloved.

ALZY'RA, or *ALCYRA*, a city of Valencia, in Spain, which carries on a considerable trade in silk. It is seated on the river Xacar, seventeen miles from the town of Valencia. Lat. 39.6. N. lon. 0.10. E.

AM. The first person of the verb *To be*.—And God said unto Moses, *I am* that *I am*: and he said, Thus shalt thou say unto the children of Israel, *I am* hath sent me unto you. *Exodus*, iii. 14.

Come then, my soul: I call thee by that name, Thou busy thing, from whence I know *I am*: For, knowing that *I am*, I know thou art; Since that must needs exist, which can impart. *Prior*.

A'MA, *f.* in ecclesiastical writers, denotes a vessel wherein wine, water, or the like, were held, for the service of the eucharist. In this sense the word is also written *amula*; sometimes also *hama*, and *hamula*. *AMA* is sometimes also used for a wine-measure, as a cask, pipe, or the like.

AMAA'SA, *f.* Such pieces of glass as are used in enamelling.

AMABILITY, *f.* [*amabilità*, It. *amabilitas*, Lat. of *amo*, to love.] Loveliness; the power of pleasing.—No rules can make *amability*, our minds and apprehensions make that; and so is our felicity. *Taylor*.

AMABY'R, *f.* a barbarous custom which formerly prevailed in several parts of England and Wales, being a sum of money paid to the lord when a maid was married within his lordship. The word is old British, and signifies "the price of virginity."

AMADABAT', [a corruption from *Ahmed abad*, or Ahmed's city, so called from a king of that name.] A large and populous city of Hindostan, and the capital of the province of Guzerat. It is situated in E. lon. 72. 10. N. lat. 23. 22. Amadabat was formerly called Guzerat; and by Shah Jehân nicknamed *Gherd-abâd*, or the "habitation of dust," because it was much incommoded therewith. It was the seat of the Guzerat kings, as it is now of the Mogul governor. The city stands in a beautiful plain; and is watered by the river Sabremetti. The walls are built with stone and brick, flanked at certain distances with great round towers and battlements. It has twelve gates; and, including the suburbs, is about four miles and a half long. The streets are wide. The *mejdân shâh*, or king's square, is 700 paces long, and 400 broad; planted

round with trees. On the west side is the castle, well walled with free-stone. The caravanfera is on the south of the square, and its chief ornament. Near the meydân also is the king's palace, whose apartments are richly ornamented: and in the midst of the city is the English factory, where they purchase fine chintz, calicoes, and other Indian merchandize. The place is so full of gardens stored with fruit-trees, that from an eminence it looks like a wood. The Hindoos have here an hospital for sick beasts, and another for sick birds, which they take great care of. According to some late accounts, this city is little inferior to the best in Europe, and is thought to yield ten times as much revenue as Surat.

AMADAN', or *HAMADAN*, a town of Persia, between Taurus and Ispahan; lat. 35. 15. N. lon. 47. 4. E. It is seated at the foot of a mountain, where there are a great many springs which water the adjacent country. The houses are built of brick hardened in the sun, and have but a very indifferent aspect. There is but one tolerable street, and that is where stuffs, garments, and the like, are exposed to sale: it is strait, long, and wide; and the shops are very well furnished. The adjacent parts are fruitful in corn and rice, inasmuch that the neighbouring provinces are supplied from hence. It is said to enjoy a very salubrious air; but the cold in winter is intense. The Armenians have a church in this town; and the Jews have a synagogue near a tomb where they pretend Esther and Mordecai lie interred: to this place they come in pilgrimage from several parts of the Levant. About a league from Amadan there is a mountain, called Nalbana, which abounds with all sorts of curious herbs: in the spring, people flock to this mountain from all parts to recover their health by inhaling the salutary effluvia of these aromatic plants. Amadan is a very ancient city: it is said to have been destroyed by Nebuchadnezzar, and rebuilt by Darius, who brought hither all his riches. The kings of Persia frequently retired to this place on account of its delightful situation; for which reason it obtained the name of the Royal City. It was conquered by the khalif Othman, and narrowly escaped being destroyed by Jenghiz Khan in 1220. It had then strong walls and a good castle, which are now in ruins. Its present beauty consists in its gardens and springs.

AMADANA'GER, a town in the hither peninsula of India, in the province of Decan; lat. 18. 10. N. lon. 74. 15. E. It was taken by the Moguls in 1593, after a siege of six months: it was at that time defended by a strong castle seated on an eminence, and surrounded with deep ditches into which several springs discharged their waters.

AMA'DIA, a trading town of Asia, in Curdistan, belonging to the Turks; seated on a high mountain. Lat. 36. 25. N. lon. 43. 1. E.

AMADOW', *f.* a kind of black match, tinder, or touch-wood, which comes from Germany. It is made of a sort of large mushrooms, or spongy excrescences, which commonly grow on old trees. This substance, being boiled in common water, and afterwards dried and well beaten, is then put into a strong ley prepared with saltpetre, after which it is again put to dry in an oven. The druggists sell this match wholesale in France, and several hawkers retail it. Some give to the amadow the name of *pyrotechnical sponge*, because of its aptness to take fire.

AMADOW'RY, *f.* A kind of cotton which comes from Alexandria by the way of Marseilles.

AMA'IN, *adv.* [from *a* and *mazen*, Sax. might, or *à-main*, Fr.] With vehemence; with vigour; fiercely; violently. It is used of any action performed with precipitation, whether of fear or courage, or of any violent effort:

From hence the boar was rous'd, and sprung *amain*,
Like light'ning sudden, on the warrior train;
Beats down the trees before him, shakes the ground;
The forest echoes to the crackling sound,
Shout the fierce youth, and clamours ring around. *Dryden*.

AMAIN, in the sea-language, a term importing to lower something at once. Thus, *to strike amain*, is to lower or let fall the top-sails; *to wave amain*, is to make a signal, by waving a drawn sword, or the like, as a demand that the enemy strike their top-sails.

AMAK', a small island in the Baltic sea, near Copenhagen, from which it is separated by a canal, over which there is a draw-bridge. Amak is about four miles long and two broad; and is chiefly peopled by the descendants of a colony from East Friesland, to whom the island was assigned by Christian II. at the request of his wife Elizabeth, sister of Charles V. for the purpose of supplying her with vegetables, cheese, and butter. From the intermarriages of these colonies with the Danes, the present inhabitants are chiefly descended; but, as they wear their own dress, and enjoy peculiar privileges, they appear a distinct race from the natives. The island contains about six villages, and between 3000 and 4000 souls. It has two churches, in which the ministers preach occasionally in Dutch and Danish. The inhabitants have their own inferior tribunals; but in capital offences are amenable to the king's court of justice at Copenhagen. The island is laid out in gardens and pastures; and still, according to the original design, supplies Copenhagen with milk, butter, and vegetables. Lat. 55. 20. N. lon. 12. 10. E.

AMAL', a town of Sweden, in the province of Daland, seated on the river Wefer. It has a good harbour, and carries on a great trade, especially in timber, deals, and tar. Lat. 58. 50. N. lon. 12. 40. E.

AMALA'GO, *f.* in botany. See PIPER.

AMALASEN'TA, daughter of Theodoric king of the Ostrogoths, and mother of Athalaric, whom she caused to be educated after the manner of the Romans, which gave great offence to the Goths. This woman, who was qualified to have reigned over a polished people, had every quality necessary to form a great princess. Possessed of genius and courage, she maintained her country in peace, caused the arts and sciences to flourish, and drew learned men about her, and preserved the Romans from the barbarity of the Goths. She was acquainted with the languages of the various nations who gained possession of the empire, and treated with them without an interpreter. After the death of her son, in 534, she placed her cousin Theodatus on the throne, who had the barbarity to cause her to be strangled in a bath, under pretence of adultery. It is said that Theodatus put her to death at the instigation of the empress Theodora, who was stung with jealousy, on account of the attachment Justinian had for her. That emperor, being informed of this cruel perfidy, declared war against the murderer, and chastised him by his general, the great Belisarius.

AM'ALEK, [אַמֶּלֶק, Heb. i. e. is a licking or suckling people, of אָמ, a people, and לָקַק, licking as a dog with his tongue.] The son of Eliphaz, by Timna his concubine, and the grandson of Esau. Gen. xxxvi. 12. and 1 Chr. i. 36. Amalek succeeded Gatam in the government of Edom. He was the father of the Amalekites; a powerful people who dwelt in Arabia Petraea, between the Dead Sea and the Red Sea, or between Havila and Shur. 1 Sam. xv. 7. It does not appear that they had cities; for there is no mention of any but one in the Scriptures; they lived generally in hamlets, caves, or tents.

The Israelites had scarcely passed the Red Sea on their way to the wilderness, before the Amalekites came to attack them in the deserts of Rephidim, Ex. xvii. 8, &c. and put those cruelly to the sword who were obliged, either through fatigue or weakness, to remain behind. Moses, by divine command, directed Joshua to fall upon this people; to record the act of inhumanity which they had committed in a book, in order to have it always before his eyes; and to revenge it in the most remarkable manner. Joshua therefore fell upon the Amalekites and defeated them while Moses was upon the mountain, with Aaron and Hur in company. Moses, during the time of the engagement, held up his hands, to which the success of the

battle was owing; for, as often as he let them down, Amalek prevailed. But, Moses's hands being tired, Aaron and Hur supported his arms, and held them extended, while the battle lasted, which was from morning till the approach of night, when the Amalekites were cut in pieces. This happened in the year of the world 2513, before Christ 1491.

The ground of the enmity of the Amalekites against the Israelites is generally supposed to have been an innate hatred from the remembrance of Jacob's depriving their progenitor both of his birth-right and blessing. Their falling upon them, however, and that without any provocation, when they saw them reduced to so low a condition by the fatigue of their march, and the excessive drought they laboured under, was an inhuman action, and justly deserved the defeat which Joshua gave them. Under the Judges, v. 3. we see the Amalekites united with the Midianites and Moabites, in a design to oppress Israel; but Elrud delivered the Israelites from Eglon king of the Moabites, Judges iii. and Gideon, chap. viii. delivered them from the Midianites and Amalekites. About the year of the world 2930, Saul marched against the Amalekites, advanced as far as their capital, and put all the people of the country to the sword; but spared the best of all the cattle and moveables, contrary to a divine command; which act of disobedience was the cause of Saul's future misfortunes.

After this war, the Amalekites scarcely appear any more in history. However, about the year of the world 2949, a troop of Amalekites came and pillaged Ziklag, which belonged to David, 1 Sam. xxx. where he had left his two wives, Ahinoam and Abigail; but he, returning from an expedition which he had made in the company of Achish into the valley of Jezreel, pursued them, overtook and dispersed them, and recovered all the booty which they had carried off from Ziklag.

The Arabians maintain Amalek to have been the son of Ham, and grandson of Noah; that he was the father of Ad, and grandfather of Schedad. Calmet think that this opinion is by no means to be rejected; as it is not very probable that Amalek, the son of Eliphaz, and grandson of Esau, should be the father of a people so powerful and numerous as the Amalekites were when the Israelites departed out of Egypt. Moses, Gen. xiv. 7. relates, that in Abraham's time, long before the birth of Amalek the son of Eliphaz, the five confederate kings carried the war into Amalek's country, about Kadesh; and into that of the Amorites, about Hazezontamar. Moses also relates, Numb. xxiv. 20. that the diviner Balaam, observing at a distance the land of Amalek, said, in his prophetic style, "Amalek is the first, the head, the original of the nations; but his latter end shall be, that he perish for ever." Calmet observes, that this epithet of the first of nations cannot certainly agree with the Amalekites descended from the son of Eliphaz, because the generation then living was but the third from Amalek. Besides, Moses never reproaches the Amalekites with attacking their brethren the Israelites; an aggravating circumstance, which he would not have omitted were the Amalekites descended from Esau; in which case they had been the brethren of the Israelites. Lastly, we see the Amalekites almost always joined in the Scripture with the Canaanites and Philistines, and never with the Edomites; and when Saul made war upon the Amalekites, and almost utterly destroyed them, we do not find that the Edomites made the least motion towards their assistance, nor to revenge them afterwards. Thence it is thought probable, that the Amalekites who are so often mentioned in Scripture were a free people, descended from Canaan, and devoted to the curse as well as the other Amorites, and very different from the descendants of Amalek, the grandson of Esau.

AMAL'FI, an ancient city of Italy, situated in lat. 40. 35. N. lon. 15. 20. E. It is said to have derived its origin from a number of Roman families, who, about the middle of the fourth century, had left Rome, and embarked

barked for Constantinople; but, meeting with orms on their passage, were cast away on the shores of Salerno, and deprived of the means of pursuing their voyage. In this state of perplexity they long remained; but at last came to the resolution of settling on the present site of Amalfi, where they expected to enjoy security, and sufficient plenty of the necessaries of life. The earliest notice of them in this settlement dates no higher than the latter end of the sixth century. Impervious mountains and inaccessible coasts preserved their infant state from the first fury of the Lombards, who seldom attempted the conquest of a maritime people.

In the year 825, when this little republic had attained a degree of wealth and reputation sufficient to excite the ambition of its neighbours, Sico, prince of Salerno, marched a body of troops by night, surprised Amalfi, and, carrying off the greatest part of the inhabitants, compelled them to fix at Salerno, which had lately suffered a great loss of people by an epidemical disorder. But, before the fourth year of their captivity was expired, the Amalfitans took advantage of the absence of the Salernitan chiefs, who were then carrying on a war with the Beneventans; armed themselves; and, after burning and plundering Salerno, marched in triumph back to their own country. Here they framed a better system of government, and reformed many abuses in their former legislation; adopting various measures that were likely to promote internal concord, and defeat the evil intentions of foreign enemies. Their first plan was to vest the supreme authority in a temporary præfect; but the experience of a few years caused them to prefer lodging that power in the hands of a duke elected for the term of his natural life. Under these governors Amalfi attained the summit of her military and commercial glory. It extended its territory, which reached eastward from Vico Vecchio, and westward to the promontory of Minerva, including likewise the island of Caprea, and the two islands of the Galli. Towards the north, it comprehended the cities of Lettere, Gragnans, Pimontio, and Capule di Franchi; towards the south, those of Scala, Ravelli, Minori, Majuri, Atrani, Tramonti, Agerula, Citara, Prajano, and Rosilano.

Leo IV. found the Amalfitans an useful ally in his wars with the infidels, and honoured the commonwealth with the title of *Defender of the Faith*. The Neapolitans, with whom, as Greek vassals, they were united in strict bonds of friendship, experienced many signal favours at their hands; and the Mussulmen themselves found it expedient to court their alliance, and to enter into treaty with them. Their situation had from the beginning given them a turn to commerce, and their attention to naval affairs so much consequence in the eyes of their protector, the emperor of Constantinople, that by his orders a court was established at Amalfi, for the decision of all controversies arising in maritime transactions. Its code and reports became the general rule in those cases throughout this part of Europe; its precedents and decrees were allowed to be good authority to found judgment upon even in foreign tribunals. To crown the mercantile and naval glory of the republic, it was reserved to the lot of an Amalfitan to make, or at least to perfect, the most important discovery ever made for the improvement of navigation. Pasitano, a village which stands on the shore a few miles west of Amalfi, boasts of having given birth to Flavio Gioia, the inventor of the mariner's compass.

The merchants of this town engrossed the trade of the Levant, and transacted the commercial business of the world in a lucrative and exclusive manner. The Pisans, Venetians, and Genoese, rose upon their ruin; and, after monopolizing the emoluments of trade for some ages, made way for the more comprehensive and daring spirit of the present maritime powers.

At present Amalfi is subject to Naples, and is the see of an archbishop. It is but a shadow of what it was in its original state, when it extended over the stupendous rocks that hang on each side, still crowned with battlemented

walls and ruined towers. Its buildings, Mr. Swinburne says, are not remarkable for elegance or size; and contain at most 4000 inhabitants, who seem to be in a poor line of life. The cathedral is an uncouth building. Under the choir is the chapel and tomb of the apostle St. Andrew; in whose honour the edifice was dedicated, when cardinal Capuano, in 1208, brought his body from Constantinople.

AMALGAM, or **AMALGAMA**, *f.* [αμα and γαμειν.] This name is applied to the combinations or mixtures of mercury with other metallic substances. As mercury is so exceedingly fusible as to be always in the fluid state in climates of a moderate temperature, it unites with many of the metals without any greater heat than that which it usually possesses. For this purpose, therefore, nothing more is necessary than to triturate thin leaves, or plates, or filings of the metallic substance with mercury. In other instances, where the disposition to combine is less powerful, it is found necessary either to fuse or ignite the metal intended to be amalgamated. When a small quantity of mercury is combined with any metal, it renders it brittle, or rather friable; a greater quantity of mercury produces a kind of imperfect fluidity resembling that of butter. This is commonly called the consistence of an amalgam. A still greater quantity of mercury renders the mass more fluid, but not uniformly so; for a portion of the amalgam either floats at the top, or sinks to the bottom, instead of intimately combining with the whole of the mercury. This fact is of the same kind as that wherein salts are soluble in water in limited quantities, beyond which they cease to be taken up. Mercury very readily combines with gold, silver, lead, tin, bismuth, and zinc. In making an amalgam of gold or silver, the clippings of the leaves from the gold-beaters may be used, or thin plates of the metals may be ignited, and plunged in mercury previously heated, so as to smoke. When the quantity of mercury is so large as to be fluid when cold, the superfluous mercury may be strained off by pressure through a leathern bag. The remaining amalgam of gold contains about one-third of its weight of mercury, but is perfectly white. The amalgam of silver sinks in mercury, and consequently is heavier than either mercury or silver.

Mercury unites with difficulty into an amalgam with copper and arsenic; and scarcely at all with platina, or with iron. This latter metal, however, does not absolutely refuse to combine with mercury, for it adheres to and coats the end of iron pestles used for the trituration of amalgams: and Dr. Lewis has observed, that a plate of tough iron is rendered brittle by keeping it immersed in mercury for some days; a fact which has been experienced in another way by Mr. de Luc, who found that springs immersed under mercury, in the construction of a barometer, were rendered brittle and useless by its action. Iron ignited to a white heat, and thrown into a large mass of mercury, becomes completely covered with a ferruginous bright amalgam. Regulus of antimony unites with mercury, though with great difficulty. Nickel and cobalt are said not to unite with mercury; and its action on manganese, wolfram, and molybdena, is not known.

Amalgams are applied to a considerable number of useful purposes. The amalgam of gold is used in the process called water-gilding, in which the mercury first serves as the medium of adhesion between the gold and copper, and is afterwards driven off by heat. See **GILDING**. Looking-glasses are silvered by an amalgam of tin. See **SILVERING**. The amalgam of zinc, triturated with talow, is found to assist the excitation or production of electricity, by the friction of a cushion against glass, in a wonderful degree; inasmuch that the quantity of electricity is twenty or thirty times as great as without it. When mercury is contaminated with any imperfect metal, it is found that by agitation, in contact with vital air, or the air of the atmosphere, the imperfect metal becomes converted into a black powdery calx, which separates from the mercury.

TO AMALGAMATE, *v. a.* To unite metals with quicksilver.

AMALGAMATION, *f.* The act or practice of amalgamating metals. For the new process, see **ORE**.

AMALTHÆA, the name of the Cumæan Sibyl, who offered to Tarquinius Superbus nine books, containing the Roman destinies, and demanded 300 pieces of gold for them. He derided her; whereupon she threw three of them into the fire; and, returning, asked the same price for the other six; which being denied, she burnt three more; and returned, still demanding the same price. Upon which Tarquin, consulting the pontiffs, was advised to buy them. These books were in such esteem, that two magistrates were created to consult them upon extraordinary occasions.

AMALTHÆA, in pagan mythology, the daughter of Melissus, king of Crete, and the nurse of Jupiter, whom she fed with goat's milk and honey. According to others, Amalthæa was a goat, which Jupiter translated into the sky, with her two kids, and gave one of her horns to the daughters of Melissus, as a reward for the pains they had taken in attending him. This horn had the peculiar property of furnishing them with whatever they wished for; and was thence called the *cornucopia*, or horn of plenty.

AMALTHÆUS (Jerôme, John Baptista, and Cornelle), three celebrated Latin poets of Italy, who flourished in the sixteenth century. Their compositions were printed at Amsterdam in 1685. One of the prettiest pieces in that collection is an epigram on two children, whose beauty was very extraordinary, though each of them was deprived of an eye:

‘Lumine Acon dextro, capta est Leonilla sinistro:

‘Et poterat forma vincere uterque Deos.

‘Parve puer, lumen quod habes concede forori;

‘Sic tu cæcus Amor, sic erit illa Venus.’

AMA'MA (Sixtinus), professor of the Hebrew tongue in the university of Franeker, a man of great learning, was born in Friesland, and studied under Drusus. He published a criticism upon the translation of the Pentateuch; collated the Dutch translation of the Bible with the original; and wrote a censure of the Vulgate translation of the historical books of the Old Testament, Job, the Psalms, and Canticles. It is impossible to answer the reasons whereby he shows the necessity of consulting the originals. This he recommended so earnestly, that some synods, being influenced by his reasons, decreed, that none should be admitted into the ministry but such as had a competent knowledge of the Hebrew and Greek text of the Scripture. He died in 1629.

AMA'NA, a mountain of Cilicia, and one of the Bahama islands.

AMA'NCE, a town in the duchy of Lorraine, upon a rivulet of the same name. Lat. 48. 45. N. lon. 6. 10. E.

AMA'ND (Mark-Anthony-Gerard, sieur de St.), a French poet, was born at Roan, in Normandy, in 1594. In the epistle-dedictory to the third part of his works, he tells us, that his father commanded a squadron of ships in the service of Elizabeth queen of England for twenty-two years, and that he was for three years prisoner in the Black Tower at Constantinople. He mentions also, that two brothers of his had been killed in an engagement against the Turks. His own life was spent in a continual succession of travels, which was of no advantage to his fortune. There are miscellaneous poems of this author, the greater part of which are of the comic or burlesque, and the amorous, kind. In 1650, he published “*Stances sur la grosseffe de la reine de Pologne et de Suede*.” In 1653, he printed his “*Moïse sauvé, idyle heroïque*.” This poem had at first many admirers: Monsr. Chapelain called it a *speaking picture*; but it has since fallen into contempt. Amand was admitted a member of the French academy, when it was first founded by cardinal Richelieu, in the year 1633: and Mr. Pelisson informs us, that in 1637, at his own desire, he was excused from the obligation of making a speech in his turn, on condition that he would compile the comic part of the dictionary which the aca-

demy had undertaken, and collect the burlesque terms. This was a task well suited to him; for it appears by his writings, that he was extremely conversant in these terms, of which he seems to have made a complete collection from the markets, and other places where the lower people resort. He died in 1661, being sixty-seven years of age.

AMAND (St.), a town of France, in the department of Cher, and late territory of Bourbonnois. It is situated on the river Cher, twenty miles south of Bourges. Lat. 46. 32. N. lon. 3. 30. E.

AMAND (St.), a town of France, in the department of the North, and in the late French Flanders. It is seated on the river Scarpe, seven miles north of Valenciennes. Lat. 50. 27. N. lon. 2. 35. E.

AMANDA'TION, *f.* [from *amando*, Lat.] The act of sending on a message or employment.

AMAN'DOLA, *f.* is a green marble, having the appearance of a honey-comb, and containing white spots: one hundred parts of it contain seventy-six of mild calcareous earth; twenty of shistus; two of iron, partly calcined. The cellular appearance proceeds from the shistus. *Kirwan*.

AMANICÆ PYLÆ, (Ptolemy;) **AMANIDES PYLÆ**, (Strabo;) **AMANI PORTÆ**, (Pliny;) straits or defiles in mount Amanus, through which Darius entered Cilicia; at a greater distance from the sea than the Pylæ Ciliciæ, or Syria, through which Alexander passed.

AMAN'NIA, *f.* in botany. See **AMMANNIA** and **PEPLIS**.

AMANTE'A, a sea-port town and bishop's see of the kingdom of Naples, situated near the bay of Euphemia, in the province of Calabria, in lat. 39. 15. N. lon. 16. 20. E.

AMANUE'NSIS, *f.* [Lat.] A person who writes what another dictates.

AMA'NUS, or **OMANUS**, a god of the ancient Persians, supposed to be the sun, or the everlasting fire which they worshipped.

AMANUS, a mountain of Syria, separating it from Cilicia; a branch of mount Taurus, extending chiefly eastward, from the sea of Cilicia to the Euphrates; now called *Monte Negro*, or rather *Montagna Neres*, by the inhabitants; that is, the watery mountain, as abounding in springs and rivulets.

AMAPAL'LA, a city and port-town of North America, in the province of Guatimala, seated on the gulph of the same name, in the Pacific ocean. Lat. 12. 30. N. lon. 63. 20. W.

AMARA'CUS, *f.* in botany. See **ORIGANUM**.

AMARA INDICA, *f.* in botany. See **MOMORDICA**.

AMARANTE, *f.* An order of knighthood, instituted in Sweden by queen Christina, in 1653, at an annual feast, celebrated in that country, called *Wirtschafft*. This feast was solemnized with entertainments, balls, masquerades, and the like diversions, and continued from evening till the next morning. That princess, thinking the name too vulgar, changed it into that of *the feast of the gods*, in regard each person here represented some deity, as it fell to his lot. The queen assumed the name of *Amarante*; that is, unfading, or immortal. The young nobility, dressed in the habit of nymphs and shepherds, served the gods at the table. At the end of the feast, the queen threw off her habit, which was covered with diamonds, leaving it to be pulled in pieces by the masques; and, in memory of so gallant a feast, founded a military order, called in Sweden *Ceschsiffschafft*, into which all that had been present at the feast were admitted, including sixteen lords, and as many ladies, besides the queen. Their device was the cypher of *Amarante*, composed of two A's, the one erect, the other inverted, and interwoven together; the whole inclosed by a laurel crown, with this motto, *Dolce nella memoria*. Bullstrode Whitlock, the English ambassador from Cromwell to the court of Sweden, was made a knight of the order of *Amarante*, on which account it seems to be, that we sometimes find him styled *Sir Bullstrode Whitlock*.

AMARANTE, a town of Entre-Douro-e-Minho, Portugal. Here is a linen manufactory of considerable extent.

A'MARANTE,

AMARANTH, J. [from α , priv. and $\mu\alpha\rho\alpha\nu\alpha$, to fall or wither: because the flower being cropped does not soon wither.] In botany, a genus of the monœcia pentandria class. The generic characters are—I. Male flowers on the same plants with the females. Calyx: perianthium five or three-leaved, upright, coloured, permanent; leaflets lanceolate, acute. Corolla: none, unless you take the calyx for such. Stamina: filaments five or three capillary, from upright patulous, the length of the calyx. Antheræ oblong, versatile. II. Female flowers in the same raceme with the males. Calyx: perianthium as in the male. Pistillum: germ ovate; styles three, short, subulate. Stigmas simple permanent. Pericarpium: capsule ovate, somewhat compressed, as is the calyx on which it is placed, coloured and of the same size, three-beaked, one-celled, cut open transversely. Seed: single, globular, compressed, large.—*Essential Character.* Male. Calyx: three or five leaved. Corolla: none. Stamina: three or five. Female. Calyx: three or five leaved. Corolla: none. Styles, three. Capsule one-celled, opening horizontally. Seed, one.

The amarantus are annual, herbaceous plants. The leaves simple, alternate, ending in a little bristle. Stipules none. Flowers loosely disposed either in glomerules or in spikes. Almost all the species are natives of America, especially North America; some however are found in the tropical countries of Asia and Africa, and two only in Europe. The old English names of the few sorts formerly known, were flower-gentle, florumour, and velvet-flower, or flower-velure; but all these have given place to amaranth. Most of the species are used as culinary plants in hot countries; and the seeds of several have been sent to England, with advice to cultivate them for the same purpose here. Where esculent plants are scarce, these may be esteemed; but spinach being cultivated with us with greater ease, and being also much preferable, these are not worthy of being propagated as cuculents.

Species. I. With three stamens. 1. *Amaranthus græcizans*, or pellitory-leaved amaranth: glomerules axillary; leaves lanceolate repand obtuse. Native of North America. It flowers from July to September.

2. *Amaranthus albus*, or white amaranth: glomerules axillary; leaves roundish-ovate emarginate, stem four-cornered simple. This species is nearly related to the first, from which however it may be distinguished by its stem, and by the petioles of the leaves which are not so stout as in the other. Native of Pennsylvania, on the coast, from whence it has migrated into Italy. It flowers in July and August.

3. *Amaranthus deflexus*: spike very short with few flowers, leaves rhomb-lanceolate, capsules not gaping. It is distinguished from the rest, by the capsule not opening transversely, but being entire. Native place unknown.

4. *Amaranthus polygonoides*, or spotted-leaved amaranth: glomerules three-leaved; female flowers funnel-shaped; leaves rhomb-ovate emarginate. This species varies in different situations. In a hot-bed the stems were a foot high, and the whole plant was green except the calyxes. In the open air the stem was red, the length of the middle finger, almost upright; and the leaves were much smaller. It differs from the other species, particularly from the second, which it most resembles, in having the stem round, and the calyx of the female flowers one-leaved and funnel-shaped. Found wild by way-sides and among rubbish in the tropical countries of Asia, Africa, and America; as in Jamaica, Guiana, Senegal, Guinea, Ceylon, &c. It flowers in August.

5. *Amaranthus polygamus*, or hermaphrodite amaranth: glomerules two-stamened, subspiked, ovate; flowers hermaphrodite and female; leaves lanceolate. A native of Guiana, China, Cochin, and Amboina. The inhabitants eat the leaves and stalks of this sort, boiled, with oil and pepper, and prefer it to any of the others. It was introduced among us in 1780, by Sir Joseph Banks, baronet; and flowers in July and August.

6. *Amaranthus mangostanus*: glomerules subspiked, axillary, solitary; leaves rhomb-roundish. Native of the East Indies.

7. *Amaranthus inamæus*: glomerules subspiked, three-leaved, axillary, geminate, leaves rhomb-lanceolate. This resembles the foregoing species very much; but differs in having a three-leaved calyx; the glomerules axillary and in pairs; the spike terminating, erect, and more slender; the leaves rhomb-lanceolate; and the petiole shorter than the leaves. It is supposed to be a native of Japan.

8. *Amaranthus melancholicus*, or two-coloured amaranth: glomerules axillary peduncled roundish, leaves ovate-lanceolate coloured. This species varies in the colour of the leaves. In the open air, they are of a dirty purple on their upper surface, and the younger ones are green; in a stove the whole plant is of a fine purple colour. It is however easily distinguished in all states by its colour, its leaves, and the lateness of its flowering, after all the others are past.

9. *Amaranthus gangeticus*, or oval-spiked amaranth: glomerules in very short spikes, ovate; leaves ovate-lanceolate, emarginate. It varies with leaves entirely green. Perhaps it may be a variety of the foregoing species; but it differs from it, in having a terminating spike; axillary, sessile glomerules; leaves not so much waved or wrinkled; and also in its colour. Native of Bengal, and the Society Isles. It flowers from July to September.

10. *Amaranthus oleraceus*, or eatable amaranth: glomerules axillary branching, leaves wrinkled oblong very obtuse emarginate. Native of Guiana, the East Indies, and Egypt. It is not entitled to a place in gardens on account of its beauty. This and the next sort are esteemed in some parts of India as esculent herbs; they gather them when young, and dress them as we do spinach; but, being much inferior to it, they are seldom used where spinach will thrive. It flowers in July.

11. *Amaranthus viridis*, or green amaranth: glomerules axillary geminate, male flowers trifid, leaves ovate emarginate, stem erect. This sort is distinct from all the rest, in having the bractes not surrounding the flowers, but scattered along the rachis of the glomerule. Native of Jamaica and Brasil. It flowers in August and September.

12. *Amaranthus tricolor*, or three-coloured amaranth: glomerules sessile roundish stem-clasping, leaves lanceolate-ovate coloured. It varies in the colour of the leaves, which are less painted in the open air than in the stove. It was in Gerard's garden, in 1596, and flowers from June to September. It has been long cultivated for the beauty of its variegated leaves, in which the colours are elegantly mixed. When the plants are in full vigour, these are large, and closely set from the bottom to the top of the stalks; the branches also form a sort of pyramid: so that there is not a more handsome plant than this, when it is in full lustre. Native of Guiana, Persia, Ceylon, China, Japan, the Society Isles, &c.

13. *Amaranthus lividus*, or livid amaranth: glomerules subspiked rounded, leaves elliptic retuse, stem upright. Native of Virginia and Guiana. It flowers from July to September.

14. *Amaranthus tristis*, or round-headed amaranth: glomerules in loose spikes, leaves subcordate-ovate emarginate, shorter than the petioles. Native of China, Cochin, Amboina, and Brasil. The young plants of this sort are much used, as we do spinach, in these countries. Linneus says, that the leaves have a livid spot underneath, but this is not always observable. The colour of the leaves, although it be remarkable in this genus, is yet changed by culture. It flowers from June to August.

15. *Amaranthus blitum*, or least amaranth or blite: glomerules subspiked, flowers three-leaved, leaves ovate retuse, stem diffusid. Native of all Europe, except the very cold parts, Japan, &c. in cultivated grounds, on dunghills, banks, among rubbish, &c.

16. *Amaranthus scandens*, or climbing amaranth: spikes interrupted

interrupted compound, spikelets bent in, leaves ovate, stem weak. It resembles the foregoing species. Native of America.

II. With five stamens. 17. *Amaranthus hystericus*: flowers in simple spikes, axillary, glomerate; leaves ovate, acute. It is doubtful whether this be a distinct sort, or merely hybridous; as perhaps several others are. It is the connecting link, in point of outward form, between the three-stamened and five-stamened amaranths. It varies much; for from the same seed arise individuals wholly green, red, and rufous liver-coloured; with spikes both green and red, sometimes very thin and slender, sometimes condensed, blunt, and thick, sometimes again long and interrupted: their stature however is always low, and the spike simple. The native place is not known.

18. *Amaranthus hybridus*, or clustered amaranth: racemes decompound, heaped, erect; leaves ovate-lanceolate. It is found wild in Virginia and Arabia Felix. It flowers from June to September.

19. *Amaranthus strictus*: racemes compound, erect, strict; leaves ovate, concave. It differs from all the five-stamened species, in its upright racemes pressed close to the stalk; and the stiffness of the whole habit. Its native place of growth is unknown.

20. *Amaranthus latus*: racemes compound, erect; leaves ovate, obtuse, mucronate. It varies with a reddish stalk and leaves. The edge of the leaves has almost always a tendency to red, but the other parts are green.

21. *Amaranthus cruentus*, or various-leaved amaranth: racemes decompound, naked, patulous; leaves lanceolate-ovate. As first cultivated in England in 1728, the stem was wholly red and smooth; the petioles, ribs, and nerves of the leaves underneath, purple; the spikes purple, much spreading, and a little nodding. They were very beautiful, and made a gay appearance for the first two years; but afterwards the seeds degenerated, and the plants had little beauty; which is the same with some others of this genus. It is a native of the East Indies and of China; and flowers from June to August.

22. *Amaranthus hypochoeriacus*, or prince's-feather amaranth: racemes compound, crowded, erect; leaves oblong-lanceolate, mucronate. It is a native of Virginia, and flowers from July to September. Mr. Miller cultivated it in 1739: but it is now become a common weed, frequently growing upon dung-hills: the plants abound with seeds, so that, where they are permitted to scatter, they will come up abundantly the following summer; and will remain in the ground several years.

23. *Amaranthus sanguineus*, or spreading or bloody amaranth: racemes compound, erect; branches spreading, smooth; leaves oblong, acute. The seeds of this species were sent to Mr. Miller from the Bahama islands before 1735, as an esculent plant, bearing fine flowers. He describes it as growing three feet high, with purple stalks and leaves; the spikes short and swelling out in the middle, frequently produced from the axils; but at the extremity of the stalk arises a large cluster of spikes placed crosswise, with one upright stalk in the middle: these are of a bright purple colour at first, but afterwards become darker, as the seeds ripen. It flowers from the middle of June to September.

24. *Amaranthus paniculatus*: racemes compound; branches spreading, pubescent; leaves ovate-lanceolate. Native of America.

25. *Amaranthus retroflexus*, or hairy amaranth: racemes superdecompound, erect; branches pubescent; leaves ovate, waved. It differs very much from all the other species, in its pubescent stem, flouter stature, green colour of the whole, and peculiar habit. Native of Pennsylvania. It flowers from July to September; and was cultivated by Mr. Miller in 1739. Being now become a common weed in many gardens near London, it is seldom allowed a place except in botanic gardens.

26. *Amaranthus chlorostachys*: racemes compound, nodding; leaves lanceolate. Native place not known.

27. *Amaranthus flavus*, or pale amaranth: racemes compound, nodding; leaves ovate-lanceolate. Although it has the name of *flavus*, the flowers are always green; only turning yellow as the seed ripens. It is a native of the East Indies. Mr. Miller, who cultivated it in 1768, mentions, that he received the seeds from Portugal, by the title of *Bredos*, recommending it to be cultivated as a culinary herb: but the Portuguese call all the green amaranths by this name.

28. *Amaranthus caudatus*, or pendulous amaranth, or love-lies-bleeding. It flowers in August and September; and was cultivated in 1683, by Mr. James Sutherland. Native of Persia, Ceylon, Guiana, Peru, &c.

29. *Amaranthus spinosus*, or prickly amaranth: racemes terminating compound, axils thorny. Native of the East and West Indies, Guiana, Guinea, &c. In the former they eat it as a green boiled. It flowers from July to September. This species makes no great figure, and therefore is rarely allowed a place except in botanic gardens.

Propagation and Culture. The sorts which are worthy of a place in the pleasure garden, are particularly the eighth and the twelfth: these are tender, and require some art and care to bring them to perfection in England, therefore their management will be hereafter more particularly inserted. They are generally disposed in pots with cockscombs and other showy plants, to adorn court-yards, and other immediate environs of the house.

The twenty-first sort is also tender; whoever therefore is inclinable to cultivate that plant should treat it in the same manner as is directed for the twenty-third and twenty-eighth. Next to these are the twenty-third and twenty-eighth sorts, for the ornament of principal borders in the pleasure-garden or parterre: the seeds of these should be sown upon a moderate hot-bed towards the end of the month; and, when the plants come up, they should have a large share of air admitted to them in mild weather, to prevent their drawing up weak. When they are large enough to transplant, there should be another moderate hot-bed provided, to which they should be removed, placing them at six inches distance every way, observing to water them, as also to shade them from the sun until they have taken new root; after which, the air should be freely admitted to them at all times when the weather is favourable; their waterings should be frequent, but not given in great quantities. As the plants advance, and the warmth of the season increases, they should have a greater share of air, that by degrees they may be hardened to bear the open air. In the beginning of June they may be taken up, with large balls of earth to their roots, and planted, some into pots and others into the borders of the pleasure-garden, observing to shade them until they have taken good root; after which they must be frequently watered in dry weather, especially those in the pots, which will require watering every evening in warm dry weather. The tree amaranth will not thrive in pots, but should be planted in a rich light soil, where, if it be allowed room, and plentifully watered in dry weather, the plants will grow to a very large size, and make a fine appearance. The twenty-third and twenty-eighth sorts must be sown on a good hot-bed in February, or the beginning of March at farthest; and in about a fortnight's time, if the bed is in good temper, the plants will rise; soon after which you must prepare another hot-bed, covered with good, rich, light earth, about four inches thick; then raise up the young plants with your finger, so as not to break off the tender roots, and prick them into your new hot-bed about four inches distance every way, giving them a gentle watering to settle the earth to their roots; but in doing this, be very cautious not to bear the young plants down to the ground by hasty watering, which rarely rise again, or at least so as to recover their former strength in a long time, but very often rot in the stems, and die. In the middle of the day keep them screened with mats from the heat of the sun, and give them air by raising up the glasses; and, if the glasses are wet, it will be proper to turn

turn them every day in good weather, that they may dry; for the moisture which is occasioned by the fermentation of the dung, and the perspiration of the plants, is of a noxious quality, and very unkindly to plants; so that if the weather happens to prove bad, that you cannot turn your glasses, it will be of great service to the plants to wipe off all moisture two or three times a day with a woollen cloth to prevent its dropping upon the plants. When the plants are firmly rooted, and begin to grow, you must observe to give them air every day, more or less, as the weather is cold or hot, to prevent their drawing up too fast, which greatly weakens their stems.

In about three weeks or a month's time, these plants will have grown so as to meet, and will stand in need of another hot-bed, which should be of a moderate temper, and covered with the same rich earth about six inches thick, into which they should be removed, observing to take with them as much earth about their roots as possible, and plant them six or seven inches distance every way, giving them some water to settle the earth about their roots; but be very careful not to water them heavily, so as to bear down the plants, as was before directed; and keep them shaded in the heat of the day, until they have taken fresh root; and be sure to refresh them often gently with water, and give them air in proportion to the heat of the weather, covering the glasses with mats every night, lest the cold chill your beds, and stop the growth of your plants.

The middle of May you must provide another hot-bed, which should be covered with a deep frame, that the plants may have room to grow. Upon this hot-bed you must set as many three-penny pots as can stand within the compass of the frame; these pots must be filled with good rich earth, and the cavities between each pot filled up with any common earth, to prevent the heat of the bed from evaporating, and filling the frame with noxious steams. When the bed is in good order to receive the plants, they should be carefully taken up with a trowel, observing to preserve as much earth to their roots as possible; then place each single plant in the middle of one of the pots, filling the pot up with the earth before described, and settle it close to the root of the plant with your hands; water them gently as before, and shade them in the heat of the day from the violence of the sun by covering the glasses with mats. In about three weeks more these plants will have grown to a considerable size and strength, so that you must now raise the glasses very much in the day-time; and when the air is soft, and the sun is clouded, draw off the glasses, and expose them to the open air; and repeat this as often as the weather will permit, which will harden them by degrees to be removed abroad into the places where they are to remain the whole season; but it is not advisable to set these plants in the open air until after the first week in July, observing to do it when the air is perfectly soft, and if possible in a gentle shower of rain. Let them at first be set in shelter for two or three days, where they may be screened from the violence of the sun, and from strong winds, to which they must be inured by degrees. These plants, when grown to a good stature, perspire very freely, and must be every day refreshed with water, if the weather proves hot and dry; otherwise they will stint, and never produce so large leaves as those which are skilfully treated. This is the proper management in order to have fine amaranths, which, if rightly followed, and the kinds are good, in a favourable season, will produce large fine leaves, and these plants are the greatest ornament to a good garden for upwards of two months in the latter part of summer.

The other sorts, being hardy enough to grow in the open air, may be sown on a bed of light earth in the spring, and, when the plants are fit to remove, they may be transplanted into any part of the garden, where they will thrive and produce plenty of seeds, which, if permitted to scatter, will stock the garden with plants.

AMARANTH, *f.* in poetry, is sometimes an imaginary flower, supposed, according to its name, never to fade:

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Immortal *amaranth*! a flower which once
In paradise, fast by the tree of life,
Began to bloom; but soon, for man's offence,
To heav'n remov'd, where first it grew, there grows,
And flow'rs aloft, shading the fount of life,
And where the river of bliss, thro' midst of heav'n,
Rolls o'er Elysian flow'rs her amber stream:
With these, that never fade, the spirits elect
Bind their resplendent locks, inwreath'd with beams. *Milton.*

AMARANTH, GLOBE, *f.* in botany. See GOMPHRENA.
AMARANTH, SPICA, *f.* in botany. See PHRYMA.
AMARANTHINE, *adj.* [*amaranthinus*, Lat.] Relating to amaranths; consisting of amaranths:

By the streams that ever flow,
By the fragrant winds that blow
O'er the Elysian flow'rs;
By those happy souls that dwell
In yellow meads of asphodel,
Or *aramanthine* bow'rs.

Pope.

AMARANTH, AFFINIS, *f.* in botany. See GOMPHRENA and ILLECEBRUM.

AMARANTHOIDES, *f.* in botany. See CELOSIA, GOMPHRENA, and ILLECEBRUM.

AMARANTHUS, *f.* in botany. See ACHYRANTHES, AMARANTH, CELOSIA, ILLECEBRUM, IRESINE, and RIVINA.

AMARANTHUS LUTEUS, *f.* in botany. See GNAPHALIUM.

AMARELLA, *f.* in botany. See GENTIANA.

AMARITUDE, *f.* [*amaritudo*, Lat.] Bitterness.—What *amaritudo* or acrimony is comprehended in choler, it acquires from a commixture of inclancholy, or external malign bodies. *Harvey.*

AMARULENCE, *f.* [*amaritudo*, Lat.] Bitterness.

AMARYLLIS, *f.* [the name of a shepherdess.] In botany, a genus of the hexandria monogynia class, ranking in the natural order of lilia or liliaceæ. The generic characters are—Calyx: spathe oblong, obtuse, compressed, emarginate, gaping on the flat side and withering. Corolla: petals six, lanceolate; nectary six very short scales without the base of the filaments. Stamina: filaments six, awl-shaped; with oblong, incumbent, rising, antheræ. Pistillum: germ roundish, furrowed, inferior; style filiform, almost of the length and in the situation of the filaments; stigma trifid, slender. Pericarpium: a subovate, three-celled, three-valved capsule. Seeds, several.—*Essential Character.* Corolla, hexapetaloid, irregular; filaments inserted into the throat of the tube, bending down, unequal in proportion or direction.

Species. 1. *Amaryllis lutea*, or yellow amaryllis, or autumnal narcissus: spathe undivided, obtuse; flower sessile; corolla bell-shaped, erect, shortly tubular at the base; stamens erect, alternately shorter. The flowers of yellow amaryllis seldom rise above three or four inches high; they are shaped something like those of the large yellow crocus; the green leaves come up at the same time, like the saffron, and, after the flowers are past, the leaves increase all the winter. The roots are shaped like those of the narcissus. Is a native of the south of France, Spain, Italy, and Thrace, and flowers in September.

2. *Amaryllis pumilio*, or dwarf amaryllis: spathe two-leaved, one-flowered; corolla funnel-shaped, equal, segments revolute; stamens bent in, alternately shorter. It is a native of the Cape of Good Hope, where it was found by Mr. Francis Maïson. It flowers in November.

3. *Amaryllis atamasco*, or atamasco lily: spathe bifid, acute; flower pedicelled, corolla bell-shaped, nearly equal, erect, shortly tubular at the base; stamens bent down, equal. The flowers of the atamasco lily, at their first appearance, are of a fine carnation colour on the outside, but fade till they are almost white. They are nearly as large as those of the small orange lily, but do not grow above six or eight inches high; they appear the end of May, or beginning of June, and sometimes in August. It is a native

of Virginia and Carolina, where it grows plentifully in the fields and woods, and makes a beautiful appearance when in flower.

4. *Amaryllis formosissima*, or *Jacobæa lily*: spathe undivided; flower pedicelled; corolla two-lipped, nodding, deeply six-parted; stamens and pistil bent down. The flower-stems of the *Jacobæa lily* are produced from the sides of the bulbs, so that, after the flower produced on one side is decayed, another stalk arises from the other side of the bulb; but there is usually no more than one flower produced on the same stalk. The flowers are large, and of a very deep red; the under petals are very large, and the whole flower stands nodding on one side of the stalk, making a most beautiful appearance. Sometimes, but rarely, two flowers proceed from the same spathe. It is a native of South America, and was first known in Europe in 1593.

5. *Amaryllis reginæ*, or Mexican lily: spathe with about two flowers; pedicels divaricating; corollas bell-shaped, shortly tubular, nodding; throat of the tube hirsute; leaves lanceolate patulous. It flowered in Mr. Fairchild's garden, at Hoxton, in 1728, when the late Dr. James Douglass caused a figure of it to be drawn, and wrote a folio pamphlet on it. He gave it the title of *lilium reginæ*, because it was in full beauty on the first of March, which was the late queen's birth-day. It flowers constantly in the spring, when it is placed in a very warm stove. It is in beauty in February, and those which are in a moderate temperature of air will flower in March or April.

6. *Amaryllis purpurea*, or purple-flowered *amaryllis*: spathe with about two flowers, corollas somewhat erect, tubular at the base, throat of the tube smooth; leaves linear-lanceolate. This species is very nearly allied to the foregoing; inasmuch, that Monf. L'Héritier doubts whether it be a distinct species. It is a native of the Cape of Good Hope, where it was found by Thunberg and Maffon.

7. *Amaryllis equestris*, or Barbadoes lily: spathe with about two flowers, pedicels erect shorter than the spathe, tube filiform horizontal, border spreading open obliquely and curved upwards, throat hairy. This species is a native of the West Indies.

8. *Amaryllis reticulata*, or flat-stalked *amaryllis*: spathe with about two flowers, corollas tubular at the base and nodding, throat of the tube smooth, scape compressed, leaves oblong attenuated at the base. This is distinguished by the petals being transversely veined, and by the smoothness of the throat. It flowers in April, and is a native of Brazil.

9. *Amaryllis belladonna*, or belladonna lily: corollas somewhat erect, six-petalled, petals flat; scape compressed; leaves sharply channelled, bluntly keeled, very smooth. This differs from the fifth species, in having the edges of the petals waved, and not reversed at the tip. It was first brought into England about the year 1712, from Portugal, where the gardens formerly abounded with these flowers; but the *Jacobæa lily* has since supplanted this in most of their gardens, and the bulbs imported thence for this of late years have generally proved to be the *Jacobæa lily*. The gardens in Italy have great quantities of these flowers, especially about Florence, where they are commonly sold in the markets, under the name of *Narcissus Belladonna*. This sort usually flowers about the end of September, or the beginning of October, in England; and, if the roots are strong, the stem will rise upwards of two feet high. If the season is favourable, or the flowers are screened from frosts, violent winds, and heavy rains, they will continue in beauty a month or longer; and are very ornamental plants to a garden, at a season when there is a great scarcity of flowers. Native of the West Indies, on shady hills, by the side of streams.

10. *Amaryllis vittata*, or superb or ribband *amaryllis*: flowers pedicelled, corollas wedge-funnel-shaped, the rachis of the outer fastened to the edge of the inner petals, scape round, stigmas grooved. This species, when it

blossoms in perfection, deserves the name of superb, which the late Mr. Aiton has given it; the stem rising to the height of three feet or more, and producing from two to five beautiful flowers. It usually blossoms in April or May, but may be forwarded by artificial heat. Of what country it is a native is not known with certainty, but most probably of the Cape.

11. *Amaryllis falcata*, or sickle-leaved *amaryllis*, or *crinum*: corollas peduncled, erect, six-petalled; scape compressed, length of the unbel; leaves flat, pressed to the ground, about the edge sickle-shaped, white-cartilaginous crenate. Professor N. J. Jacquin received the bulb of this species from the Cape in 1770. Introduced here in 1774, by Mr. Francis Maffon.

12. *Amaryllis ornata*, or Cape Coast lily or *amaryllis*: flowers sessile, corollas tubular at the base, tube longer than the spathe and border, curved, segments of the border oblong, awned, lowest segment divaricate, concave. This is a native of Guinea, and flowers with us in June and July.

13. *Amaryllis longifolio*, or long-leaved *amaryllis*: flowers pedicelled, from twelve to twenty flowers in a spathe, corollas tubular at the base, tube curved short, segments of the border lanceolate obtuse, leaves broad-subulate channelled flaccid at the tip. It is a native of the Cape of Good Hope; flowers in July.

14. *Amaryllis revoluta*, or revolute *amaryllis*: flowers pedicelled, corollas tubular at the base, tube filiform short curved, leaves linear narrow channelled long flaccid from their origin. This is a native of the Cape of Good Hope, and flowers in September.

15. *Amaryllis aurea*, or golden *amaryllis*: flowers pedicelled somewhat erect, corollas funnel-form club-shaped, almost six-petalled, segments linear-lanceolate, stamens and style straight; leaves linear, erect, channelled, with a reflex smooth margin. This species is a native of China, and flowers in August and September.

16. *Amaryllis orientalis*, or broad-leaved African *amaryllis*: spathe many-flowered, flowers pedicelled, six-parted, considerably shorter than the peduncles, irregular; germs wedge-shaped, angular. It grows naturally at the Cape of Good Hope; from whence Mr. Miller says that he received the roots, which succeeded at Chelsea.

17. *Amaryllis farniensis*, or Guernsey lily: petals linear, flat, stamens and pistil straightish longer than the corolla, stigmas parted, revolute. The flowers begin to come out at the end of August, and the head is usually three weeks in expanding gradually. This beautiful plant is a native of Japan, and has been long naturalized in Guernsey. According to Cornutus, it was brought from Japan to Paris, and cultivated in Morin's garden before 1634. It was in the royal garden before 1666. In England, it was cultivated by general Lambert, at Wimbledon, in 1659, but it seems then to have been little known. In 1664 it was grown more common. It does not appear to have been in Holland before the year 1695. The plants are reputed to owe their origin in Guernsey to the shipwreck of a vessel in its return from Japan, probably before the middle of the last century.

18. *Amaryllis undulata*, or waved-flower African *amaryllis*: petals linear channelled waved, stamens and pistil bent down, shorter than the corolla, stigmas obsolete. The flowers are void of scent, and expand from November till the beginning of January. Native of the Cape of Good Hope; flowers here from April to June.

19. *Amaryllis radiata*, or snow-drop-leaved *amaryllis*: petals lanceolate waved, stamens and pistil bent down, diverging, twice as long as the corolla, stigma obsolete. It is not known where it grows naturally. It flowers in June.

20. *Amaryllis montana*: spathe many-flowered, leaves linear-subulate, petals alternate mucronate, stamens and style erect. Native of the higher parts of mount Lebanon.

21. *Amaryllis tubispatha*: spathe one-leaved tubular bifid one-flowered, peduncle twice as long as the spathe. Found at Buenos Ayres, by Commerçon.

22. *Amaryllis*

22. *Amaryllis tubiflora*: spathe one-flowered two-leaved, corolla funnel-shaped, with a very long tube. This species is found in Peru.

23. *Amaryllis spiralis*: spathe two-leaved, few-flowered, peduncles filiform, very long, leaves subulate. Discovered by Bruguere, in sandy grounds near the Cape of Good Hope.

24. *Amaryllis maculata*: spathe one-flowered, two-leaved linear, flower peduncled, stamens and style bent down. Found in Chili, by Dombey.

25. *Amaryllis chilensis*: spathe one or two-flowered, one or two leaved, lanceolate, flowers peduncled, leaves linear. This has flowers of a purple colour. Found also in Chili, by Dombey.

26. *Amaryllis clavata*: spathe one-flowered, two-leaved, subulate, corolla club-shaped. This species is a native of the southern part of Africa.

27. *Amaryllis zeylanica*, or Ceylon lily: spathe many-flowered, corollas reclining, tube filiform, very long, segments uncinat. 28. *Amaryllis latifolia*: spathe many-flowered, flowers pedicelled, somewhat reclining, tubular at the base; leaves oblong-lanceolate. Natives of the East Indies.

29. *Amaryllis cinnamomea*: spathe many-flowered, corollas subhexapetalous lanceolate waved, stamens and pistil erect, shorter than the corolla. Found at the Cape of Good Hope, by Bruguere.

Propagation and Culture. These plants are of the liliaceous or bulbous tribe; most of them have flowers of singular beauty, highly deserving the care and attention of the curious botanist and florist. The yellow autumnal amaryllis is very hardy, and increases fast by offsets. The season for transplanting these roots is any time from May to the end of July, when their leaves are decayed, after which it will be too late to remove them; for they will begin to push out new fibres by the middle of August, or sooner if the season be moist, and many times they flower the beginning of September; so that, if they are transplanted, it will spoil their flowering. This plant will grow in any soil or situation; but it will thrive best in a fresh, light, dry, soil, and in an open situation; not under the dripping of trees, nor too near walls. It is commonly called by the gardeners, the yellow autumnal narcissus, &c. and is usually sold by them, with colchicums, for autumnal ornaments to gardens; for which purpose this is a pretty plant, as it will frequently keep flowering from the beginning of September to the middle of November, provided the frost is not so severe as to destroy the flowers; for, although there is but one flower in each cover, yet there is a succession of flowers from the same root, especially when they are suffered to remain three or four years unremoved. The *Jacobæa* lily is now become pretty common in the curious gardens in England, the roots sending forth plenty of offsets, especially when they are kept in a moderate warmth in winter: for the roots of this kind will live in a good green-house, or may be preserved through the winter under a common hot-bed frame; but then they will not flower so often, nor send out so many offsets, as when they are placed in a moderate stove in winter. This will produce its flowers two or three times in a year, and is not regular to any season; but from March to the beginning of September the flowers will be produced when the roots are in vigour. It is propagated by offsets, which may be taken off every year; the best time to shift and part these roots is in August, that they may take good root before winter; in doing this, there should be care taken not to break off the fibres from their roots. They should be planted in pots of a middling size; and, if they are kept in a moderate degree of warmth, they will produce their flowers in plenty, and the roots will make great increase.

The Mexican lily, being not so hardy as the foregoing or the *Belladonna* lily, must be placed in a warm stove; and, if the pots are plunged into a hot-bed of tanner's bark, the roots will thrive better, and the flowers will be

strong. It is increased by offsets, as the others, and flowers usually the beginning of spring, when it makes a fine appearance in the stove.

The method in which Mr. Miller cultivated the *Belladonna* lily with great success, we shall give in his own words: "I prepared a border close to a wall which had a fourth-west aspect, of about six feet wide, in the following manner, viz. I removed all the earth to the depth of three feet, then I put some very rotten dung in the bottom, six inches thick, upon which I laid light garden mould about twenty inches deep; after making this level, I placed the roots at six inches distance every way, and then covered them over with light sandy earth, to the height of the border, whereby the upper part of the roots were five or six inches buried; and in the winter I covered the border all over with rotten tanner's bark, three inches deep, to prevent the frost from penetrating the ground; and, when the frost was very severe, I laid some mats or straw over the leaves to protect them from being killed. With this management the roots have greatly increased, and have constantly flowered every year; some of them have put out two or three stems, which grew near three feet high, and produced many flowers in each umbel, which have made a fine appearance during the month of October. The green leaves come up soon after, and abide all the winter and spring until June, at which time they decay; soon after which the roots should be transplanted, for, if they are let stand till July, they will have sent forth new fibres, when it will greatly injure the roots, if they are disturbed. If some of these roots are planted in a warm border, close to a fourth wall, and on a dry soil, they will thrive very well, especially if they are covered in severe frost; and these roots will flower much stronger than those which are kept in pots, and will multiply faster."

The *Guernsey* lily is supposed to come originally from Japan, but has been many years cultivated in the gardens of *Guernsey* and *Jersey*; in both which places it seems to thrive as well as if it was their native country; and from those islands their roots are sent annually to the curious in most parts of Europe. The bulbs are generally brought over in June and July; but, the sooner they are taken out of the ground after their leaves decay, the better they are: for, although the roots which are taken up when their flower-stems begin to appear will flower, yet their flowers will not be so large, nor will their roots be near so good after, as those which were removed before they had sent out fresh fibres. When these roots come over, they should be planted in pots filled with fresh, light, sandy, earth, mixed with a little very rotten dung, and placed in a warm situation, observing now and then to refresh the earth with water: but by no means let them have too much wet, which would rot their roots, especially before they come up. About the middle of September, such of the roots as are strong enough to flower will begin to shew the bud of their flower-stem, which is commonly of a red colour; therefore you should remove these pots into a situation where they may have the full benefit of the sun, and may be sheltered from strong winds: but by no means place them too near a wall, nor under glasses, which would draw them up weak, and render them less beautiful. At this season they should be gently refreshed with water, if the weather be warm and dry; but, if it should prove very wet, they should be screened from it. When the flowers begin to open, the pots should be removed under shelter, to prevent the flowers from being injured by too much wet; but they must not be kept too close, nor placed in a situation too warm, which would occasion their colour to be less lively, and hasten their decay. The flowers of this plant will continue in beauty, if rightly managed, a full month; and, though they have no scent, yet, for the richness of their colour, they are justly esteemed in the first rank of the flowery tribe. After the flowers are decayed, the leaves will begin to shoot forth in length, and, if sheltered from severe cold, will continue growing all the winter; but they must have

have as much free air as possible in mild weather, and be covered only in great rains or frosts; for which purpose, a common hot-bed frame is the properest shelter for them; because the glasses may be taken off constantly every day in dry open weather, which will encourage the leaves to grow strong and broad; whereas when they are placed in a green-house, or not exposed to the open air, they will grow long and slender, and have a pale weak aspect, whereby the roots will become weak, so that it seldom happens that they produce flowers under such management.

These roots should be transplanted every fourth or fifth year towards the latter end of June, or beginning of July, and planted into fresh earth, but they should not be oftener removed, for that would retard their flowering. The offsets should also be taken off, and planted into several pots, which, in three years time, will produce flowers; so that, after a person is once stocked with these roots, he may increase them, so as to have a supply of blowing roots, without being at the trouble or expence of sending to Guernsey every year for fresh roots; and the roots preserved here will flower stronger than those which are usually brought from thence, for the inhabitants of those islands are not very curious in cultivating them. Their usual method is to plant them at a great distance in a bed of common earth, where they let them remain for many years; in which time they produce such a number of offsets, that many times one single cluster has contained above a hundred roots; by which means, those which grow on the inside are so much compressed by the outer roots, that they are perfectly flatted; and from the number of roots growing in each cluster, they are all rendered weak, and unfit to produce such large stems of flowers, as those which have grown single, and are of a spherical figure. But, when a person is possessed of a large number of these roots, it will be troublesome to preserve them in pots, therefore there should be a bed prepared of the following earth, in some well-sheltered part of the garden, viz. Take a third part of fresh virgin earth from a pasture ground, which is light, then put near an equal part of sea-sand, to which you should add rotten dung, and sifted lime-rubbish, of each an equal quantity. With this earth, when well mixed and incorporated, you should make your bed about two feet thick, raising it about four or five inches above the surface of the ground, if the situation be dry; but, if the ground be wet, it should be raised eight or nine inches higher. In this bed, about the beginning of July, as was before directed, you should plant the roots about six or eight inches asunder each way; and in the winter, when the frost begins, you should either cover the bed with a frame, or arch it over, and cover it with mats and straw, to prevent their leaves from being pinched with cold; but in the spring the covering may be entirely removed, and the bed kept constantly clear from weeds during the summer, observing to stir the surface of the earth now and then; and every year, when the leaves are decayed, you should sift a little fresh earth over the beds, to encourage the roots. In this bed the roots may remain until they are strong enough to produce flowers, when they may be taken up and planted in pots, as was before directed, or suffered to remain in the same bed to flower. The roots of these plants do not flower again the succeeding year, as in many other sorts of bulbs; but if their bulbs contain two buds in their center, as is often the case, they very often flower twice within the compass of three years; after which, the same individual root does not flower again in several years, but only the offsets from it.

The Ceylon lily is tender, and must be treated in the same manner as the Mexican lily; this is more common in the gardens in Holland than in this country; and, as it is a plant which increases but slowly, will not be very common here. It flowers usually in June and July, and sometimes the same root will flower again in autumn; for, if the pots are plunged into a bed of tanner's bark, the roots generally flower twice every year, but the flowers are not of long duration.

The best time to transplant the roots of all the species is about the beginning of August, when their leaves are quite decayed, before they put out new fibres, for it will be very improper to remove them afterwards. All these bulbous-rooted flowers delight in a loose sandy earth, mixed with good kitchen-garden mould; and in the culture of them there should be but little water given them at those times when their leaves decay, and the roots are not in a growing state, for much moisture at that time will often cause them to rot; but when they are growing, and putting out their flower-stems, they should be frequently refreshed with water, but not given in too great quantities at a time. The pots, with the tender sorts, should constantly be kept in the stove, and in summer they should have as much free air as possible; for, although some of these sorts may be kept abroad in summer, yet those do not thrive so well, nor flower so constantly, as those which are treated in the manner here described.

AMARYLLIS CAPENSIS, *f.* in botany. See HYPOXIS STELLATA.

AMARYLLIS CILIARIS, *f.* in botany. See HÆMANTHUS CILIARIS.

AMARYLLIS DISTICHA, *f.* in botany. See HÆMANTHUS TOXICARIUS.

AMARYLLIS UMBRELLA, *f.* in botany. See CYRTANTHUS OBLIQUUS.

AMARYNTHIA, a surname of Diana, taken from a village of Eubœa, where she was worshipped.

AMARYNTHUS, anciently a hamlet of Eretrias, in the island of Eubœa, about seven stadia distant from its walls. Here Diana was worshipped by an annual solemnity, at which those of Carytus assisted; hence the title of the goddess was *Amarynthia* and *Amarysia*.

AMA'SA, [אמאסא Heb. i. e. sparing the people.] The son of Abigail.

AMA'SIA, now Marburg, a city in the landgraviate of Hesse on the Lahn. According to others, it is Embden in Westphalia.

AMASIA, an ancient town of Turkey, in Natolia, remarkable for the birth of Strabo the geographer. It is the residence of a bashaw, and gives its name to the province it stands in, where there are the best wines and the best fruits in Natolia. It is seated near the river Iris or Casal-mack; and was anciently the residence of the kings of Cappadocia. Lat. 39. 33. N. lon. 36. 10. E.

AMASIA, the name of the northern division of Lesser Asia, lying on the south shore of the Euxine Sea in Natolia. It takes its name from Amasia the capital, mentioned in the preceding article.

To AMA'SS, *v. a.* [*amasser*, Fr.] To collect together in one heap or mass.—When we would think of infinite space, or duration, we, at first step, usually make some very large idea, as perhaps of millions of ages, or miles, which possibly we double and multiply several times. All that we thus *amass* together in our thoughts, is positive, and the assemblage of a great number of positive ideas of space or duration. *Locke*.—In a figurative sense, to add one thing to another, generally with some share of reproach, either of eagerness or indiscrimination.—Do not content yourselves with mere words, lest your improvements only *amass* a heap of unintelligible phrases. *Watts*.

AMASS, *f.* [*amas*, Fr.] An assemblage; an accumulation.—This pillar is but a medley or *amass* of all the precedent ornaments, making a new kind by stealth. *Wotton*.

AMASSMENT, *f.* [from *amass*.] A heap; an accumulation; a collection.—What is now, is but an *amassment* of imaginary conceptions, prejudices, ungrounded opinions, and infinite impostures. *Glanville*.

AMASO'NIA, *f.* [from *Amason*, a traveller into America]. In botany, a genus of the didynamia angiospermia class. The generic characters are—Calyx: perianthium one-leaved, bell-shaped, semiquinquefid, acute, equal, permanent. Corolla: one-petalled, tubulous, longer than the calyx: border quinquefid, subequal, spreading, small. Stamina: filaments four, at the upper side of the corolla

and

and longer than it; bending in at the end; two of them shorter; antheræ oval, incumbent. Pistillum: germ ovate; style in the situation and form of the stamens; stigmas two, sharp. Seeds: an ovate, one-celled nut, of the same length with the calyx.—*Essential Character.* Corolla: tubulous; limb small, quinquefid; nut ovate, one-celled.

This is a native of Surinam. The stem is three feet in height. The flowers in a simple terminal raceme, a foot long, with about three flowers on a pedicle. Bractes ovate, sessile, a little longer than the flowers, which are yellow, nodding, and grow all on one side of the stalk.

AMAS'TRIS, or AMASTRO, a seaport of Aratolia, but its two harbours have been long ago choaked up with sand, and there now remains little of its ancient splendour, except some ruins.

AMATA, the wife of King Latinus. She had betrothed her daughter Lavinia to Turnus, before the arrival of Æneas in Italy. She zealously favoured the interest of Turnus, and, when her daughter was given to Æneas, she hung herself.

To AMA'TE, *v. a.* [from *a* and *mate*.] To accompany; to entertain as a companion. It is now obsolete:

A lovely bevy of fair ladies fate,
Courtied of many a jolly paramour,
The which did them in modest wife amate,
And each one fought his lady to aggrate. *Fairy Queen.*

To terrify; to strike with horror. In this sense, it is derived from the old French word *matter*, to crush or subdue.

AMATHIA, one of the fifty Nereids, according to Homer.

AMATHUS, a very ancient town in the south of Cyprus: so called from Amathus the founder; or, according to others, from Amath, a Phœnician town sacred to Venus, with a very ancient temple of Adonis and Venus: and hence Venus is denominated *Amathusia*. According to Ovid, it was a place rich in copper-ore, and where the inhabitants became *Cerastra*, or horned. Now called *Limisso*.

AMATHUS, anciently a town of the tribe of Gad, beyond Jordan; but whether at a greater or less distance from it, is not so easy to determine. Eusebius places it in the Lower Peræa; Reland, in Ramoth-Gilead. Gabinius, proconsul of Syria, established five juridical conventions in Judea; two of which were on the other side Jordan; one at Gadara, the other at Amathus.

AMATHUSIA, a surname of Venus, taken from a city in the island of Cyprus, particularly dedicated to her.

AMATORCULIST, *f.* [*amatorculus*, Lat.] A little insignificant lover; a pretender to affection.

AMATORII MUSCULI, in anatomy, a term sometimes used for the obliquus superior and obliquus inferior muscles of the eye, as these muscles assist in ogling or drawing the eye sideways.

A'MATORY, *adj.* [*amatorius*, Lat.] Relating to love; causing love.—It is the same thing whether one ravish Lucretia by force, as Tarquin, or by *amatory* potions not only allure, but necessitate, her to satisfy his lust, and incline her effectually, and draw her inevitably, to follow him spontaneously. *Bramham.*

AMATRICE, a city of the kingdom of Naples, in the farther Abruzzo, upon the confines of the pope's territories, and the marquise of Ancona.

AMAURO'SIS, *f.* [*αμαυρωσις*, *q. d.* darkness, Gr.] a deprivation of sight, the eye remaining fair and seemingly unaffected. See MEDICINE.

To AMAZE, *v. a.* [from *a* and *maze*, perplexity.] To confuse with terror. To put into confusion with wonder. To put into perplexity.

Go, heav'nly pair, and with your dazzling virtues,
Your courage, truth, your innocence and love,
Amaze and charm mankind. *Smith.*

AMAZE, *f.* [from the verb *amaze*.] Astonishment; confusion, either of fear or wonder.

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AMAZEDLY, *adv.* [from *amazed*.] Confusedly; with amazement; with confusion:

—Stands Macbeth thus *amazedly*?
Come, sisters, cheer we up his spirits. *Shakespeare.*

AMAZEDNESS, *f.* [from *amazed*.] The state of being amazed; astonishment; wonder; confusion.—I was by at the opening of the farthel, heard the old shepherd deliver the manner, how he found it; whereupon, after a little *amazement*, we were all commanded out of the chamber. *Shakespeare.*

AMAZEMENT, *f.* [from *amaze*.] Such a confused apprehension as does not leave reason its full force; extreme fear; horror:

But look! *amazement* on thy mother sits;
O step between her and her fighting soul:
Conceit in weakest bodies strongest works. *Shakespeare.*

Extreme dejection. Height of admiration. Astonishment; wonder at an unexpected event.—They knew that it was he which sat for alms at the beautiful gate of the temple, and they were filled with wonder and *amazement* at that which had happened unto him. *Acts.*

AMAZING, *part. adj.* [from *amaze*.] Wonderful; astonishing.—It is an *amazing* thing to see the present desolation of Italy, when one considers what incredible multitudes it abounded with during the reigns of the Roman emperors. *Addison.*

AMAZINGLY, *adv.* [from *amazing*.] To a degree that may excite astonishment; wonderfully.—If we arise to the world of spirits, our knowledge of them must be *amazingly* imperfect, when there is not the least grain of sand but has too many difficulties belonging to it for the wisest philosopher to answer. *Watts.*

AMAZON, or ORELLANA, a river of South America, which has its source among the Andes, in Peru, not far from the South Sea, from whence running eastward, it pours into the ocean directly under the equinoctial line. This largest of all rivers is, at its mouth, 150 miles broad, and 1500 miles from its mouth, thirty or forty fathoms deep. It runs at least 3000 miles, forms during its course many islands in itself, receives near two hundred other rivers, many of which have a course of 500 or 600 leagues, some of them not inferior to the Danube, or the Nile; and, in pouring itself into the ocean, repels the briny waters of the sea, to the distance of many leagues from the land.

AMAZONIA, is that part of South America which the aboriginal Indians still possess. It is situated between the equator and twenty degrees of south latitude; its length is 1400 miles, and its breadth 900. It is bounded on the north by Terra Firma, and Guiana; on the east by Brasil; on the south by Paraguay; and on the west by Peru. The air is cooler in this country than could be expected, considering it is situated in the torrid zone. This is partly owing to the heavy rains which occasion the rivers to overflow their banks one half of the year, and partly to the cloudy atmosphere, which obscures the sun great part of the time he is above the horizon. During the rainy season this country is subject to dreadful storms of thunder and lightning. The soil is extremely fertile, producing cocoa-nuts, pine-apples, bananas, plantains, and a great variety of tropical fruits; cedar, red-wood, pak, ebony, log-wood, and many other sorts of dying wood; also tobacco, sugar-canes, cotton, potatoes, balsam, honey, &c. The woods abound with tigers, wild boars, buffaloes, deer, and game of various kinds. The rivers and lakes abound with fish. Here are also sea-cows and turtles; but the crocodiles and water-serpents render fishing a dangerous employment.

The natives of this country, like all the other Americans, are of a good stature, have handsome features, long black hair, and copper complexions. They are said to have a taste for the imitative arts, especially painting and sculpture, and make good mechanics. Their cordage is

made of the bark of trees, and their sails of cotton; their hatchets of tortoise-shells or hard stones; their chisels, planes, and wimbles, of the horns and teeth of wild beasts; and their canoes are trees hollowed. They spin and weave cotton cloth, build their houses with wood and clay, and thatch them with reeds. Their arms in general are darts and javelins, bows and arrows, with targets of cane or fish-skins. The several nations are governed by their respective chiefs or caziques. The regalia, which distinguish these chiefs, are a crown of parrot's feathers, a chain of tiger's teeth or claws, which hangs round the waist, and a wooden sword. This part of South America has hitherto remained unsubdued; the original inhabitants, therefore, enjoy there native freedom and independence.

AMAZONIUS, a name of Apollo, given him by the Laedæmonians on account of the assistance he gave them against the Amazons.

AMAZIAH, [Army of my strength, and of the Lord, Heb. i. e. the strength of the Lord.] A king of Judah.

AMAZONS, [of α priv. and $\mu\alpha\varsigma\tau\epsilon\rho\alpha$, a pap.] In antiquity, a nation of female warriors, who founded an empire in Asia Minor, upon the river Thermoodon, along the coasts of the Black Sea. They are said to have formed a state out of which men were excluded. What commerce they had with that sex was only with strangers; they killed all their male children; and they cut off the right breasts of their females, to make them more fit for the combat. From which last circumstance it is that they are supposed to take their name, viz. from the privative α , and $\mu\alpha\varsigma\tau\epsilon\rho\alpha$, *mamma*, "breast." But Dr. Bryant, in his *Analysis of Ancient Mythology*, explodes this account as fabulous; and observes, that in general they were Cuthite colonies from Egypt and Syria, who formed settlements in different countries, and that they derived their name from *zon*, "the sun," which was the national object of worship. Vol. iii. p. 463. It has indeed been controverted even among ancient writers, whether ever there really were such a nation as that of the Amazons. Strabo, Pausanias, Diodorus Siculus, Trogus Pompeus, Justin, Pliny, Mela, Plutarch, &c. expressly assert it.

M. Petit, a French physician, published a Latin dissertation in 1685, to prove that there really was a nation of Amazons. It contains abundance of curious inquiries relating to their habit, their arms, the cities built by them, &c. Others of the moderns also maintain, that their existence is sufficiently proved by the testimony of such of the historians of antiquity as are most worthy of credit; by the monuments which many of them have mentioned; and by medals, some of which are still remaining; and that there is not the least room to believe that what is said of them is fabulous.

The Amazons are mentioned by the most ancient of the Greek writers. In the third book of the *Iliad*, Homer represents Priam speaking of himself as having been present, in the earlier part of his life, in a battle with the Amazons: and some of them afterwards came to the assistance of that prince during the siege of Troy. Herodotus informs us, that the Grecians fought a battle with the Amazons on the river Thermoodon, and defeated them. After their victory, they carried off all the Amazons they could take alive in three ships. But, whilst they were out at sea, these Amazons conspired against the men, and killed them all. Having, however, no knowledge of navigation, nor any skill in the use of the rudder, sails, or oars, they were driven by wind and tide, till they arrived at the precipices of the lake Mæotis, in the territories of the Scythians. Here the Amazons went ashore, and, marching into the country, seized and mounted the first horses they met with, and began to plunder the inhabitants. The Scythians at first conceived them to be men; but after they had had skirmishes with them, and taken some prisoners, they discovered them to be women. They were then unwilling to carry on hostilities against them; and by degrees a number of the young Scythians formed

connections with them, and were desirous that these gentle dames should live with them as wives, and be incorporated with the rest of the Scythians. The Amazons agreed to continue their connection with their Scythian husbands, but refused to associate with the rest of the inhabitants of the country, and especially with the women of it. They afterwards prevailed upon their husbands to retire to Sarmatia, where they settled. "Hence," says Herodotus, "the wives of the Sarmatians still continue their ancient way of living. They hunt on horseback in the company of their husbands, and sometimes alone. They march with their armies, and wear the same dress with the men. The Sarmatians use the Scythian language, but corrupted from the beginning, because the Amazons never learned to speak correctly. Their marriages are attended with this circumstance: no virgin is permitted to marry till she has killed an enemy in the field; so that some always grow old before they can qualify themselves as the law requires."

Diodorus Siculus says, "There was formerly a nation who dwelt near the river Thermoodon, which was subjected to the government of women, and in which the women, like men, managed all the military affairs. Among these female warriors was one, who excelled the rest in strength and valour. She assembled together an army of women, whom she trained up in military discipline, and subdued some of the neighbouring nations. Afterwards, having by her valour increased her fame, she led her army against the rest; and, being successful, she was so puffed up, that she styled herself the daughter of Mars, and ordered the men to spin wool, and do the work of the women within doors. She also made laws, by which the women were enjoined to go to the wars, and the men to be kept at home in a servile state, and employed in the meanest offices. They also debilitated the arms and thighs of those male children who were born to them, that they might be thereby rendered unfit for war. They seared the right breasts of their girls, that they might be no hindrance to them in fighting: from whence they derived the name of Amazons. Their queen, having become extremely eminent for skill and knowledge in military affairs, at length built a large city at the mouth of the river Thermoodon, and adorned it with a magnificent palace. In her enterprizes she exactly adhered to military discipline and good order; and she added to her empire all the adjoining nations, even to the river Tanais. Having performed these exploits, she at last ended her days like a hero, falling in a battle in which she had fought courageously. She was succeeded in the kingdom by her daughter, who imitated the valour of her mother, and in some exploits excelled her. She caused the girls from their very infancy to be exercised in hunting, and to be daily trained up in military exercises. She instituted solemn festivals and sacrifices to Mars and Diana, which were named Tauropoli. She afterwards carried her arms beyond the river Tanais, and subdued all the people of those regions, even unto Thrace. Returning then with a great quantity of spoils into her own kingdom, she caused magnificent temples to be erected to the deities before-mentioned; and she gained the love of her subjects by her mild and gentle government. She afterwards undertook an expedition against those who were on the other side of the river, and subjected to her dominion a great part of Asia, extending her arms as far as Syria."

Diodorus also mentions another race of Amazons who dwelt in Africa; and whom he speaks of as being of greater antiquity than those who lived near the river Thermoodon, and is unquestionably the race of people spoken of by Pigafetta, as bordering on Sofala and Monomotapa. "In the western parts of Libya (says he), upon the borders of those tracts that are habitable, there was anciently a nation under the government of women, and whose manners and mode of living were altogether different from ours. It was the custom of these women to manage all military affairs; and, for a certain time, during which they

they preserved their virginity, they went out as soldiers into the field. After some years employed in this manner, when the time appointed for this purpose was expired, they associated themselves with men, in order to obtain children. But the magistracy, and all public offices, they kept entirely in their own hands. The men, as the women are with us, were employed in household affairs, submitting themselves wholly to the authority of their wives. They were not permitted to take any part in military affairs, or to have any command or any public authority, which might have any tendency to encourage them to cast off the yoke of their wives. As soon as any child was born, it was delivered to the father, to be fed with milk, or such other food as was suitable to its age. If females were born, they seared their right breast, that it might not be burdensome to them when they grew up, for they considered it as a great hindrance in fighting."

Justinian represents the Amazonian republic to have taken its rise in Scythia. The Scythians had a great part of Asia under their dominion upwards of 400 years, till they were conquered by Ninus, the founder of the Assyrian empire. After his death, which happened about 1150 years before the Christian æra, and that of Semiramis and their son Ninias, Ilinus and Scolopites, princes of the royal blood of Scythia, were driven from their country by other princes, who like them aspired to the crown. They departed with their wives, children, and friends; and, being followed by a great number of young people of both sexes, they passed into Asiatic Sarmatia, beyond mount Caucasus, where they formed an establishment, supplying themselves with the riches they wanted by making excursions into the countries bordering on the Euxine Sea. The people of those countries, exasperated by the incursions of their new neighbours, united, surprised and massacred the men.

The women then resolving to revenge their death, and at the same time to provide for their own security, determined to form a new kind of government, to choose a queen, enact laws, and maintain themselves, without men, even against the men themselves. This design was not so very surprising as at first sight appears: for the greatest number of the girls among the Scythians had been inured to the same exercises as the boys; to draw the bow, to throw the javelin, to manage other arms; to riding, hunting, and even the painful labours that seem reserved for men; and many of them, as among the Sarmatians, accompanied the men in war. Hence they had no sooner formed their resolution, than they prepared to execute it, and exercised themselves in all military operations. They soon secured the peaceable possession of the country; and, not content with shewing their neighbours that all their efforts to drive them thence or subdue them were ineffectual, they made war upon them, and extended their own frontiers. They had hitherto made use of the instructions and assistance of a few men that remained in the country; but finding at length that they could stand their ground, and aggrandize themselves, without them, they killed all those whom flight or chance had saved from the fury of the Sarmatians, and for ever renounced marriage, which they now considered as an unsupportable slavery. But, as they could only secure the duration of their new kingdom by propagation, they made a law to go every year to the frontiers, to invite the men to come to them; to deliver themselves up to their embraces, without choice on their part, or the least attachment; and to leave them as soon as they were pregnant. All those whom age rendered fit for propagation, and were willing to serve the state by breeding girls, did not go at the same time in search of men: for, in order to obtain a right to promote the multiplication of the species, they must first have contributed to its destruction; nor was any thought worthy of giving birth to children till she had killed three men.

If from this commerce they brought forth girls, they educated them; but with respect to the boys, if we may believe Justin, they strangled them at the moment of their

birth. According to Diodorus Siculus, they twisted their legs and arms, so as to render them unfit for military exercises; but Quintus Curtius, Philostratus, and Jardanus, say, that the less savage sent them to their fathers. It is probable, that at first, when their fury against the men was carried to the greatest height, they killed the boys; that when this fury abated, and most of the mothers were filled with the greatest horror at depriving the little creatures of the lives they had just received from them, they fulfilled the first duties of a mother; but, to prevent their causing a revolution in the state, maimed them in such a manner as to render them incapable of war, and employed them in the mean offices which these warlike women thought beneath them. In short, that, when their conquests had confirmed their power, their ferocity subsiding, they entered into political engagements with their neighbours; and, the number of the males they had preserved becoming burdensome, they, at the desire of those who rendered them pregnant, sent them the boys, and continued still to keep the girls.

As soon as the age of the girls permitted, they took away the right breast, that they might draw the bow with the greater force. The common opinion is, that they burnt that breast, by applying to it, at eight years of age, a hot brazen instrument, which insensibly dried up the fibres and glands; some think that they did not make use of so much ceremony, but that when the part was formed they got rid of it by amputation: some again, with much greater probability, assert, that they employed no violent measures; but, by a continual compression of that part from infancy, prevented its growth, at least so far as to hinder its ever being inconvenient in war.

Plutarch, in his life of Theseus, gives some account of a battle which had been fought between the Athenians and the Amazons at Athens; and he relates some particulars of this battle which had been recorded by an ancient writer named Clidenus. He says, "That the left wing of the Amazons moved towards the place which is yet called Amazonium, and the right to a place called Pryx, near Chrysa; upon which the Athenians, issuing from behind the temple of the Muses, fell upon them; and that this is true, the graves of those that were slain, to be seen in the streets that lead to the gate Piræica, by the temple of the hero Chalcoedus, are a sufficient proof. And here it was that the Athenians were routed, and shamefully turned their backs to women, as far as to the temple of the Furies. But fresh supplies coming in from Palladium, Ardetus, and Lyceum, charged their right wing, and beat them back into their very tents; in which action a great number of the Amazons were slain." In another place he says, "It appears that the passage of the Amazons through Thessaly was not without opposition; for there are yet to be seen many of their sepulchres near Scotufæa and Cynocephalæ." And in his life of Pompey, speaking of the Amazons, Plutarch says, "They inhabit those parts of mount Caucasus that look towards the Hyrcanian sea (not bordering upon the Albanians, for the territories of the Getæ and the Leges lie betwixt): and with these people do they yearly, for two months only, accompany and cohabit, bed and board, near the river Thermodoon. After that they retire to their own habitations, and live alone all the rest of the year."

Quintus Curtius says, "The nation of the Amazons is situated upon the borders of Hyrcania, near the river Thermodoon. Their queen was named Thalestris, and she had under her subjection all the country that lies between mount Caucasus and the river Phasis. This queen came out of her dominions, in consequence of an ardent desire she had conceived to see Alexander; and, being advanced near the place where he was, she previously sent messengers to acquaint him, that the queen was come to have the satisfaction of seeing and conversing with him. Having obtained permission to visit him, she advanced with 300 of her Amazons, leaving the rest of her troops behind. As soon as she came within sight of the king, she leaped.

leaped from her horse, holding two javelins in her right hand. The apparel of the Amazons does not cover all the body; for their left side is naked down to the stomach; nor do the skirts of their garments, which they tie up in a knot, reach below their knees. They preserve their left breast entire, that they may be able to suckle their female offspring; and they cut off and sear their right, that they may draw their bows, and cast their darts, with the greater ease. Thalestris looked at the king with an undaunted countenance, and narrowly examined his person; which did not, according to her ideas, come up to the fame of his high exploits: for the barbarians have a great veneration for a majestic person, esteeming those only to be capable of performing great actions on whom nature has conferred a dignified appearance. The king having asked her whether she had any thing to desire of him, she replied, without scruple or hesitation, that she was come with a view to have children by him, she being worthy to bring him heirs to his dominions. Their offspring, if of the female sex, she would retain herself; and, if of the male sex, it should be delivered to Alexander. He then asked her, whether she would accompany him in his wars? But she declined, alleging, that she had left nobody to take care of her kingdom. She continued to solicit Alexander, that he would not send her back without conforming to her wishes; but it was not till after a delay of thirteen days that he complied. She then returned to her own kingdom."

Justin also repeatedly mentions this visit of Thalestris to Alexander; and in one place he says, that she made a march of twenty-five days in order to obtain this meeting with him. The interview between Alexander and Thalestris is likewise mentioned by Diodorus Siculus. The learned Goropius, as he is quoted by Dr. Petit, laments, in very pathetic terms, the hard fate of Thalestris, who was obliged to travel so many miles, and to encounter many hardships, in order to procure this interview with the Macedonian prince; and, from the circumstances, is led to consider the whole account as incredible. But Dr. Petit, with equal erudition, with equal eloquence, and superior force of reasoning, at length determines, that her journey was not founded upon irrational principles, and that full credit is due to those grave and venerable historians by whom this transaction has been recorded.

The Amazons are represented as being armed with bows and arrows, with javelins, and also with an axe of a particular construction, which was denominated the axe of the Amazons. According to the elder Pliny, this axe was invented by Penthesilea, one of their queens. On many ancient medals are representations of the Amazons, armed with these axes. They are also said to have had bucklers in the shape of a half moon. Yet, that there should have been women, who, without the assistance of men, built cities and governed them, raised armies and commanded them, administered public affairs, and extended their dominion by arms, is undoubtedly so contrary to all that we have seen and known of human affairs, as to appear in a very great degree incredible, as is therefore by many considered as fabulous; but that women may have existed sufficiently robust, and sufficiently courageous, to have engaged in warlike enterprises, and even to have been successful in them, is certainly not impossible, however contrary to the usual course of things. In support of this side of the question, it may be urged, that women who have been early trained to warlike exercises, to hunting, and to an hard and laborious mode of living, may be rendered more strong, and capable of more vigorous exertions, than men who have led indolent, delicate, and luxurious lives, and who have seldom been exposed even to the inclemencies of the weather. The limbs of women, as well as of men, are strengthened and rendered more robust by frequent and laborious exercise. A nation of women, therefore, brought up and disciplined as the ancient Amazons are represented to have been, would be superior to an equal number of effeminate men; though

they might be much inferior to an equal number of hardy men, trained up and disciplined in the same manner.

That much of what is said of the Amazons is fabulous, there can be no reasonable doubt; but it does not therefore follow, that the whole is without foundation. The ancient medals and monuments on which they are represented are very numerous, as are also the testimonies of ancient writers. It seems not rational to suppose that all this originated in fiction, though it may be much blended with it. The abbé Guyon speaks of the history of the Amazons as having been regarded by many persons as fabulous, "rather from prejudice than from any real and solid examination;" and it must be acknowledged, that the arguments in favour of their existence, from ancient history, and from ancient monuments, are extremely powerful.

Instances of heroism in women have occasionally occurred in modern times, somewhat resembling that of the ancient Amazons. The times and the manners of chivalry in particular, by bringing great enterprises, bold adventures, and extravagant heroism, into fashion, inspired the women with the same taste. The women, in consequence of the prevailing passion, were now seen in the middle of camps and of armies. They quitted the soft and tender inclinations, and the delicate offices, of their own sex, for the toils and the toilsome occupation of ours. During the crusades, animated by the double enthusiasm of religion and of valour, they often performed the most romantic exploits; obtained indulgences on the field of battle, and died, with arms in their hands, by the side of their lovers or of their husbands.

In Europe, women have attacked and defended fortifications; princesses have commanded armies, and obtained victories. Such was the celebrated Joan de Montfort, disputing for her duchy of Bretagne, and fighting herself. Such was that still more celebrated Margaret of Anjou, that active and intrepid general and soldier, whose genius supported a long time a feeble husband; which taught him to conquer; which replaced him upon the throne; which twice relieved him from prison; and, oppressed by fortune and by rebels, which did not bend till after she had decided in person twelve battles.

The warlike spirit among the women, consistent with ages of barbarism, when every thing is impetuous because nothing is fixed, and when all excess is the excess of force, continued in Europe upwards of 400 years, shewing itself from time to time, and always in the middle of convulsions, or on the eve of great revolutions. But there were eras and countries in which that spirit appeared with particular lustre. Such were the displays it made in the 15th and 16th centuries in Hungary, and in the islands of the Archipelago and the Mediterranean, when they were invaded by the Turks.

Among the striking instances of Amazonian conduct in modern ladies, may be mentioned that of Jane of Belleville, widow of M. de Clisson, who was beheaded at Paris, in the year 1343, on a suspicion of carrying on a correspondence with England and the count de Montfort. This lady, filled with grief for the death of her late husband, and exasperated at the ill treatment which she considered him as having received, sent off her son secretly to London; and, when her apprehensions were removed with respect to him, she sold her jewels, fitted out three ships, and put to sea, to revenge the death of her husband upon all the French with whom she should meet. This new corsair made several descents upon Normandy, where she stormed castles; and the inhabitants of that province were spectators more than once, whilst their villages were all in a blaze, of one of the finest women in Europe, with a sword in one hand and a torch in the other, urging the carnage, and eyeing with pleasure all the horrors of war.

We read in Mezeray, under the article of the Croisade preached by St. Bernard in the year 1147, "That many women did not content themselves with taking the cross, but that they also took up arms to defend it, and composed squadrons

squadrons of females, which rendered credible all that has been said of the prowess of the Amazons."

In the year 1590, the League party obtained some troops from the king of Spain. Upon the news of their being disembarked, Barri de St. Aunez, Henry IV.'s governor at Leucate, set out to communicate a scheme to the duke de Montmorency, commander in that province. He was taken in his way by some of the troops of the League, who were also upon their march with the Spaniards towards Leucate. They were persuaded, that by thus having the governor in their hands, the gates of that place would be immediately opened to them, or at least would not hold out long. But Constantia de Cecelli his wife, after having assembled the garrison, put herself so resolutely at their head, pike in hand, that she inspired the weakest with courage; and the besiegers were repulsed wherever they presented themselves. Shame and their great loss rendered them desperate, they sent a message to this courageous woman, acquainting her, that, if she continued to defend herself, they would hang her husband. She replied, with tears in her eyes, "I have riches in abundance: I have offered them, and I do still offer them, for his ransom; but I would not ignominiously purchase a life which he would reproach me with, and which he would be ashamed to enjoy. I will not dishonour him by treason against my king and country." The besiegers, having made a fresh attack without success, put her husband to death, and raised the siege. Henry IV. afterwards sent to this lady the brevet of governess of Leucate, with the reversion for her son. The famous Maid of Orleans, also, is an example known to every reader.

The abbé Arnaud, in his Memoirs, speaks of a countess de St. Balmont, who used to take the field with her husband, and fight by his side. She sent several Spanish prisoners of her taking to marshal l'euquier; and, what is not a little extraordinary, this Amazon at home was all affability and sweetness, and gave herself up to reading and acts of piety.

Dr. Johnson seems to have given credit to the accounts which have been transmitted down to us concerning the ancient Amazons; and he has endeavoured to shew, that we ought not hastily to reject ancient historical narrations because they contain facts repugnant to modern manners, and exhibit scenes to which nothing now occurring bears a resemblance. "Of what we know not (says he), we can only judge by what we know. Every novelty appears more wonderful, as it is more remote from any thing with which experience or testimony have hitherto acquainted us; and if it passes farther, beyond the notions that we have been accustomed to form, it becomes at last incredible. We seldom consider, that human knowledge is very narrow; that national manners are formed by chance; that uncommon conjunctures of causes produce rare effects; or that what is impossible at one time or place may yet happen in another. It is always easier to deny than to enquire. To refuse credit confers for a moment an appearance of superiority which every little mind is tempted to assume, when it may be gained so cheaply as by withdrawing attention from evidence, and declining the fatigue of comparing probabilities. Many relations of travellers have been slighted as fabulous, till more frequent voyages have confirmed their veracity; and it may reasonably be imagined, that many ancient historians are unjustly suspected of falsehood, because our own times afford nothing that resembles what they tell. Few narratives will either to men or women appear more incredible than the histories of the Amazons; of female nations, of whose constitution it was the essential and fundamental law, to exclude men from all participation, either of public affairs or domestic business; where female armies marched under female captains, female farmers gathered the harvest, female partners danced together, and female wits diverted one another. Yet several ages of antiquity have transmitted accounts of the Amazons of Caucasus; and of the Amazons of America, who have given their name to the greatest

river in the world. Condamine lately found such memoirs as can be expected among erratic and unlettered nations, where events are recorded only by tradition, and new swarms settling in the country from time to time confuse and efface all traces of former times."

No author has taken so much pains upon this subject as Dr. Petit. But, in the course of his work, he has given it as his opinion, that there is great difficulty in governing the women even at present, though they are unarmed and unpractised in the art of war. After all his elaborate enquiries and discussions, therefore, this learned writer might probably think, that it is not an evil of the first magnitude that the race of Amazons now ceases to exist.

Rousseau says, "The empire of the woman is an empire of softness, of address, of complacency. Her commands are caresses, her menaces are tears." But the empire of the Amazons was certainly an empire of a very different kind. Upon the whole we may conclude with Dr. Johnson: "The character of the ancient Amazons was rather terrible than lovely. The hand could not be very delicate that was only employed in drawing the bow and brandishing the battle-axe. Their power was maintained by cruelty, their courage was deformed by ferocity; and their example only shews, that men and women live best together."

AMAZONIAN HABIT, in antiquity, denotes a dress formed in imitation of the Amazons. Marcia, the famous concubine of the emperor Commodus, had the appellation of *Amazonian*, because she charmed him most in a habit of this kind. Hence also that prince himself engaged in combat in the amphitheatre in an Amazonian habit; and of all titles the *Amazonius* was one of those he most delighted in. In honour either of the gallant or his mistress, the month December was also denominated *Amazonius*. Some also apply Amazonian habit to the hunting-dress worn by many ladies among us.

AM'BA, *f.* an Abylinian or Ethiopic word, signifying a rock. The Abylinians give names to each of their rock, as *amba-dorho*, the rock of a hen, &c. Some of these rocks are said to have the name of *aorni*; and are of such a stupendous height, that the Alps and Pyrenees are but low in comparison of them. Amongst the mountains, and even frequently in the plains, of this country, arise steep and craggy rocks of various forms, some resembling towers, others pyramids, &c. so perpendicular and smooth on the sides, that they seem to be the works of art; inasmuch, that men, cattle, &c. are craned up by the help of ladders and ropes; and yet the tops of these rocks are covered with woods, meadows, fountains, fishponds, &c. which very copiously supply the animals seated thereon with all the conveniences of life. The most remarkable of these rocks is called *Amba-Gessen*. It is prodigiously steep, in the form of a castle built of free stone, and almost impregnable. Its summit is about half a Portuguese league in breadth, and the circumference at the bottom about half a day's journey. The ascent at first is easy; but grows afterwards so steep, that the Abyssinian oxen, which will otherwise clamber like goats, must be craned up and let down with ropes. Here the princes of the blood were formerly confined, in low cottages amongst shrubs and wild cedars, with an allowance barely sufficient to keep them alive. There is, according to Kircher, in this country, a rock so curiously hollowed by nature, that at a distance it resembles a looking-glass; and opposed to this another, on the top of which nothing can be so softly whispered but it may be heard a great way off. Between many of these rocks and mountains are vast abysses, which appear very dreadful to the eye.

AM'BACHT, *f.* in topography, denotes a kind of jurisdiction or territory, the possessor whereof has the administration of justice, both in *alto* and *basso*. In some ancient writers, *ambacht* is particularly used for the jurisdiction, government, or chief magistracy, of a city.

AMBA'GES, *f.* [Lat.] A circuit of words; a circumlocutory form of speech; a multiplicity of words; an in-

direct manner of expression.—They gave those complex ideas names, that they might the more easily record and discourse of things they were daily conversant in, without long *ambages* and circumlocutions; and that the things they were continually to give and receive information about, might be the easier and quicker understood. *Locke*.

AMBA'GIOUS, *adj.* [from *ambages*, Lat.] Circumlocutory; perplexed; tedious.

AMBAMAR'JAM, or **AMBA'RA**, the capital of Abyssinia, near the head of the Nile. Lat. 13. 12. N. lon. 35. 14. E.

AMBAPA'YA, *f.* in botany. See **CARICA**.

AMBARVA'LIA, *f.* [of *ambio*, to surround, and *arva*, Lat. the grounds.] A feast in honour of Ceres, celebrated by the ancient Romans to obtain a good harvest of the gods. They sacrificed a heifer according to Virgil, but Tibullus says a lamb, which was carried three times in procession about their fields. This festival was generally kept at the time of the harvest, and sometimes when the product of the earth was in danger. It was sometimes celebrated at Rome, and the priests who performed the ceremonies were called *arvales*.

AMBASSA'DE, *f.* [ambassade, Fr.] Embassy; character or business of an ambassador. A word not now in use:

When you disgrac'd me in my *ambassade*,
Then I degraded you from being king. *Shakespeare*.

AMBAS'SADOR, *f.* [ambassadeur, Fr. *embaxador*, Span. It is written differently, as it is supposed to come from the French or Spanish language; and the original derivation being uncertain, it is not easy to settle its orthography. Some derive it from the Hebrew *בשר*, to tell, and *משר* a messenger; others from *ambastus*, which in the old Gaulish signified a servant; whence *ambascia*, in low Latin, is found to signify service, and *ambasciator*, a servant; others deduce it from *ambacht*, in old Teutonic, signifying a government, and Junius mentions a possibility of its descent from *αμβαστω*; and others from *am* for *ad*, and *bassus*, low, as supposing the act of sending an ambassador, to be in some sort an act of submission. All these derivations lead to write *ambassador*, not *embassador*.] A person sent in a public manner from one sovereign power to another, and supposed to represent the power from which he is sent. The person of an ambassador is inviolable. Ambassadors are either ordinary or extraordinary. Ambassador in ordinary, is he who constantly resides in the court of another prince, to maintain a good understanding, and look to the interest of his master. Till about 200 years ago, ambassadors in ordinary were not heard of: all, till then, were ambassadors extraordinary; that is, such as are sent on some particular occasion, and who retire as soon as the affair is dispatched. By the law of nations, none under the quality of a sovereign prince can send or receive an ambassador. At Athens, ambassadors mounted the pulpit of the public orators, and there opened their commission, acquainting the people with their errand. At Rome, they were introduced to the senate, and delivered their commissions to the fathers.

Ambassadors should never attend any public solemnities, as marriages, funerals, &c. unless their masters have some interest therein: nor must they go into mourning on any occasion of their own, because they represent the person of their prince. By the civil law, all writs and processes, whereby the person of any ambassador or other public minister of any foreign prince or state, or of any of his domestics or domestic servants, may be arrested, or his goods distrained, shall be void. Provided, that no merchant or other trader, within the description of any of the statutes against bankrupts, shall have any benefit of this act; nor any servant of an ambassador, unless the name of such servant be registered in the office of one of the secretaries of state, and by him transmitted to the sheriffs of London and Middlesex. 7 *An. c.* 12.

Generally, the rights, powers, duties, and privileges, of ambassadors, are determined by the law of nature and nations, and not by any municipal constitutions: for, as

they represent the persons of their respective masters, who owe no subjection to any laws but those of their own country, their actions are not subject to the controul of the private law of that state wherein they are appointed to reside. 1 *Black.* 253.

If an ambassador grossly offends, or makes an ill use of his character, he may be sent home, and accused before his master, who is bound either to do justice upon him, or avow himself the accomplice of his crimes; but the general practice throughout Europe seems now to be, not to punish him in the country where he executes the function of ambassador. *Id.*

AMBAS'SADRESS, *f.* [ambassadrice, Fr.] The lady of an ambassador. In ludicrous language, a woman sent on a message:

Well, my *ambassadresses*——
Come you to menace war, and loud defiance?
Or does the peaceful olive grace your brow. *Rowe*.

AM'BASSAGE, *f.* [from *ambassador*.] An embassy; the business of ambassador.—Maximilian entertained them with dilatory answers; so as the formal part of their *ambassage* might well warrant their further stay. *Bacon*.

AMBAY'BA, *f.* in botany. See **CECROPIA**.

AM'BE, [αμβη, Gr.] The ridge or edge of a hill. In surgery, a superficial jutting out of the bones.

AMBE, or **AMBI**, an instrument used in dislocations of the humerus. Hippocrates has taken notice of it in his treatise de Articul. sect. vi. and it is called Hippocrates's *ambe*. Galen explains the word *ambe*, by αμφοδης επιανυστης, "an eminence like a border;" and says, that the whole of the machine takes that name, because its extremity runs out with an edge like the lip or brim of a pot towards the interior cavity, which, as well as the edge or border of any thing on the top or extremity, are signified by the word *ambe*. When the head of the humerus rests in the axilla, this instrument is sometimes of service, but in no other case; and even here it is rarely used, for, when gentle methods fail, violence seldom succeeds.

AM'BEL, *f.* in botany. See **NYMPHÆA**.

AMBELA'NIA, in botany. See **WILLUGHBEIA**.

Succinum AM'BER, *f.* [ambre, Fr. *ambar*, Lat. of αμβαρ, Gr.] A solid, hard, semipellucid, bituminous, substance, of a particular nature, of use in medicine and in several of the arts. Amber has been of great repute in the world from the earliest times. Plato, Aristotle, Herodotus, Æschylus, and others, have commended its virtues. In the times of the Romans, it became in high esteem as a gem; and in the luxurious reign of Nero, immense quantities of it were brought to Rome, and used for ornamenting works of various kinds. The most remarkable property of this substance is, that when rubbed it draws or attracts other bodies to it: and this, it is observed, it does even to those substances which the ancients thought it had an antipathy to; as oily bodies, drops of water, human sweat, &c. By friction it is brought to yield light pretty copiously in the dark; whence it is reckoned among the native phosphori. The property which amber possesses, of attracting light bodies, was very anciently observed. Thales of Miletus, 600 years before Christ, concluded from hence, that it was animated. But the first person who expressly mentions this substance, is Theophrastus, about the year 300 before Christ. The attractive property of amber is likewise occasionally taken notice of by Pliny, and other later naturalists, particularly by Gassendus, Kenelm Digby, and Sir Thomas Brown; but it is generally apprehended that this quality was peculiar to amber and jet, and perhaps agate, till Gilbert published his treatise *De Magnete*, in the year 1600. From αμντρον, the Greek name for amber, is derived the term *electricity*, which is now very extensively applied, not only to the power of attracting light bodies inherent in amber, but to other similar powers, and their various effects, in whatever bodies they reside, or to whatever bodies they may be communicated.

Amber assumes all figures in the ground; that of a pear,

pear, an almond, a pea, &c. In amber there have been said to be letters found very well formed; and even Hebrew and Arabic characters. Within some pieces, leaves, insects, &c. have likewise been found included; which seems to indicate, either that the amber was originally in a fluid state, or that, having been exposed to the sun, it was once softened, and rendered susceptible of the leaves, insects, &c. which came in its way. The latter of these suppositions seems the more agreeable to the phenomenon; because those insects, &c. are never found in the centre of the pieces of amber, but always near the surface. It is observed by the inhabitants of those places where amber is produced, that all animals, whether terrestrial, aerial, or aquatic, are extremely fond of it, and that pieces of it are frequently found in their excrements. The bodies of insects, found buried in amber, are viewed with admiration by all the world; but of the most remarkable of these, many are to be suspected as counterfeit, the great price at which beautiful specimens of this kind sell having tempted ingenious cheats to introduce animal bodies in such artful manners into seemingly whole pieces of amber, that it is not easy to detect the fraud.

Of those insects which have been originally inclosed in amber, some are plainly seen to have struggled hard for their liberty, and even to have left their limbs behind them in the attempt; it being no unusual thing to see, in a mass of amber that contains a stout beetle, the animal wanting one, or perhaps two, of its legs; and those legs left in different places, nearer that part of the mass from which it has travelled. This also may account for the common accident of finding legs or wings of flies, without the rest of their bodies, in pieces of amber; the insects having, when entangled in the yet soft and viscid matter, escaped at the expence of leaving those limbs behind them. Drops of clear water are sometimes also preserved in amber. These have doubtless been received into it while soft, and preserved by its hardening round them. Beautiful leaves of a pinnated structure, resembling some of the ferns, or maiden hairs, have been found in some pieces; but these are rare, and the specimens of great value. Mineral substances are also found at times lodged in masses of amber. Some of the pompous collections of the German princes boast of specimens of native gold and silver in masses of amber; but as there are many substances of the marcasite, and other kinds, that have all the glittering appearance of gold and silver, it is not to be too hastily concluded, that these metals are really lodged in these beds of amber. Iron is found in various shapes immersed in amber; and as it is often seen eroded, and sometimes in the state of vitriol, it is not impossible but that copper, and the other metals, may be also sometimes immersed in it in the same state.

Naturalists have been greatly divided as to the origin of this substance, and what class of bodies it belongs to; some referring it to the vegetable, others to the mineral, and some even to the animal kingdom. Pliny describes it as "a resinous juice, oozing from ancient pines, others say poplars; whereof there are whole forests on the coasts of Sweden; and discharged thence into the sea, where, undergoing some alteration, it is thrown, in this form, upon the shores of Prussia, which lie very low: he adds, that it was hence the ancients gave it the denomination *succinum*; from *succus*, juice." According to Hartman, amber is formed of bitumen, mixed with vitriol and other salts. But, though this were allowed him with regard to the fossil amber, many dispute whether the sea-amber be so produced. It is, however, apparent, that all amber is of the same origin, and probably that which is found in the sea has been washed thither out of the cliffs; though Hartman thinks it very possible, that some of it may be formed in the earth under the sea, and be washed up thence. The sea-amber is usually finer to the eye than the fossil; but the reason is, that it is divested of that coarse coat with which the other is covered while in the earth. Upon the whole, it seems generally agreed upon, that

amber is a true bitumen of fossil origin. In a late volume of the *Journal de Physique*, however, we find it asserted by Dr. Girtanner to be an animal product, a sort of honey or wax formed by a species of large ant called by Linnaeus *formica rufa*. These ants, our author informs us, inhabit the old pine forests, where they sometimes form hills about six feet in diameter; and it is generally in these ancient forests, or in places where they have been, that fossil amber is found. This substance is not so hard as that which is taken up in the sea at Prussia, and which is well known to naturalists. It has the consistence of honey or of half-melted wax, but it is of a yellow colour like common amber; it gives the same product by chemical analysis, and it hardens like the other when it is suffered to remain some time in a solution of common salt. This accounts for the insects that are so often found inclosed in it. Among these insects ants are always the most prevailing; which tends farther, Dr. Girtanner thinks, to the confirmation of his hypothesis. Amber, then, in his opinion, is nothing but a vegetable oil rendered concrete by the acid of ants, just as wax is nothing but an oil hardened by the acid of bees; a fact incontestably proved, we are told, since Mr. Metherie has been able to make artificial wax by mixing oil of olives with the nitrous acid, and which wax is not to be distinguished from the natural.

Amber of the finest kind has been found in England. It is frequently thrown on the shores of Yorkshire and many other places, and found even in our clay-pits; the pits dug for tile-clay between Tyburn and Kensington gravel-pits, and that behind St. George's Hospital at Hyde-park corner, have afforded fine specimens. Poland, Silesia, and Bohemia, are famous for the amber dug up there at this time. Germany affords great quantities of amber, as well dug up from the bowels of the earth as tossed about on the shores of the sea and rivers there. Saxony, Misnia, and Sweden, and many other places in this tract of Europe, abound with it. Denmark has afforded, at different times, several quantities of fossil amber; and the shores of the Baltic abound with it. But the countries lying on the Baltic afford it in the greatest abundance of all; and of these the most plentiful country is Prussia, and the next is Pomerania. Prussia was, as early as the times of Theodoric the Goth, famous for amber; for, this substance coming into great repute with this prince, some natives of Prussia, who were about his court, offered their service to go to their own country, where that substance, they said, was produced, and bring back great stores of it. They accordingly did so; and from this time Prussia had the honour to be called the Country of Amber, instead of Italy, which had before undeservedly that title. This article alone brings his Prussian majesty a revenue of 26,000 dollars annually. The amber of Prussia is not only found on the sea-coasts, but in digging; and, though that of Pomerania is generally brought from the shores, yet people who dig, on different occasions, in the very heart of the country, constantly find amber. In the mines where it is found, the upper surface is composed of sand, under which is a stratum of loam, and under this a bed of wood partly entire, but chiefly mouldered or changed into a bituminous substance. Under the wood is a stratum of vitriolic or rather aluminous mineral, in which the amber is found. Strong sulphureous exhalations are often perceived in the pits.

The specific gravity of amber is from 1,065 to 1,000; its fracture is even, smooth, and glossy; it is capable of a fine polish, and, when rubbed or heated, gives a fragrant aromatic smell, particularly when it melts, that is at 550 of Fahrenheit, but it then loses its transparency; projected on burning coals, it burns with a whitish flame, and a whitish-yellow smoke, but gives very little soot, and leaves brownish ashes; it is insoluble in water and spirit of wine, though this latter, when highly rectified, extracts a reddish colour from it; but it is soluble in the vitriolic acid, which then acquires a reddish purple colour, and is precipitable from it by water; no other acid dissolves it, nor is it soluble

soluble in fixed alkalies, nor in essential nor expressed oils, without some decomposition and long digestion; but balsams dissolve it readily; 75 grains of it alkalize 100 of nitre; by distillation it affords a small quantity of water, an oil of the nature of petrol, and a peculiar acid.

Amber having been formerly considered as a valuable substance, and the specimens, which are large, or contain entire or perfect insects within them, being still of considerable price, the methods of softening it so as to introduce these extraneous bodies, or of uniting smaller pieces together, have been kept as profitable secrets, if it be true that they ever were discovered. It is said that two pieces of this substance may be united by wetting them with oil of tartar, and applying them together with heat; and Wallerius mentions, that pieces of yellow amber may be softened, formed into one, and even dissolved, by means of oil of turnip-seed, in a gentle heat; and that, according to some authors, it may be rendered transparent by boiling in rape-seed oil, linseed oil, salt water, &c. Neumann, however, denies that either salt water or linseed oil produce this effect; though he states, as the common practices of workmen, the following methods: the one consists in surrounding the amber with sand in an iron pot, and cementing it with a gradual fire for forty hours, some small pieces placed near the sides of the vessel being occasionally taken out for judging of the effect of the operation; the second method, which he says is that most generally practised, is by digesting and boiling the amber about twenty hours with rape-seed oil, by which it is rendered both clear and hard.

Amber is principally of two colours, white and yellow. The white is the most esteemed for medicinal purposes, as being the most odoriferous, and containing the greatest quantity of volatile salt; though the yellow is most valued by those who manufacture beads and other toys with it, by reason of its transparency. Amber is the basis of all varnishes, by solution in the way described under the article VARNISH.

Could amber be dissolved without impairing its transparency, the art of embalming might possibly be carried to a great height by it, if we could preserve the human corpse in a transparent case of amber, as the bodies of flies, spiders, grasshoppers, &c. are to a great perfection. Something of a substitute of this kind we have in fine rosin; which being dissolved by heat, and the bodies of small animals several times dipped in it, they are thus coated with colophony, that in some degree resembles amber; but this must be kept from dust.

Amber in substance has been much recommended as a nervous and cordial medicine; and alleged to be very efficacious in promoting the menstrual discharge, and the exclusion of the fœtus and secundines in labour; but, as in its crude state it is quite insoluble by our juices, it certainly can have very little effect on the animal system, and therefore it is now seldom given in substance. The forms in which amber is prepared are, a tincture, a salt, and an oil, the preparations and uses of which are described in the proper place under the article PHARMACY.

AM'BERBOI, *f.* in botany. See CENTAUREA.

AM'BER-TREE, *f.* in botany. See ANTHOSPERMUM.

AM'BERG, a city of Germany, the capital of the palatinate of Bavaria, with a good castle, ramparts, bastions, and deep ditches. It is seated near the confines of Franconia, on the river Ills, forty miles E. of Nuremburg. It drives a great trade in iron and other metals, found in the neighbouring mountains. Lat. 49. 30. N. lon. 12. 7. E.

AMBERGREASE, AMBERGRISE, or GREY AMBER, *f.* [*amber gris*, Fr.] is a solid, opaque, ash-coloured, fatty, inflammable, substance, variegated like marble, remarkably light, rugged and uneven in its surface, and has a fragrant odour when heated. It is found in the sea, or on the sea-coast, or in the sand near the sea-coast; especially in the Atlantic Ocean, on the sea-coast of Brazil, and that of Madagascar; on the coast of Africa, of the East Indies, China, Japan, and the Molucca islands; but most of the ambergrease which is brought to England

comes from the Bahama islands, from Providence, &c. where it is found on the coast. It is also found in the abdomen of whales by the whale-fishermen, always in lumps of various shapes and sizes, weighing from half an ounce to an hundred and more pounds.

There have been many different opinions concerning the origin of this substance. It has been supposed to be a fossil bitumen or nephtha, exuding out of the bowels of the earth in a fluid form, and distilling into the sea, where it hardens and floats on the surface. But the most satisfactory account of the real origin of ambergrease is given by Dr. Swedjar, in the Philosophical Transactions for 1783.

We are told by all writers on ambergrease, that sometimes claws and beaks of birds, feathers of birds, parts of vegetables, shells, fish, and bones of fish, are found in the middle of it, or variously mixed with it. Of a very large quantity of pieces, however, which the doctor examined, he found none that contained any such thing; though he allows that such substances may sometimes be found in it: but, in all the pieces of any considerable size, whether found on the sea or in the whale, he constantly found a considerable quantity of black spots, which, after the most careful examination, appeared to be the beaks of the *Sepia octopodia*; and these beaks, he thinks, might be the substances which have hitherto been always mistaken for claws or beaks of birds, or for shells.

According to the best information Dr. Swedjar could obtain from several of the most intelligent persons employed in the spermaceti-whale-fishery, and in procuring and selling ambergrease, it appears, that this substance is found in the belly of the whale, but in that particular species only which is called the *spermaceti whale*, and which, from its description and delineation, appears to be the *Physeter macrocephalus* Linnæi. The New England fishermen, according to their account, have long known that ambergrease is to be found in the spermaceti whale; and they are so convinced of this fact, that whenever they hear of a place where ambergrease is found, they always conclude that the seas in that part are frequented by this species of whale.

The persons who are employed in the spermaceti-whale-fishery, confine their views for ambergrease to the *Physeter macrocephalus*. Whenever they hook a spermaceti whale, they observe, that it constantly not only vomits up whatever it has in its stomach, but also generally discharges its feces at the same time; and, if this latter circumstance takes place, they are generally disappointed in finding ambergrease in its belly. But whenever they discover a spermaceti whale, male or female, which seems torpid and sickly, they are always pretty sure to find ambergrease, as the whale in this state seldom voids its feces upon being hooked. They likewise generally meet with it in the dead spermaceti whales, which they sometimes find floating on the sea. It is observed also, that the whale in which they find ambergrease often has a morbid protuberance, or, as they express it, a kind of gathering, in the lower part of its belly, in which, if cut open, ambergrease is found. It is observed, that all those whales in whose bowels ambergrease is found, seem not only torpid and sick, but are also constantly leaner than others; so that, if we may judge from the constant union of these two circumstances, it would seem that a larger collection of ambergrease in the belly of the whale is a source of disease, and probably sometimes the cause of its death. As soon as they hook a whale of this description, torpid, sickly, emaciated, or one that does not dung on being hooked, they immediately either cut up the above-mentioned protuberance, if there be any, or they rip open its bowels from the orifice of the anus, and find the ambergrease sometimes in one sometimes in different lumps, of generally from three to twelve and more inches in diameter, and from one pound to twenty or thirty pounds in weight, at the distance of two, but most frequently of about six or seven, feet from the anus, and never higher up in the intestinal canal; which, according to their description, is in all probability the intestine cæcum, hitherto mistaken for a peculiar bag made

made by nature for the secretion and collection of this singular substance. That the part they cut open to come at the ambergrease, is no other than the intestinal canal is certain, because they constantly begin their incision at the anus, and find the cavity every where filled with the faeces of the whale, which, from their colour and smell, it is impossible for them to mistake. The ambergrease found in the intestinal canal is not so hard as that which is found on the sea or sea-coast, but soon grows hard in the air: when first taken out it has nearly the same colour, and the same disagreeable smell, though not so strong, as the more liquid dung of the whale has; but, on exposing it to the air, it by degrees not only grows greyish, and its surface is covered with a greyish dust, like old chocolate, but it also loses its disagreeable smell, and, when kept for a certain length of time, acquires the peculiar odour which is so agreeable to most people.

In considering whether there be any material difference between the ambergrease found upon the sea or sea-coast, and that found in the bowels and among the dung of the whale, the doctor refutes the opinion, that all ambergrease found in whales is of an inferior quality, and therefore much less in price. Ambergrease, he observes, is only valued for its purity, lightness, compactness, colour, and smell. There are pieces of ambergrease found on different coasts, which are of a very inferior quality; whereas there are often found in whales pieces of it of the first value; nay, several pieces found in the same whale, according to the above-mentioned qualities, are more or less valuable. All ambergrease found in whales, has at first, when taken out of the intestines, very near the same smell as the liquid excrements of that animal have; it has then also nearly the same blackish colour: they find it in the whale sometimes quite hard, sometimes rather softish, but never so liquid as the natural faeces of that animal. And it is a matter of fact, that, after being taken out and kept in the air, all ambergrease grows not only harder and whiter, but also loses by degrees its smell, and assumes such an agreeable one, as that in general has which is found swimming upon the sea; therefore the goodness of ambergrease seems rather to depend on its age. By being accumulated after a certain length of time in the intestinal canal, it seems even then to become of a whiter colour, and less ponderous, and acquire its agreeable smell. The only reason why ambergrease found floating on the sea generally possesses the above-mentioned qualities in a superior degree, is because it is commonly older, and has been longer exposed to the air. It is more frequently found in males than females; the pieces found in females are in general smaller, and those found in males seem constantly to be larger and of a better quality; and therefore the high price in proportion to the size is not merely imaginary for the rarity sake, but in some respect well founded, because such large pieces appear to be of greater age, and possess the above-mentioned qualities in general in a higher degree of perfection than smaller pieces.

It is known, that the sepia octopodia, or cuttle-fish, is the constant and natural food of the spermaceti whale, or physeter macrocephalus. Of this the fishers are so well persuaded, that, whenever they discover any recent relics of it swimming on the sea, they conclude that a whale of this kind is, or has been, in that part. Another circumstance which corroborates the fact is, that the spermaceti whale on being hooked generally vomits up some remains of the sepia. Hence it is easy to account for the many beaks, or pieces of beaks, of the sepia, found in all ambergrease. The beak of the sepia is a black horny substance, and therefore passes undigested through the stomach into the intestinal canal, where it is mixed with the faeces; after which it is either evacuated with them, or, if these latter be preternaturally retained, forms concretions with them, which render the animal sick and torpid, and produce an obfipation, which ends either in an abscess of the abdomen, as has been frequently observed, or becomes fatal to the animal; whence, in both the cases, on

the bursting of its belly, that hardened substance known under the name of *ambergrease* is found swimming on the sea or thrown upon the coast.

From the preceding account, and his having constantly found the above-mentioned beaks of the sepia in all pieces of ambergrease of any considerable size, Dr. Swediaur concludes, that all ambergrease is generated in the bowels of the physeter macrocephalus, or spermaceti whale; and there mixed with the beaks of the sepia octopodia, which is the principal food of that whale. He therefore defines ambergrease to be the preternaturally hardened dung or faeces of the physeter macrocephalus, mixed with some indigestible relics of its food. Mr. Magellan, however, mentions an undoubtedly vegetable ambergrease, gathered from a tree which grows in Guyana, and is called *cuma*. Specimens of this were presented to him by Mr. Aublet, author of the *Histoire de la Guyane*, published in 1774, who himself collected it on the spot; and Mr. Magellan presented part of it to the late Dr. Fothergill, and also to Dr. Combe. It is of a whitish brown colour, with a yellowish shade; melts and burns like wax on the fire, but is rather of a more powdery consistence than any ambergrease he had seen.

The use of ambergrease in Europe is now nearly confined to perfumery, though it has been recommended in medicine by several eminent physicians. It is soluble in boiling spirit of wine; from which, if the saturated solution be set in a very cold place, a part of the ambergrease concretes into a whitish unctuous substance. Distilled it yields an aqueous phlegm, a brown acidulous spirit, a deep-coloured oil, a thicker balsam, and sometimes a little concrete salt. The spirit, oil, balsam, and salt, are similar to those obtained from amber, except that the oil is more agreeable to the smell. Rectified spirit of wine takes up near one-twelfth of its weight of ambergrease. According to Neumann, if the spirit is impregnated with a little essential oil, the ambergrease will dissolve more readily in it. A deeper coloured tincture is made with alcohol, but not a stronger. Dulcified acids and alkaline spirits have no effect upon it; water and expressed oils have as little. It is one of the most agreeable perfumes; it heightens the natural odour of other bodies; but the great secret to this end is, to add it so sparingly, that while it improves the smell of that to which it is added, its own may not be discovered. From two grains to a scruple it is a high cordial and powerful antispasmodic; though the common dose is from two to four grains, which may be given in an egg lightly poached. Riverius says, that ambergrease is a specific against the fumes canina.

In Asia, and part of Africa, ambergrease is not only used as a medicine and as a perfume, but considerable use is also made of it in cookery, by adding it to several dishes as a spice. A great quantity of it is also constantly bought by the pilgrims who travel to Mecca; probably to offer it there, and make use of it in fumigations, in the same manner as frankincense is used in catholic countries.

Ambergrease may be known to be genuine by its fragrant scent when a hot needle or pin is thrust into it, and its melting like fat of an uniform consistence; whereas the counterfeit will not yield such a smell, nor prove of such a fat texture. One thing, however, is very remarkable, that this drug, which is the most sweet of all the perfumes, should be capable of being resembled in smell by a preparation of one of the most odious of all stinks. Mr. Homberg found, that a vessel in which he had made a long digestion of the human faeces, acquired a very strong and perfect smell of ambergrease, inasmuch that any one would have thought a great quantity of essence of ambergrease had been made in it. The perfume was so strong and offensive, that the vessel was forced to be removed out of the laboratory.

AM'BERT, a town in the department of Puy-de-Dome, and in the late province of Auvergne. It is seated in a beautiful valley, on the river Ore. It carries on the paper manufacture very extensively, and has also a trade in coarse laces, cumblets, ferrets, &c. It is twenty-one
5 K miles

miles E. of Iffoire, and 300 from Paris. Lat. 45. 25. N. lon. 3. 50. E.

AMBIANCUTIVA, a kingdom and town of Ethiopia, on the river Nile.

AMBIA'NI, or **AMBIANEN'SIS CIVITAS**, now Amiens, a city of Picardy. It is called Samarobriva by Cæsar and Cicero; which, according to Valesius, signifies the bridge of the Samara, or Somme. Ambiani is a later name, taken from that of the people, after the usual manner of the lower age.

AMBIDEX'TER, *f.* a person who can use both hands with the same facility, and for the same purposes, that the generality of people do their right hands. As to the natural cause of this faculty, some, as Hæfer, attribute it to an extraordinary supply of blood and spirits from the heart and brain, which furnish both hands with the necessary strength and agility; others, as Nicholas Massa, to an erect situation of the heart, inclining neither to the right hand nor left; and others to the right and left subclavian arteries being of the same height, and same distance from the heart, by which the blood is propelled with equal force to both hands. But these are only conjectures, or rather chimeras. Many think, that, were it not for education and habit, all mankind would be ambidexters; and, in fact, we frequently find nurses obliged to be at a good deal of pains before they can bring children to forego the use of their left hands. How far it may be an advantage to be deprived of half our natural dexterity, may be doubted. It is certain, there are infinite occasions in life, when it would be better to have the equal use of both hands. Surgeons and oculists are of necessity obliged to be ambidexters; bleeding, &c. in the left arm or left ankle, and operations on the left eye, cannot be well performed but with the left hand. Various instances occur in history, where the left hand has been exercised preferably to the right. But by the laws of the ancient Scythians, people were enjoined to exercise both hands alike; and Plato enjoins ambidexterity to be encouraged in his republic.

AMBIDEXTER, among the English lawyers, a juror or embracer, who accepts money of both parties, for giving his verdict: an offence for which he is liable to be imprisoned, for ever excluded from a jury, and to pay ten times the sum he accepted of.

AMBIDEXTERITY, *f.* The quality of being able equally to use both hands. Double dealing.

AMBIDEX'TROUS, *adj.* Having, with equal facility, the use of either hand. Double dealing; practising on both sides.—Æsop condemns the double practices of trimmers, and all false, shuffling, and *ambidextrous*, dealings. *L'Etrange*.

AMBIDEX'TROUSNESS, *f.* The quality of being ambidextrous.

AM'BIENT, *adj.* [*ambiens*, Lat.] Surrounding; encompassing; investing. It is chiefly applied to such bodies, especially fluids, as encompass others on all sides: thus, the air is frequently called an ambient fluid, because it is diffused round the earth:

This which yields or fills
All space, the ambient air wide interfus'd. *Milton*.

AMBIGENÆ OVES, *f.* in the heathen sacrifices, an appellation given to such ewes as, having brought forth twins, were sacrificed, together with their two lambs, one on each side.

AMBIGENAL HYPER'BOLA, *f.* a name given by Sir Isaac Newton to one of the triple hyperbolas of the second order, having one of its infinite legs falling within an angle formed by the asymptotes, and the other without.

AMBIGU, *f.* [*Fr.*] An entertainment, consisting not of regular courses, but of a medley of dishes set on together:

When straiten'd in your time, and servants few,
You'd richly then compose an *ambigu*;
Where first and second course, and your desert,
All in one single table have their part.

King.

AMBIGU'ITY, *f.* [from *ambiguous*.] Doubtfulness of meaning; uncertainty of signification; double meaning.—With *ambiguities* they often entangle themselves, not marking what doth agree to the word of God in itself, and what in regard of outward accidents. *Hooker*.

AMBIGUOUS, *adj.* [*ambigu*, *Fr.* *ambiguo*, *It.* and *Sp.* of *ambiguus*, of *ambo*, both, and *ago*, Lat. to drive.] Doubtful; having two meanings; of uncertain signification. Applied to persons using doubtful expressions. It is applied to expressions, or those that use them, not to a dubious or suspended state of mind:

Th' *ambiguous* god, who rul'd her lab'ring breast,
In these mysterious words his mind express'd;
Some truths reveal'd, in terms involv'd the rest. *Dryden*.

AMBIGUOUSLY, *adv.* In an ambiguous manner; doubtfully; uncertainly; with double meaning.

AMBIGUOUSNESS, *f.* The quality of being ambiguous; uncertainty of meaning; duplicity of signification.

AMBI'LOGY, *f.* [*ambilogium*, or *ambiloquium*, Lat. of *ambo*, both, and *λογος*, a word or speech.] Talk of ambiguous or doubtful signification.

AMBI'LOQUOUS, *adj.* [from *ambo* and *loquor*, Lat.] Using ambiguous and doubtful expressions.

AMBI'LOQUY, *f.* [*ambiloquium*, Lat.] The use of doubtful and indeterminate expressions; discourse of doubtful meaning.

AM'BIT, *f.* [*ambitus*, Lat.] The compass or circuit of any thing; the line that encompasses any thing.

AMBIT of a **FIGURE**, in geometry, is the perimeter or line, or sum of the lines, by which the figure is bounded.

AMBIT was particularly used, in antiquity, to denote a space of ground to be left vacant betwixt one building and another. By the laws of the twelve tables, houses were not to be built contiguous, but an ambit or space of two feet and a half was to be left about each for fear of fire. The ambitus of a tomb or monument denoted a certain number of feet, in length and breadth, around the same, within which the sanctity assigned to it was limited. The whole ground wherein a tomb was erected was not to be secreted from the common uses; for this reason, it was frequent to inscribe the ambit on it, that it might be known how far its sanctity extended: thus, *in fronte pedes tot, in agrum pedes tot*.

AMBI'TION, *f.* [*ambitio*, Lat. the desire of something higher than is possessed at present.] The desire of preferment or honour.—Who would think, without having such a mind as Antiphras, that so great goodness could not have bound gratefulness? and so high advancement not have satisfied his *ambition*? *Sidney*.—The desire of any thing great or excellent:

Urge them, while their souls
Are capable of this *ambition*;
Left zeal, now melted by the windy breath
Of soft petitions, pity, and remorse,
Cool and congeal again to what it was. *Shakespeare*.

It is used with *to* before a verb, and *of* before a noun.—I had a very early *ambition* to recommend myself to your lordship's patronage. *Addison*.—There was an *ambition* of wit, and an affectation of gaiety. *Pope*.

Ambition is one of those passions that is never to be satisfied. It swells gradually with success; and every acquisition serves but as a spur to further attempts. "If a man (it has been well observed) could at once accomplish all his desires, he would be a miserable creature; for the chief pleasure of this life is to wish and desire. Upon this account, every prince who aspires to be despotic aspires to die of weariness. Searching every kingdom for the man who has the least comfort in life, Where is he to be found?—In the royal palace.—What! his majesty? Yes; especially if he be despotic."

Marius, so famous in the Roman history, was a man that had but one passion, the desire of aggrandizing himself, to which he never made any scruple to sacrifice every thing;

for

for he never knew either integrity, sincerity, or gratitude, when the pursuit of his views was in question. It was this ambition that made him quit the plough and take up the profession of arms, by which he was in hopes of making his fortune. He succeeded beyond all expectations: but after having passed through every honour in the Roman government; having acquired a considerable fortune, and made a good alliance, by marrying Julia, Cæsar's aunt; instead of being satisfied with his uncommon success, and enjoying the fruits of his toils and dangers, at the age of seventy, when he was become exceedingly gross and heavy, and oppressed with many infirmities, he was determined to take on him the war against Mithridates king of Pontus. He imagined, that this war furnished an occasion of acquiring great glory and riches, without much danger. But Sylla, as consul, was general of the Roman armies, and had a just right to appropriate the first and most glorious province to himself: he was likewise appointed to this command by the senate. Marius opposed him. The contest ran high: and a civil war ensued. Sylla besieges the city of Rome, and Marius is obliged to save himself by flight. Sylla makes an alteration in the government, and an order is issued out in all the cities of Italy, to seize and kill Marius wherever he should be found. After wandering from place to place, and suffering a variety of difficulties, dangers, and distresses, both by sea and land, he is at last treacherously set on shore in the province of an enemy, without aid, without defence, and abandoned by all the world. He, however, did not abandon himself; but crossing marshes, ditches full of water, and muddy grounds, he came at length to a poor wood-cleaver's cottage. He threw himself at his feet, and conjured him to save a man, who, if he escaped danger, would reward him beyond his hopes. The peasant, whether he knew him, or was struck with the loftiness and majesty of his appearance, which his misfortunes had not effaced, answered, "That, if he only wanted rest, he might find it in his cottage; but, if he fled from enemies, he would shew him a safer retreat." Marius having accepted the last offer, the man conducted him to a hollow place, near a marsh, where he covered him with leaves, reeds, and rushes. Marius had scarcely entered this dismal retreat, before he heard his enemies in pursuit of him. They questioned, pressed, and menaced, the woodman, for concealing an enemy of the public, condemned to die by the Roman senate. Marius had no resource left: he quitted his retreat, undressed himself, and plunged into the black and muddy water of the marsh. This dirty asylum could not conceal him. His pursuers ran to him; and having drawn him out of the water naked, and all covered with mud, they put a cord about his neck, and dragged him to Minturnæ, where they delivered him to the magistrates. Let us here consider Marius attentively in his deplorable state at this moment! What might then be his thoughts? How much ought he to have abhorred a fatal ambition that, from the height of greatness and glory, had plunged him into an abyss of misery below the condition of mankind! And what a lesson is this to those who are never contented with their condition; and who imagine they want all things, when but a single object is wanting to their insatiable avidity! But such are the vicissitudes of human life, that even when hope forsook him, and while the hand was lifted up, he escaped the blow. From the lowest state of misery, he yet rose to the pinnacle of what is falsely called honour and greatness. By the intrigues of a faction, he returned to Rome, where he gave the most melancholy proofs that his misfortunes had neither made him wiser nor better, had neither taught him humility, compassion, nor moderation. Being at first, as it were, only protected by Cinna, who was then master of Rome, he affected an air of dejection; but his unextinguished ambition soon rendered him the soul of the party. Having now the sword in his hand, and burning with revenge and indignation, he cut down all before him: naturally merciless and cruel, he spared neither age, dignity, nor

virtue; a look, a nod, determined at once the fate of the most illustrious persons; every one whom he in the least suspected or disliked were put to death without the least form or ceremony. The slaughter, attended with plundering of houses, and the most criminal violences, continued five days and five nights in Rome, which became one general scene of horror; unpitied shrieks and cries were every where heard, the canals poured down with human blood, while the lifeless bodies, even of the most eminent senators, were trampled under foot; for it was prohibited to give them burial. These were the glorious fruits of ambition! By these, without doubt, Marius intended to render himself great and happy; but he found it quite otherwise. The state of prosperity in which he was, did not calm the disquiets occasioned by the fear of Sylla's return, who was carrying on the war with Mithridates. So formidable an avenger made Marius tremble; and he could not even dissemble his fears. These thoughts tormented him continually, and occasioned his nights to pass without sleep, which began to affect his health and spirits. He therefore abandoned himself to the excesses of the table; and to spend his nights in drinking with his friends and dependants. By this regimen he soon inflamed his blood. He was attacked with a fever, which presently seized his head; and, in his delirium, he raved of nothing but the war with Mithridates: he imagined he had the command of it; and not only spoke, but made gestures, and assumed the attitude of a man that fights, or of a general giving orders: so violent and incurable was the passion, and so deeply had it taken root in his heart, with which ambition and jealousy uniting, had inspired him for that command. Thus, says Plutarch, at the age of seventy, the only man who had been seven times consul, and possessing riches that might have sufficed for several kings, lamented as one suffering indigence, and died before he could put his views in execution.

AMBITION, a Roman deity, who had a temple at Rome. She was represented with wings on her back, and naked feet.

AMBITIOUS, *adj.* [*ambitiosus*, Lat.] Seized or touched with ambition; desirous of advancement; eager of honours; aspiring. It has the particle *of* before the object of ambition, if a noun; *to*, if expressed by a verb:

We seem *ambitious* God's whole work *t'* undo. *Donne.*

The neighb'ring monarchs, by thy beauty led,

Contend in crowds, *ambitious* of thy bed:

The world is at thy choice, except but one,

Except but him thou canst not choose alone. *Dryden.*

AMBITIOUSLY, *adv.* In an ambitious manner; with eagerness of advancement or preference.

AMBITIOUSNESS, *f.* The quality of being ambitious.

AMBITUDE, *f.* [*ambitudo*, Lat. of *ambio*, to surround.] Compass; circuit; circumference.

AMBITUS, *f.* in Roman antiquity, the setting up for some magistracy or office, and formally going round the city to solicit the interest and votes of the people. *Ambitus* differed from *ambition*, as the former lies in the act, the latter in the mind. *Ambitus* was of two kinds; one lawful, the other infamous. The first, called also *ambitus popularis*, was when a person offered his service to the republic frankly, leaving it to every body to judge of his pretensions as they found reasonable. The second kind was that wherein force, cajoling, money, or other extraordinary influence, was made use of. This was held infamous, and severely punished, as a source of corruption and other mischiefs.

The practice ceased from the time of the emperors, by reason posts were not then to be had by courting the people, but by favour from the prince. Persons who had caused depending practised the same, going about among the judges to implore their favour and mercy. They who practised this were called *ambitiosi*. Hence we also meet with *ambitiosa decreta*, and *ambitiosa jura*, used for such sentences

sentences and decrees as were thus procured from the judges, contrary to reason and equity, either gratuitously or for money.

To AM'BLE, *v. n.* [*ambler*, Fr. *ambulo*, Lat. to walk.] To move easily, without hard shocks; or shaking.—Who ambles time withal? A rich man that hath not the gout; for he lives merrily, because he feels no pain; knowing no burthen of heavy tedious penury: him time ambles withal. *Shakespeare*.—In a ludicrous sense, to move with submission, and by direction; as, A horse that ambles uses a gait not natural. To walk daintily and affectedly:

I am rudely stamp'd, and want love's majesty,
To strut before a wanton ambling nymph.

Shakespeare.

AMBLE, *f.* A pace or movement in which the horse removes both his legs on one side; as, on the far side, he removes his fore and hinder leg of the same side at one time, whilst the legs on the near side stand still; and, when the far legs are upon the ground, the near side removes the fore leg and hinder leg, and the legs on the far side stand still. An amble is the first pace of young colts, but, when they have strength to trot, they quit it. There is no amble in the manage; riding-masters allow only of walk, trot, and gallop. A horse may be put from a trot to a gallop without stopping; but he cannot be put from an amble to a gallop without a stop, which interrupts the justness of the manage.

AM'BLER, *f.* A horse that has been taught to amble; a pacer.

AMBLINGLY, *adv.* With an ambling movement.

AM'BLESIDE, Westmoreland, is a small market-town, having a market on Wednesday, and two fairs annually, viz. Whitfun-Wednesday, and 29th of October. No principal manufacture is carried on here; the goods made being chiefly for the manufacturers in Kendal, from which it is distant thirteen miles and a quarter; from Kewick sixteen miles; and from London two hundred and seventy-one miles. It stands at the head of Windermere Lake; and is noted for a manufactory of cloth, and for a considerable waterfall. The town is situated on the steep decline of a hill, over which many high mountains arise towards the north. In Camden's time, many ruins of the ancient Amboglana of the Romans were to be seen here; the extent of the fortrefs, as he gives its dimensions, was 132 ells in length and eighty in breadth. Roman bricks, urns, and other earthen vessels, glass lachrymals, coins, mill-stones, or quern-stones, as he calls them, were frequently found here; the ground, in which the traces of such places is now to be seen, forms an oblong square with obtuse angles, and lies near the river Brathay. The traces of its antiquity are, however, almost defaced; the modern inhabitants have preserved few of the Roman monuments which were formerly discovered. Ambleside lies in the direct road from Kendal, through Kewick and Cockermouth, to Whitehaven; and is distant from Cockermouth twenty-eight miles; and from Whitehaven forty-one. Lat. 54. 28. N. lon. 3. 6. W.

AM'BLETEUSE, a sea-port in the department of the Straits of Calais. It is eight miles north of Boulogne. Lat. 50. 49. N. lon. 1. 41. E.

AMBLO'TICS, *f.* [*ambloïtica*, Lat. *αμβλωτικά*, Gr.] Medicines that cause abortion.

AM'BLYGON, *f.* of *αμβλυνος*, blunt, and *γωνία*, Gr. a corner.] In geometry, denotes an obtuse-angled triangle, or a triangle one of whose angles consists of more than ninety degrees.

AMBLYOG'MOS, or AMBLYOSMOS, *f.* from *αμβλυνος*, Gr. dull.] Dimness of sight. Hippocrates often uses this word, and says, this dimness of sight, and corruscations of sight seeming to dart before the eyes, are among the symptoms of an approaching hæmorrhage in continual fevers and genuine tertians. Sometimes he uses the word *amblyosmos* to express the same thing. Galen explains this word by *abortus*, but he mistakes it.

AMBLYO'PIA, *f.* [from *αμβλυνος*, dull, and *ὄψις*, the eye.] This is a debility of sight, absolute or relative, with ocular inopacity. The principal symptom of which disease is an obscurity of sight without any apparent opacity of the cornea, or interior part of the eye. Actuarius says, that there is a manifest, but not visible, cause of this dulness of sight, for neither the coats, nor the humours, of the eye, are disordered; and that a defect of the nervous influence is the probable cause. See his work, De Meth. Med. lib. ii. cap. 7.

The amblyopia is said by some others to be fourfold: see; 1st, *Myopia*, or short-sightedness. 2dly, *Presbyta*, or seeing only at a great distance. 3dly, *Nyctalopia*, or seeing only in the night, which Celsus names *imbecillitas oculorum*. 4thly, *Amaurosis*, dulness of sight. Dr. Cullen places this word in his Nosology as synonymous with the word *dyfopia*, which is his generic term for those disorders in and of the eye, called myopia, &c. The amblyopia of some writers, is the amaurosis of Dr. Cullen; for the different species of which see MEDICINE.

AM'BO, or AMBON, *f.* [of *αμβων*, Gr. to mount.] A kind of pulpit or desk, in the ancient churches, where the priests and deacons stood to read or sing part of the service, and preach to the people; called also *analogium*. The ambo was mounted upon two sides; whence some derive the appellation from the Latin *ambo*, "both." Besides the gospel, which was read at the top of the ambo, and the epistle, which was read a step lower, they likewise published from this place the acts of the martyrs, the commemoration of departed saints, and the letters of peace and communion sent by one church to another. Here, too, converts made a public profession of their faith; and bishops their defence, when accused: treaties also were sometimes concluded, and the coronations of emperors and kings performed, in the same place. The modern reading-desks and pulpits have been generally substituted to the ancient ambos; though, in some churches, remains of the ambos are still seen. In that of St. John de Lateran at Rome, there are two moveable ambos.

AMBOHITSME'NE, or VOHITSANGHOM'BE, a province of the island of Madagascar, so called from some red mountains of the same name, lying in south lat. 20°. These mountains are very high, resembling the Tafelberg of the Cape of Good Hope. On one side of this ridge the sea extends into the country for fifteen leagues; on the other is a flat country, abounding in ponds and marshes. Here is also a lake fifteen leagues in length, and the same in breadth, containing many small islands. The inhabitants of the mountains are called *Zaferahongs*; and have plenty of gold, iron, cattle, silk, &c.

AMBOISE (George D'), of the illustrious house of Amboise in France, was born in 1460. Being destined at a very early age for the church, he was elected bishop of Montauban when only fourteen. He was afterwards made one of the almoners to Louis XI. to whom he behaved with great prudence. After the death of this prince in 1480, he entered into some of the intrigues of the court with a design to favour the duke of Orleans, with whom he was closely connected; but, those intrigues being discovered, D'Amboise and his protector were both imprisoned. The duke of Orleans was at last restored to his liberty; and this prince, having negotiated the marriage of the king with the princess Anne of Brittany, acquired great reputation and credit at court. Of this his favourite D'Amboise felt the happy effects, for soon after the archbishopric of Narbonne was bestowed on him. The king dying in 1498, the duke of Orleans ascended the throne, by the name of Louis XII. and D'Amboise became his prime minister. By his first operation in that office, he conciliated the affection of the whole nation. It had been a custom, when a new monarch ascended the throne, to lay an extraordinary tax on the people, to defray the expences of the coronation, but, by the counsel of D'Amboise, this tax was not levied; and the imposts were soon reduced one-tenth. Some time after D'Amboise was received at Paris, with

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great magnificence, in quality of legate from the pope. During this legation, he laboured to reform many of the religious orders, as the Jacobins, the Cordeliers, and those of St. Germain des Près. He died in 1510, in the convent of the Celestines, at Lyons, of the gout in his stomach, aged 50 years. This minister has been greatly praised for having laboured for the happiness of France; but he has been much censured for having advised his master to sign the treaty of Blois, in 1504, by which France ran the risk of being dismembered. He governed both the king and the state; laborious, kind, honest, he possessed good sense, firmness, and experience; but he was not a great genius, nor were his views extensive. The desire he had to ease the people in their taxes, procured him during his life, but much more after his death, the title of Father of the People.

There were several other distinguished men of this name, as, 2. Aimery D'Amboise, a brother of the former, who was grand master of the order of St. John of Jerusalem. The great naval victory he obtained over the sultan of Egypt, near Montenegro, in 1510, made his name celebrated, not only among his own order, but throughout Europe. He died about two years after. Abbé Verrot has drawn his character as "a wise prince, able in government, and happy in all his enterprises; who enriched his order with the spoils of the infidels, without appropriating any to himself." 3. Francis D'Amboise, surgeon to king Charles IX. of France, who died about the year 1620. He is said to have been the editor of Abelard's Works, in quarto, in 1616, and the author of a lively comedy, called *Les Neapolitains*. 4. Adrian D'Amboise, brother of the latter, who was author of a tragedy called *Holoferne*. 5. James D'Amboise, a doctor of physic, and rector of the university of Paris, was brother to the two last. Under his rectorate the university of Paris swore allegiance to Henry IV. 6. Michel D'Amboise, *seigneur de Chevillon*, a natural son of Michel D'Amboise, admiral of France.

AMBOISE, a town of France, in the department of Indre and Loire, and in the late province of Touraine, seated at the confluence of the rivers Loire and Maifée. The town is rendered famous in history by the conspiracy of the Protestants in 1560, which opened the fatal wars of religion in France. The castle is situated on a craggy rock, extremely difficult of access, and the sides of which are almost perpendicular. At its foot flows the Loire, which is divided into two streams by a small island. To this fortress the duke of Guise, when he expected an insurrection among the Hugonots, removed Francis II. as to a place of perfect security. Charles VIII. was born and died at Amboise. Lat. 47. 25. N. lon. 0. 54. E.

AMBO'RA, *f.* in botany. See MITHRIDATA.

AMBOULE, a province of Madagascar, somewhat to the northward of south lat. 23°. It is a fertile and agreeable country, watered by the river Manampani. The country produces plants and fruits in plenty. Iron mines are also found here. The black cattle are extremely fat, and their flesh excellent. In this province stands a large town of the same name; near which is a fountain of hot water, within twenty feet of a small river whose sand is almost burning. The water of the fountain is said to boil an egg hard in two hours; and the inhabitants affirm it to be a sovereign remedy against the gout.

AMBOYNA, one of the Molucca islands in the East Indies. It lies in S. lat. 4. 0. and E. lon. 127. 0. and is remarkable for being the centre of the commerce for nutmegs and cloves, which is entirely monopolized by the Dutch East-India company. It is about twenty-four leagues in circumference. Besides cloves, it likewise abounds in most of the tropical fruits and fish; nor is there here any deficiency of good water; but flesh is very scarce. This scarcity, however, proceeds more from the policy of the Dutch than either the intemperature of the climate or the barrenness of the soil: for, excepting cloves, they have in Amboyna, as well as the Moluccas, industriously discouraged the cultivation of every esculent commodity, with the view of withholding subsistence from those who

might be tempted to invade them. Of the natives, the men wear large whiskers, but leave little hair upon their chin; and have only a slight piece of stuff wrapped round their middle. The women tie their hair in knots: the maids are bought of their fathers before they are married; and, if the wife proves barren, the marriage is dissolved. Some of the natives are Mahometans, and some Christians. Their houses are built of bamboo-canes and sago-trees. They sleep on mats. Their weapons are bows and arrows, javelins, scymitars, and targets.

Amboyna was first discovered by the Portuguese, who built a fort upon it, which was taken from them by the Dutch, in 1605. They did not, however, become masters of the whole island at once. The English had here five factories, which lived under the protection of the Dutch castle; holding themselves safe, in respect of the friendship between the two nations. Great differences had arisen between the Dutch and English colonists in this part of the world; till at last, the English East India company applying to king James, a treaty was concluded in 1619, by which the concerns both of the English and Dutch were regulated, and certain measures agreed upon for preventing future disputes. This was an additional security to the English; and, by virtue of the treaty, they continued two years in Amboyna, trading with the Dutch. During this time, however, several disputes happened; which occasioning mutual discontents, the complaints were sent to Jacatra, in the island of Java Major, to the council of defence of both nations there residing: but, they not agreeing, a state of the matter was sent over to Europe, to be decided by the East-India companies of both nations; or, in case they could not agree, by the king of England and the states of Holland, according to an article in the treaty of 1619. But, before these disputes could be decided in a legal way, the Dutch, in order to give the more specious colouring to the violent seizure which they meditated of the island of Amboyna, made use of the stale pretext of a conspiracy being formed by the English and Japanese to dispossess them of one of their forts in this place. The plot, it was alleged, had been confessed by a Japanese and Portuguese in the English service, who were most inhumanly tortured till they should answer in the affirmative such interrogatories as might favour the secret design of those cruel inquisitors. Upon the injurious evidence of this constrained declaration, they immediately accused the English factors of the pretended conspiracy. Some of them they imprisoned, and others they loaded with irons, and sent on-board their ships; seizing at the same time all the English merchandize, with their writings and books.

These acts of violence were followed by a scene of horror unexampled in the punishment of the most atrocious offenders. Some of the factors they tortured, by compelling them to swallow water till their bodies were distended to the utmost pitch; then taking the miserable victims down from the boards to which they had been fastened, and causing them to disgorge the water; if they did not acknowledge the imputed guilt, the process of torture was repeated. Others of the English they consumed by burning them gradually from the feet upwards, in order to extort the confession of a conspiracy, which was only pretended by the infernal policy of those savage tormentors. Some had the nails of their fingers and toes torn off; and in some they made holes in their breasts, filling the cavities with inflammable materials, to which they afterwards put fire. Those who did not expire under the agonies of torture, were consigned to the hands of the executioner. This tragical event happened in 1622.

The allegation of this pretended conspiracy was equally void of probability and truth. The Dutch had a garrison of 300 men in the fort, besides the burghers in the town, and several other forts and garrisons in the island, while the number of the English did not amount to twenty men; nor were even those provided with arms or ammunition to effect such a design as that with which they were charged. There likewise was not one English vessel in the harbour,

whereas the Dutch had eight ships riding near the town : neither, when the Dutch broke open the desks and trunks of the factors, was there found a single paper or letter which could be contrived into the most distant relation to any conspiracy. Add to all this, that such of the unhappy sufferers as could speak to be heard, declared in the most solemn manner their innocence of the plot with which they were charged. The whole of the transaction affords the most irrefragable testimony, that it was founded entirely upon a political fiction of the Hollanders, who had themselves formed the design of monopolizing the trade of the Spice Islands; for the accomplishment of which they perpetrated, about the same time, a similar tragedy at Pooleron, where they put to the torture 162 of the natives, whom they likewise charged with a pretended conspiracy. It may justly be reckoned singular in the fortune of this commercial republic, that they have ever since been permitted to enjoy in peace those invaluable islands, which were originally obtained by such atrocious infringements of humanity and the laws of nations, as will stain the Dutch annals, to the latest ages, with indelible infamy. The more effectually to preserve this trade, the Dutch have had all the clove-trees in the adjacent islands grubbed up. Sometimes also, when the harvest is very large, part of the produce of Amboyna itself is burnt. To prevent the rearing of cloves in any of the neighbouring islands, or the inhabitants from selling them to strangers, the governor of Amboyna makes the tour of his government with a fleet of curricurries, consisting sometimes of twenty, and at others of thirty, forty, or fifty, sail. This expedition is made with all the pomp imaginable, in order to gratify the pride and folly of the Indian chiefs. The true reason of their taking all this pains is, because experience has shewn, that no contracts, however solemn, can prevent the inhabitants of those islands from selling their spice to strangers : and even now, frauds are so frequently practised by the Dutch themselves, though the company is inexorable in punishing them, that the common people call the cloves *galcken-kruid*, that is, the gallows-spice. Besides the cloves, coffee is also cultivated here by the Dutch, and a gold mine has been lately discovered. This was accidentally found, by the quantities of gold-dust that were washed from some mountains by the torrents. Here also grow several kinds of valuable wood, of which they make tables, chairs, escrutoirs, &c. for the principal persons in the government; and the rest is sold all over the Indies, at a very extravagant rate.

Amboyna is divided into two parts, viz. a greater and lesser peninsula. The former, called *Hiton*, is twelve leagues in length, and two and a half broad. In this the Dutch have no less than five forts, or rather strong redoubts, mounted with cannon. The other is called *Leytimor*, five leagues in length, and one and a half broad, which is the southern part of the island; on this stands the fort of Victoria, which is the residence of the governor and his council, composed of fifteen gentlemen or merchants. The fortress is a square, the ramparts mounted with sixty pieces of brass cannon, and the garrison usually composed of 600 men. It is so strong by nature and art, as to be in a manner impregnable; and so effectually does it command the harbour, that no vessel could come in or go out without being sunk by the cannon, if the governor chose. The inhabitants of Amboyna are computed at 70 or 80,000, of whom but a small number are Dutch; and this obliges the latter to be continually upon their guard, and to keep a component number of troops in each of their forts, particularly in that of Middleburgh, which stands upon the isthmus that connects these peninsulas. There are also redoubts and garrisons in all the islands of this government.

AMBRA'CIA, one of the most considerable cities of ancient Epirus, situated on the river Aracthus, at a small distance from the sea. At first it was a free city; but was afterwards reduced by the *Æacidæ* kings of Epirus, who chose it for their place of residence. In process of time, the *Ætolians* made themselves masters of it, and held it

till the year before Christ 189, when it fell into the hands of the Romans. At this time Ambracia was a place of great strength. It was defended on one side by the river Aracthus, and on the other by steep and craggy hills; and surrounded with a high and thick wall, above three miles in compass. The Roman consul Fluvius began the siege by forming two camps, separated by the river, but with a communication between them; the Romans were posted in one, and the Epirots, their allies, in the other. He then threw up two lines, one of circumvallation, and the other of contravallation; and built a wooden tower, in form of a castle, over-against the citadel, which stood on a hill. The *Ætolians*, however, before the lines were quite finished, found means to throw about 1000 men into the place.

The lines being completed, the city was attacked in five different places at once. The battering-rams shook the walls on all sides: and the Romans, from their moveable towers, pulled down the battlements with a kind of scythes, which they fastened to long beams. The besieged made a vigorous defence. They were night and day on the walls, and indefatigable in preventing the effects of the rams and scythes. The strokes of the former they deadened, by letting down beams, large stones, lumps of lead, &c. by means of pulleys, upon them when they were in motion: the others they rendered useless, by pulling the beams to which they were fastened into the city with hooks contrived for the purpose.

While Fluvius was carrying on the siege, Nicander, the *Ætolian* prætor, found means to throw 500 men into the city, under the command of one Nicodamus, with whom Nicander agreed to attack the Roman camp in the night; not doubting, that, if the garrison from within, and the army from without, fell upon them at the same time, they would be obliged to raise the siege. Nicodamus narrowly watched the time at which he was ordered to sally; and, though Nicander did not appear, he marched out at the head of the garrison, armed with fire-brands and torches. The Roman centinels, surprised at this sight, ran to awake the legionaries, and soon spread a general alarm all over the camp. The legionaries marched in small bodies as they happened to meet, to repulse the enemy, whom they engaged in three different places. Two parties of the garrison were driven back; but the third, commanded by two *Ætolian* generals, made a great slaughter of the Romans; and, not finding themselves seconded by Nicander, retired in good order into the city.

Though the besieged were thus abandoned, and had no hopes of assistance, they continued to defend themselves with incredible vigour and resolution. The Romans had no sooner made a breach in the wall, but it was repaired, and a new one built behind it. The consul, therefore, altered his measures; and, instead of making breaches with the ram, began to undermine the wall, in hopes of throwing down great part of it at once, and entering the city before the besieged could have time to build a new wall. The miners, being covered, were not observed by the garrison, till the great quantities of earth brought out of the mine gave the alarm. The *Ætolians* immediately began to countermine; and, having dug a trench of the depth they supposed the mine to be, they carried it along the wall, where they heard the strokes of the pick-axes of the Romans. When the two mines met, a battle ensued, first with pick-axes and spades, and then with swords and spears: but this attack did not last long, each party making themselves a kind of rampart with the loose earth. The *Ætolians*, in order to drive their enemies quite out of the mine, invented a machine, which they brought to the place where the two mines met: this was an hollow vessel with an iron bottom, bored through in many places, and armed with spikes at proper distances, to prevent the enemy from approaching it: this vessel they filled with feathers, which they set on fire, and, with bellows driving the smoke on the besiegers, obliged them to leave the mine, half-suffocated. This interval the *Ætolians* made use of in repairing the foundations of the wall.

The

The vigorous resistance made by the Ambracians, however, did not raise the courage of the nation in general, who were determined on a peace with Rome at all events. Fluvius, in the mean time, being desirous of getting possession of Ambracia before the conclusion of the peace, employed Amynder, king of the Athamanes, to persuade the inhabitants to surrender. As Amynder had great interest in Ambracia, having long resided there, he easily persuaded them to capitulate on the following terms, viz. That the Ætolian garrison should have leave to march out of the city; that the inhabitants should pay 500 talents; and that they should deliver to the consul all the prisoners and deserters that were in the city. The gates were then opened to Fluvius; and he was presented with a crown of gold, together with many costly statues and pictures, of which there were great numbers in the city, it having been the capital of Pyrrhus, who had enriched it with every thing valuable and curious. From this time the city of Ambracia made no figure in history. It is scarcely known at present where the city stood; but that called *Arba*, in Upper Albania, seems best to agree with what is said of the ancient situation of this city. The river Aracthus, on which Ambracia was situated, is now called by the natives *Spagmuri*.

AMBRA'RIA, *f.* in botany. See ANTHOSPERMUM.

AMBRAS, AM'RAS, or OM'BRA, a town of Austria, with a castle or fort of the same name, which was, as its name (shade) rather imports, a summer retreat for the arch-dukes. The statues, medals, treasures of gold, precious stones, and rarities, are immense; among the last, there is the trunk of an oak, inclosing the whole body of a deer, which is supposed to have perished in the snow, and to have been covered with the mud and wreck of the trees, &c. washed from the mountains on the thaw. That a tree, thus deposited, and taking root, inclosed with its roots the body of the animal, and, in its further growth, raised the body up with it. Here is also a good library, with a gallery of busts and admirable paintings.

AMBRESBURY, Wilts, an ancient town, standing on the river Avon, in a fine open champaign country, distant from London 80 miles. It had its name from the valiant Ambrosius Aurelius, a British prince, who rebuilt the monastery after it had been destroyed by the Saxons, and filled it with 300 monks, to pray for the souls of those noble Britons who were slain by the perfidious Hengist the Saxon, who massacred here, in cold blood, 300 of the British nobility, whom he had invited to meet him without arms, to treat of a league of amity, and to keep a feast together. This treachery was revenged by the noble Aurelius, who, in the declension of the Roman empire, assumed the government of Britain, and with the assistance of the valiant Arthur, repelled all foreign invaders; but was at length killed in a battle on Salisbury plain, and buried under Stonehenge, which is one mile from Ambresbury. See *STONEHENGE*. The monastery was afterwards converted into a nunnery; and Eleanor, king Henry III's queen, retired and died here; whose example induced the princess Mary, king Edward II's daughter, with thirteen noblemen's daughters, to take the veil together, in this house. In the wall of the abbey is still to be seen an old grave-stone, supposed of queen Gunever, king Arthur's wife. The town at present consists of two streets that intersect each other; at which place is the church. It is a great thoroughfare to Warminster, Frome, Wells, &c. and has two good inns. A charity-school was erected and endowed here in 1715, for fifteen boys and as many girls. The town suffered greatly by fire, in the year 1753. It is said to be remarkable for a little fish, taken in the river, of a very delicate flavour, called a loach; and near this town is dug the best clay in the kingdom for making tobacco-pipes. It has a market on Fridays; and four annual fairs, viz. on May 17; June 22; October 6; and the first Wednesday after the 12th of December. Here is a noble seat which belonged to the duke of Queensbury, and was built by Inigo Jones. The pre-

sent duke made great improvements in the gardens and grounds, having inclosed and planted a large steep hill, at the foot of which the Avon beautifully winds, as also through the greatest part of the gardens. It is now occupied by some emigrated nuns.

AMBRO'NES, a Gaulish people, who lived near the foot of the Alps, between Switzerland and Provence. They invaded the Roman territories in conjunction with the Cimbri and Teutones; but were defeated with great slaughter by Marius, about 101 years before Christ. Their women, who had staid during the engagement in a kind of fortification made with their carts, on seeing their husbands flying, and the Romans at their heels, armed themselves with axes, and, gnashing with their teeth, fell with fury on the pursuers and the pursued. Their first rage being spent, they desired to surrender themselves, upon the single condition that their chastity should not be violated; but, this equitable request being denied, they first killed their children, and then themselves, not one remaining alive out of the whole multitude.

AMBRO'MA, *f.* in botany. See AEROMA.

AM'BROSE, [*αμβροσιος*, Gr. immortal.] A proper name of men.

AMBROSE (St.), bishop of Milan, one of the most eminent fathers of the fourth century, born in Gaul, in the year 333 according to Dr. Cave, or in 340 as Mr. Du Pin affirms. His father was at this time *præfælus prætoris* in Gaul, and resided at Arles, the capital of Gallia Narbonensis. The birth of Ambrose is said to have been followed with a remarkable presage of his future eloquence; for, we are told, that a swarm of bees came and settled upon his mouth as he lay in his cradle. He soon made himself master of the several parts of secular learning; and pleaded causes before Probus with so much eloquence, that he was appointed his assessor, and soon after governor of the provinces of Liguria and Æmilia; he settled at Milan; where, in the year 374, upon the death of Auxentius, bishop of that city, there being a great contest between the Catholics and Arians concerning the choice of a new bishop, Ambrose thought it his duty, as governor, to go to the church, in order to compose the tumult. He accordingly addressed himself to the people in a pathetic speech, exhorting them to proceed to their choice in a calm and friendly manner. While he was speaking to them, the whole assembly cried out with one voice, "Let Ambrose be bishop!" Such a sudden and unexpected incident surprised him extremely; so that he retired immediately, and used every method to divert them from their resolution of choosing him: but at last he was obliged to comply; and was baptised (being but a catechumen before), and ordained bishop towards the latter end of the year 374. About the year 377, the barbarous nations making an incursion into the Roman empire, he fled to Illyricum, and afterwards to Rome. In the year 384, he was sent to the tyrant Maximus, who had usurped the empire, and prevailed on him not to pass into Italy. The heathens, encouraged by these intestine commotions, attempted to restore their religion, and employed Q. Aurelius Symmachus, prefect of Rome, a man of great eloquence, to plead their cause. This gave rise to the famous contest between St. Ambrose and him about repairing the altar of Victory. But Symmachus, having lost his cause, was expelled the city, and commanded not to approach within an hundred miles of it. The petition which he sent to Valentinian the younger, is still extant. We find in it the strongest figures of rhetoric, and the greatest force of eloquence: St. Ambrose wrote a confutation of this petition; but he has been thought guilty of many paralogisms; and yet he protests, "that he endeavoured only after the solidity of reasoning, leaving Symmachus all the glory of eloquence and politeness; it being (says he) the peculiar privilege of the pagan philosophers to amuse the mind with colours as false as their idols; and to say *great* things, not being able to say *true* ones." Ambrose met with a good deal of opposition from the Arians, against whom he acted with great

great spirit and intrepidity. Justina the empress, and mother of Valentinian, who was an Arian, resolved to restore Arianism at Milan, began with demanding of St. Ambrose one of the churches, which was called the Portian church: but he refused it; and, the people surrounding the palace in a body, she was obliged to leave him in possession of his church, and even desire him to pacify the people. He died at Milan, the 4th of April, 397, being fifty-seven years of age, according to Mr. Du Pin and some other writers; but Dr. Cave and Olearius say that he was sixty-four years old at his death. He was buried in the great church at Milan. He wrote several works, the most considerable of which is that *De Officiis*. Paulinus wrote his life, and dedicated it to St. Augustin: this life is prefixed to St. Ambrose's works; the best edition of which is reckoned to be that published by the Benedictine monks, in two volumes, folio, Paris, 1686 and 1690.

AMBROSE (Isaac), an eminent dissenting minister, was educated at Brazen-nose-college, Oxford, where he took the degree of bachelor of arts, and became minister of Preston, and afterwards of Garstang, in Lancashire, where he was, in 1662, ejected for nonconformity. It was usual with him to retire every year for a month into a little hut in a wood, where he shunned all society, and devoted himself to religious contemplation. Dr. Calamy observes, that he had a very strong impulse on his mind of the approach of death, and took a formal leave of his friends at their house a little before his departure; and the last night of his life he sent his discourse concerning *angels* to the press. The next day he shut himself up in his parlour, where, to the great surprise and regret of all who saw him, he was found just expiring. He died in 1663-4, in the seventy-second year of his age. He wrote several other books; as the *Prima, Media, et Ultima*, or the First, Middle, and Last, Things; War with Devils, Looking unto Jesus, &c.

AMBROSE, or St. Ambrose in the Wood, an order of religious, who use the Ambrosian office, and wear an image of that saint engraven on a little plate: in other respects they conform to the rule of the Augustines.

AMBROSIA, *f.* [*ambrosie*, Fr. *ambrosia*, Ital. Sp. and Lat. *αμβροσία*, Gr. compounded of the particle *α* and *βροτος*, immortal, as being supposed to render those immortal who fed on it.] In heathen antiquity, denotes the solid food of the gods, in contradistinction from the drink, which was called *nectar*; from which every thing eminently pleasing to the smell or taste is called ambrosia.

AMBROSIA is also a pompous kind of title given by some physicians to certain alexipharmic compositions of extraordinary virtue. The name was particularly given to a famous antidote of Philip of Macedon, against all poisons, bites, and stings of venomous creatures, as well as many internal diseases.

AMBROSIA, *f.* in botany, a genus of the monoecia pentandria class, ranking in the natural order of compositæ nucamentaceæ. The generic characters are—I. Male flowers compound. Calyx: perianthium common, one-leaved, flat, of the same length with the floscules. Corolla: compound, uniform, tubulous, equal, hemispherical; proper, one-petalled, tubulous, funnel-shaped, erect, quinquefid. Stamina: filaments very small; antheræ erect, parallel, acuminate. Pistillum: style filiform, length of the stamens; stigma orbiculate, membranaceous. Receptaculum: common, scarcely any, naked. II. Female flowers below the males, doubled. Calyx: perianthium one-leaved, acuminate, entire, permanent, the belly five-toothed, one-flowered. Pistillum: germ ovate, in the bottom of the calyx; style filiform, of the same length with the calyx; stigmas two, setaceous, long, divaricate. Pericarpium: a subovate nut, formed from the calyx hardened, one-celled, not opening, crowned with the five acuminate teeth of the calyx. Seed single, roundish.—*Essential Character*. Male. Calyx common, one-leaved. Corolla one-petalled, trifid, funnel-shaped. Receptaculum naked. Female. Calyx one-leaved, entire, the belly

five-toothed, one-flowered. Corolla, none. Nut of the hardened calyx one-seeded.

Species. 1. *Ambrosia trifida*, or trifid-leaved ambrosia: leaves three-lobed serrate. It is a common weed in North America; it often grows eight or ten feet high; and if it be planted in a rich moist soil, or often watered, it will grow much higher, and spread out into many branches; in which case they must be supported by stakes, being very subject to break with strong winds. The flowers are not more conspicuous than those of hemp, and therefore this plant is preserved only by persons curious in botany. It is an annual.

2. *Ambrosia eliator*, or tall ambrosia: leaves pinnatifid; racemes panicled, terminal, smooth. This is an annual herbaceous plant, from two to three feet in height, upright and branched. Native of Jamaica, in barren, sandy, and rocky, situations, by river sides, in the southern part of the island. It flowers there from February to June; but with us in July and August. It has the appearance and taste of wormwood. Mr. Miller affirms, that he has frequently received the seeds from Virginia and Carolina, as well as from the West-India islands.

3. *Ambrosia artemisiifolia*, or mugwort-leaved ambrosia: leaves bipinnatifid, the first leaves at the origin of the smaller branches undivided, and quite entire. This is an annual, and a native of North America.

4. *Ambrosia maritima*, or sea ambrosia: leaves multifid, spikes solitary, hairy, subscissile. Annual; grows naturally in Cappadocia, Tuscany, and the county of Nice, on sandy shores.

5. *Ambrosia arborescens*, or tree ambrosia: leaves pinnatifid, hirsute, racemes solitary terminating, stem shrubby. Grows to the height of ten or twelve feet, with a woody stem, dividing into several branches. This species is perennial; a native of Peru.

Propagation and Culture. The seeds, when sown in the spring, seldom germinate the first year, but frequently remain in the ground until the following spring; so that, when the plants do not appear, the ground must not be disturbed till after the spring following. When the plants come up, some of them may be transplanted into a moist rich soil, allowing them at least four or five feet room every way. If the seeds ripen and are suffered to scatter, they will vegetate the following spring, provided the ground be not disturbed; or, if the seeds be sown in autumn, the plants will come up in the spring, and may be treated as above. See ARTEMISIA and COCHLEARIA.

AMBROSIA, a daughter of Atlas, and one of the Hyades.

AMBROSIAL, *adj.* Partaking of the nature or qualities of ambrosia; fragrant; delicious; delectable:

Thus while God spake, *ambrosial* fragrance fill'd
All heaven, and in the blessed spirits elect
Sense of new joy ineffable diffus'd.

Milton.

To farthest shores th' *ambrosial* spirit flies,
Sweet to the world, and grateful to the skies.

Pope.

AMBROSIAL OFFICE, or RITE, *f.* in church history, a particular formula of worship in the church of Milan, which takes its name from St. Ambrose, who instituted that office in the fourth century. Each church originally had its particular office; and when the pope, in after-times, took upon him to impose the Roman office upon all the western churches, that of Milan sheltered itself under the name and authority of St. Ambrose; from which time the Ambrosian ritual has prevailed.

AMBROSIN, *f.* in middle-age writers, denotes a coin struck by the lords or dukes of Milan, whereon was represented St. Ambrose on horseback, with a whip in his hand.

AMBROSIN'IA, *f.* [from Bartolomeo and Hyacinto *Ambrosini*, Professors of Botany at Bologna fifty-two years.] In botany, a genus of the gynandria polyandria class, ranking in the natural order of: pipéritæ. The generic characters are—I. Males. Calyx: spathe one-leaved, cowed; convolute at the base, converging at the tip; partition membranaceous. Stamina: filaments none; antheræ

theræ very many, solitary, within the hinder cell of the spathe, in the upper part of the partition, digested in a distinct order. Nectaries two, roundish, concave, at the base of the antheræ. II. Female. Calyx: spathe common with the males. Pistillum: germ in the anterior cell of the spathe, and the lower part of the partition, solitary, roundish; style cylindrical, shorter than the spathe; stigma obtuse. Pericarpium: capsule roundish, one-celled. Seeds very many, ovate, nestling.—*Essential Character.* Spathe one-leaved, separated by a partition; stamens on the inner, pistils on the outer, side of it.

Description. Root perennial, tuberous, acrid. Leaves radical, petiolate, ovate, shining. Spadix quite simple, cylindrical. Spathe fleshy, greenish white on the outside, deeper green on the inside, with purple spots, ending in a sharp recurved point. The leaves appear at the beginning of autumn, and decay in the spring. It is a native of Sicily, near Palermo; and was first found, described, and figured, by Bocconi. It requires the protection of a green-house, and may be increased from the root. There is but one species.

AMBROSIUS, AURELIANUS, or AURELIUS AMBROSIVS, a famous general of the ancient Britons, of Roman extraction. He was educated at the court of Aldroen of Amoria; who, at the request of the Britons, sent him over with ten thousand men, to assist them against the Saxons, whom Vortigern had invited into Britain. Ambrosius had such success against the Saxons, that the Britons chose him for their king, and compelled Vortigern to give up to him all the western part of the kingdom divided by the Roman highway called *Watling-street*. Some time after, the Britons being discontented with Vortigern, and having withdrawn their allegiance from him, he returned to a castle in Wales, where being besieged by Ambrosius, and the castle taking fire, he perished in the flames, and left his rival sole monarch of Britain; who now took upon him the imperial purple, after the manner of the Roman emperors. Geoffrey of Monmouth tells us, that Ambrosius built Stonehenge near Salisbury in Wiltshire. Ambrosius, according to this historian, coming to a monastery near Caeracardoc, now Salisbury, where three hundred British lords, massacred by Hengist, lay buried, and resolving to perpetuate the memory of this action, he ordered his workmen to prepare a large quantity of stones and other materials. But having, at the instigation of Tremounus archbishop of Caerleon, consulted the famous Merlin, this magician advised him to send over to Ireland for certain great stones, called *chorea gigantum*, the giant's dance, placed in a circle on a hill called *Killair*, having been brought thither by giants from the farthest borders of Africa. A body of forces were accordingly sent into Ireland, under Pendragon, Ambrosius's brother, to fetch these stones; but were opposed in their attempt by Gillomanus king of the country, who derided the folly of the Britons in undertaking so ridiculous an expedition. Nevertheless, the Britons, having vanquished this prince in battle, brought away the stones; and by the direction and assistance of Merlin, who had accompanied them, these wonderful stones, by order of Ambrosius, were placed over the graves of the British lords, and are now what is called *Stonehenge*. Alexander Meham celebrates this fable in his poem *De divinæ sapientiæ laudibus*. Polydore Virgil assigns another origin of Stonehenge; he tells us it was erected by the Britons as a monument to their general Ambrosius, on the place where he fell in battle, to perpetuate the memory of his glorious actions and services done to his country. Both these stories are rejected by our best antiquaries; who, however, are by no means agreed as to the true origin of this famous piece of antiquity. See *STONEHENGE*.

After the Britons had defeated the Saxons, and obliged them to retire northward, Ambrosius is said to have convened the princes and great men at York, where he gave orders for repairing the churches destroyed by the Saxons, and restoring the exercise of religion to its former lustre.

This is confirmed by Matthew of Westminster; who highly applauds the great zeal of Ambrosius in repairing the churches, encouraging the clergy, and restoring the honour of religion. The Monmouth historian gives this prince a very high character: "He was a man," says he, "of such bravery and courage, that when he was in Gaul no one durst enter the lists with him; for he was sure to unhorse his antagonist, or to break his spear into shivers. He was, moreover, generous in bestowing, careful in performing religious duties, moderate in all things, and more especially abhorred a lie. He was strong on foot, stronger on horseback, and perfectly qualified to command an army." The same author tells us he was poisoned at Winchester by one Eopa a Saxon, disguised as a physician, and hired for that purpose by Pascentius one of the sons of Vortigern: but the generally-received opinion is, that he was killed in a battle which he lost in the year 508, against Cerdic, one of the Saxon generals.

AM'BRY, *f.* [a word corrupted from *almonry*.] The place where the almoner lives, or where alms are distributed. The place where plate, and utensils for house-keeping, are kept; also a cupboard for keeping cold victuals: a word obsolete, though still used in the northern counties, and in Scotland. In the ancient abbeys and priories, there was an office under this denomination, wherein were laid up all charities for the poor.

AM'BS-ACE, *f.* [from *ambo*, Lat. and *ace*.] A double ace; so called when two dice turn up the ace.—I had rather be in this choice, than throw *ambs-ace* for my life. *Shakespeare*.

AMBUBA'JÆ, in Roman antiquity, were immodest women, who came from Syria to Rome, where they lived by prostitution, and by playing on the flute: the word is derived from the Syriac *abub*, which signifies a flute; although others make it to come from *am* and *Baïæ*, because these prostitutes often retired to Baïæ. According to Cruquius, these women used likewise to sell paint for ornamenting the face, &c. so that the present fashion among the females may shelter itself under the authority of the remotest antiquity.

AM'BULANT, or AMBULATORY, *f.* They formerly gave in France the name of *ambulant commissioners* to those commissioners, or clerks of the king's farms, who had no settled office; but visited all the offices within a certain district, to see that nothing were done in them against the king's right and the interest of the farm.

AMBULANT, is also used to denote those brokers at Amsterdam, or exchange agents, who have not been sworn before the magistrates. They transact brokerage business, but their testimony is not received in the courts of justice.

AMBULA'TION, *f.* [*ambulatio*, of *ambulo*, Lat. to walk.] The act of walking.—From the occult and invisible motion of the muscles, in station, proceed more offensive lassitudes than from *ambulation*. *Brown*.

AM'BULATORY, *adj.* [*ambulo*, Lat.] That which has the power and faculty of walking. That which happens during a passage or walk. Moveable; as, an *ambulatory* court; a court which moves from place to place for the exercise of its jurisdiction.

AMBUL'LI, a name given to Jupiter, Minerva, and the Tyndarides. It signifies prolongation, for they thought these gods prolonged life.

AM'BULO, *f.* The name of a disease, called also *furiosus flatulentus*, and also *status furiosus*. It is a distention or inflation attended with pain, and variously periodical. It is caused by vapours shooting through various parts of the body.

AMBUR'BIUM, *f.* in Roman antiquity, a procession made by the Romans round the city and pomærium, in which they led a victim, and afterwards sacrificed it, to avert some calamity that threatened the city.

AM'BURY, or ANBURY, *f.* among farriers, denotes a tumour, wart, or swelling, which is soft to the touch, and full of blood. This is cured by tying a horse-hair very hard about its root; and, when it has fallen off, which commonly

commonly happens in about eight days, firing some powder of verdigrease upon the part, to prevent the return of the complaint. If the tumour be so low that nothing can be tied about it, they cut it out with a knife, or else burn it off with a sharp hot iron; and, in sinewy parts, where a hot iron is improper, they eat it away with oil of vitriol, or white sublimate.

AM'BUSCADE, *f.* [*embuscade* Fr.] A private station in which men lie to surprise others; ambush.

Then waving high her torch, the signal made,
Which rous'd the Grecians from their *ambuscade*. *Dryden*.

—When I behold a fashionable table set out, I fancy that gout, fevers, and lethargies, with innumerable distempers, lie in *ambuscade* among the dishes. *Addison*.

AMBUSCA'DO, *f.* [*emboscada*, Span.] A private post, in order to surprise an enemy:

Sometimes she driveth o'er a soldier's neck,
And then he dreams of cutting foreign throats,
Of breaches, *ambuscadoes*, Spanish blades,
Of healths five fathom deep.

Shakespeare.

AM'BUSH, *f.* [*ambusche*, Fr. from *bois*, a wood; whence *embuscher*, to hide in woods, ambushes being commonly laid under the concealments of thick forests.] The post where soldiers or assassins are placed, in order to fall unexpectedly upon an enemy. The act of surprising another, by lying in wait or lodging in a secret post:

—Nor shall we need,
With dangerous expedition, to invade
Heav'n, whose high walls fear no assault or siege,
Or *ambush* from the deep.

Milton.

The state of being posted privately, in order to surprise; the state of lying in wait. Perhaps the persons placed in private stations:

For you, my noble lord of Lancaster,
Once did I lie in *ambush* for your life.

Shakespeare.

AM'BUSHED, *adj.* [from *ambush*.] Placed in ambush; lying in wait:

Thick as the shades, there issue swarming bands
Of *ambush'd* men, whom, by their arms and drefs,
To be Taxallan enemies I guess.

Dryden.

AM'BUSHMENT, *f.* [from *ambush*.] Ambush; surprise: a word now not used.

Like as a wily fox, that having spied
Where on a sunny bank the lambs do play,
Full closely creeping by the hinder side,
Lies in *ambushment* of his hoped prey.

Spenser.

AMBU'ST, *adj.* [*ambustus*, Lat.] Burnt; scalded.

AMBUS'TA, *f.* in medicine, burns or scalds, called also *causis*, *ambustio*, *ambustura*. Dr. Cullen places this case as a variety of the phlogosis erythema. Burns and scalds differ not as to any consideration respecting the cure. A burn is from solid substances, but considered as to the effect on the injured body: a scald is a burn from any hot fluid, or solid when in a fluid state. Their danger is according to the degree, the part injured, the peculiarity of the constitution, and consequent symptoms; and wounds from burns are more liable to form a cicatrix than when they are produced by other causes. Burns may be ranked into four kinds. 1. When a redness in the part is attended with heat and pain. 2. When after the burn there arise pustules or blisters, with pain. 3. When the skin and subjacent fat are burnt to a crust. 4. When the burning goes to the bone. The two first resemble an inflammation, and are to be considered as such, from an external cause; the third a gangrene, and the fourth a sphacelus. In general, burns and scalds of any consequence require bleeding, and repeated gentle purging, to prevent or to reduce inflammation. If lightning was the cause, the internal use of cordials is required; and if the pain is great, though a fever attends, anodynes internally will be necessary.

AMBUS'TION, *f.* [*ambustio*, Lat.] A burn or scald.

AM'BY, a town of the Netherlands, in the province of Limburg, situated opposite to Maestricht, on the east side of the river Maese, in lat. 56. 52. N. lon. 5. 41. E.

AME'DIANS, in church-history, a congregation of religious in Italy, so called from their professing themselves *amantes Deum*, "lovers of God;" or rather *amati Deo*, "beloved of God." They wore a grey habit and wooden shoes, had no breeches, and girt themselves with a cord. They had twenty-eight convents; and were united by Pope Pius V. partly with the Cistercian order, and partly with that of the Socolanti, or wooden-shoe wearers.

AMEDNAGUR', a city of Hindostan, in the Decan, once the capital of the soubah of the same name, which is now better known by that of Dowlatabad. This place was the residence of the Emperor Aurengzebe, during his conquest of the Decan and the Carnatic. It is 181 miles by Poonah from Bombay. Lat. 22. 58. N. lon. 72. 37. E.

A'MEL, *f.* [*email*, Fr.] The matter with which the variegated works are overlaid, which we call *enamelled*.—The materials of glass melted with calcined tin, compose an undiaphanous body. This white *amel* is the basis of all those fine concretes that goldsmiths and artificers employ in the curious art of enamelling. *Boyle*.

AMELANCHIER', *f.* in botany. See CHIONANTHUS and MESPILUS.

AME'LAND, an island of the United Provinces, in the German ocean, near the coast of Friesland, from which it is separated by a strait called the Wadt.

A'MELCORN, *f.* [not unlikely of *amylum*, starch, Lat. q. d. *amyle corn*.] French rice, a kind of grain of which starch is made.

AME'LIA, formerly AMERIA, or ÆMILIA, a small city in the pope's territories, seated on a mountain, between the Tiber and Nira, in a fertile country, twenty miles south-west of Spoleto, and forty-five north of Rome. Lat. 42. 33. N. lon. 12. 30. E.

AMEL'LOIDES, *f.* in botany. See CINERARIA.

AMEL'LUS, *f.* [from *mel* honey.] In botany, a genus of the syngenesia polygamia superflua class, ranking in the natural order of compositæ oppositifoliæ. The generic characters are—Calyx: common imbricate, roundish. Corolla: compound radiate; corollets hermaphrodite, very many in the disk. Females very many in the ray. Proper of the hermaphrodite tubulous, five-cleft. Female ligulate, lax, two or three toothed. Stamina: in the hermaphrodites, filaments five, capillary, short. Antheræ cylindrical, tubulous. Pistillum: in the hermaphrodites germ obovate. Style filiform, the length of the stamens. Stigmas two, filiform. Females very like the hermaphrodites. Pericarpium: none. Calyx unchanged. Seeds: to the hermaphrodites solitary obovate; down capillary, to the females, very like the others. Receptaculum: chaffy.—*Essential Character*. Calyx, imbricate. Corollets of the ray undivided. Down simple. Receptaculum, chaffy.

Species. 1. *Amellus lychnitis*, or trailing amellus: leaves opposite, lanceolate, obtuse, downy, peduncles one-flowered. Rises from two to three feet high, sending out branches on every side, terminated by flower-stalks, each supporting one violet-coloured flower, with a yellow disk, and appearing in July or August. It grows naturally at the Cape of Good Hope.

2. *Amellus umbellatus*, or umbelled amellus: leaves opposite, three-nerved, downy underneath, flowers umbelled. This has herbaceous, upright, simple, round, hairy, stems, two feet high, or at most two feet and a half. It is a native of Jamaica, in the cooler woods and mountains, and flowers there in summer.

Propagation and Culture. The first is a perennial plant, easily propagated by cuttings, planted in the shade during any of the summer months, and duly watered. These should be taken up with balls of earth to their roots, and planted in pots, that they may be sheltered in winter, either under a common frame, or in a green-house, where they may

may have plenty of air in mild weather, otherwise they will draw up weak and have little beauty. The second may be propagated by seeds, which should be sown on a hot-bed in the spring; when the plants are fit to remove, two or three of them should be planted in pots, then plunged into a hot-bed of tan, to bring them forward to get ripe seeds in the autumn, otherwise the plants will require a stove in winter.

AMELLUS, *f.* in botany. See CALFA and ERIGERON.

AMELLUS VIRGILII, *f.* in botany. See ASTER.

AMELOT' DE LA HOUSSE (Nicholas), born at Orleans in 1634, was much esteemed at the court of France, and appointed secretary of an embassy which that court sent to the commonwealth of Venice, as appears by the title of his Translation of Father Paul's History of the Council of Trent; but he afterwards published writings which gave such offence, that he was imprisoned in the Bastille. The first works he printed were the History of the Government of Venice, and that of the Uscocks, a people of Croatia. In 1683 he published his translations into French of Machiavel's Prince, and Father Paul's History of the Council of Trent, and Political Discourses of his own upon Tacitus. These performances were well received by the public. His translation of Father Paul was attacked by the partisans of the pope's unbounded power and authority. In France, however, it met with great success; all the advocates for the liberty of the Gallican church promoting it to utmost of their power, though at the same time there were three memorials presented to have it suppressed. In 1684, he printed, at Paris, a French translation of Baltasar Gracian's *Oraculo Manual*, with the title of *L'Homme de Cour*. In 1686, he printed *La Morale de Tacite de la Flatterie*; in which work he collected several particular facts and maxims, which represent in a strong light the artifices of court-flatterers, and the mischievous effect of their poisonous discourses. He wrote several other works; and died at Paris in 1706, being then almost seventy-three years of age.

AMELOT (Denis), a celebrated French writer, was born at Saintonge in 1606. He maintained a close correspondence with the fathers of the Oratory, a congregation of priests founded by Philip of Neri. He wrote the life of Charles de Gondren, second superior of this congregation, and published it at Paris in 1643. Amelot's translation of the New Testament, in 4 vols octavo, was printed in the years 1666, 1667, and 1668. Amelot wrote also an Abridgement of Divinity, a Catechism for the Jubilee, and a kind of Christian Manual for every day. Towards the end of his life, he entered into the congregation of the Oratory in 1650; and continued amongst them till his death; which happened in 1678.

A'MEN, *adv.* [a word of which the original has given rise to many conjectures. Scaliger writes, that it is Arabic; and the rabbies make it the compound of the initials of three words, signifying *the Lord is a faithful king*; but the word seems merely Hebrew, אמן, which, with a long train of derivatives, signifies, firmness, certainty, fidelity.] A term constantly used in devotions, by which, at the end of a prayer, we mean, *so be it*; at the end of a creed *so it is*. It was a sort of affirmation used often by our Saviour: *Αμην, αμην, λεγω υμιν, Verily, verily, I say unto you*. Lastly, it is understood as expressing a wish; as, *Amen, so be it*; Numb. v. 22. or an affirmation, *Amen, yes, I believe it*, 1 Cor. xiv. 16. The Hebrews, and the five books of Psalms, according to their way of distributing them, with the words *Amen, amen*; which the Septuagint have translated, *Γεννητο, γεννητο*; and the Latins, *Fiat, fiat*. The Greek and Latin churches have preserved this word in their prayers, as well as *alleluia* and *hoshannah*; because they observed more energy in them than in any terms which they could use in their own languages. At the conclusion of the public prayers, the people answered with a loud voice, *Amen*; and St. Jerome says, that at Rome, when the people answered *Amen*, the sound of their voices was like a clap of thunder: *In similitudinem caelestis tonitru*

Amen reboat. The Jews assert, that the gates of heaven are opened to him who answers *Amen* with all his might.

AMENABLE, *adj.* [*amenable*, Fr. *amener quel'un*, in the French courts, signifies, to oblige one to appear to answer a charge exhibited against him.] Responsible; subject so as to be liable to enquiries or accounts.—Again, because the inferior sort were loose and poor, and not *amenable* to the law, he provided, by another act, that five of the best and eldest persons of every sept should bring in all the idle persons of their surname to be justified by the law. *Sir John Davies*.

AMENABLE, [from the French *main*, a hand.] In law, signifies tractable, *ad manum*, that may be led or governed. In the modern sense, it signifies to be responsible, or subject to answer in a court of justice.

AM'ENAGE, or AMENANCE, *f.* [They seem to come from *amener*, Fr.] Conduct; behaviour; mien: words disused.

To AMEN'D, *v. a.* [*amender*, Fr. *emendâr*, Sp. *emendo*, It. and Lat.] To correct; to change any thing that is wrong to something better. To reform the life, or leave wickedness. In these two cases we usually write *mend*.—*Amend* your ways and your doings, and I will cause you to dwell in this place. *Jerem. vii. 3*.—To restore passages in writers, which the copiers are supposed to have depraved; to recover the true reading.

"Little said, soon amended," or "silence seldom does harm." Lat. *Nulli tacuisse nocet esse locutum*. H. Ger. *Reden thut mehr schaden als stillschweigen*. Loquacity is more hurtful than silence. And indeed, if we consider the fatal consequences which in all ages have attended those who have given too great a loose to their tongue, and the serious misfortunes this little member has brought upon mankind in general, every wise man would be very cautious how he placed his words. How often does the talkative man expose himself to derision, and what pains does he not take to appear a greater fool than perhaps he in reality is; whereas the man who speaks little, and with caution, has often a greater share of wisdom ascribed to him than he deserves.

To AMEND, *v. n.* To grow better. To *amend* differs from *improve*; to *improve* supposes or not denies that the thing is well already, but to *amend* implies something wrong.

AMEN'DE, *f.* [French] This word, in French, signifies a fine, by which recompence is supposed to be made for the fault committed. We use, in a cognate signification, the word *amends*.

AMEN'DER, *f.* [from *amend*.] The person that amends any thing.

AMEND'MENT, *f.* [*amendment*, Fr.] A change from bad for the better.—Man is always mending and altering his works; but nature observes the same tenor, because her works are so perfect, that there is no place for *amendments*; nothing can be reprehended. *Ray*.—Reformation of life.—Behold! famine and plague, tribulation and anguish, are sent as scourges for *amendment*. 2 *Esdra*s, xvi. 19.—Recovery of health:

Your honour's players, hearing your *amendment*,

Are come to play a pleasant comedy.

Shakespeare.

AMENDMENT, [*amendatio*.] in law, is the correction of an error committed in any process which may be amended after judgment; but, if there be any error in giving the judgment, the party is driven to his writ of error: though, where the fault appears to be in the clerk who wrote the record, it may be amended. *Terms of the Law*. Formerly suitors were much perplexed by writs of error brought upon very slight and trivial grounds, as mis-spellings and other mistakes of the clerks, all which might be amended at the common law, while all the proceedings were in paper, for they were then considered only *in feri*, and therefore subject to the controul of the courts. But, when once the record was made up, it was formerly held, that by the common law, no *amendment* could be permitted; unless within the very term in which the judicial act so

recorded

recorded was done; for, during the term the record is in the breast of the court, but afterwards it admitted of no alteration: but now the courts are become more liberal, and, where justice requires it, will allow of amendments at any time while the suit is depending, notwithstanding the record be made up, and the term be past; for they, at present, consider the proceedings as *in fieri* till judgment is given; and therefore, that till then they have power to permit amendments by the common law; but, when judgment is once given and inrolled, no amendment is permitted in any subsequent term. Mistakes are also frequently helped by the statutes of amendment and jeofails, so called, because when a pleader perceives any slip in the form of his proceedings, and acknowledges such error (*jeo faile*, I have failed), he is at liberty by those statutes to amend it; which amendment is seldom actually made, but the benefit of the acts is attained by the court's overlooking the exceptions. 3 *Black.* 406.

AMENDS, *f.* [*amende*, Fr. from which it seems to be accidentally corrupted.] Recompence; compensation; atonement:

There I, a pris'ner chain'd, scarce freely draw
The air imprison'd also, close and damp,
Unwholesome draught; but here I feel *amends*,
The breath of heav'n fresh blowing, pure and sweet,
With day-spring born; here leave me to respire. *Milton.*

—It is a strong argument for retribution hereafter, that virtuous persons are very often unfortunate, and vicious persons prosperous; which is repugnant to the nature of a Being, who appears infinitely wise and good in all his works; unless we may suppose that such a promiscuous distribution, which was necessary for carrying on the designs of providence in this life, will be rectified and made *amends* for in another. *Spektator.*

AMENITY, *f.* [*amenité*, Fr. *amanitas*, Lat.] Pleasantness; agreeableness of situation.—If the situation of Babylon was such at first as in the days of Herodotus, it was a seat of *amenity* and pleasure. *Brown.*

AMENTACEOUS, *adj.* [*amentatus*, Lat.] Hanging as by a thread.—The pine-tree hath *amentaceous* flowers or catkins. *Miller.*

AMEN'TUM, *f.* in botany, the name of a species of calyx, consisting of valves, and hanging down in different directions from the calulis. Common oats afford a good example of the amentum.

AMENTUM, *f.* in Roman antiquity, a thong tied about the middle of a javelin or dart, and fastened to the forefinger, in order to recover the weapon as soon as it was discharged. The ancients made great use of the amentum, thinking it helped to enforce the blow. It also denotes a latchet that bound their sandals.

AME'RADE, *f.* a kind of officers among the Saracens, answering to the governor of provinces among the Europeans. The name is originally the same with that of emir.

To AME'RCE, *v. a.* [*amercier*, Fr. *εφθαλμων μεν αμερσει*, seems to give the original.] To punish with a pecuniary penalty; to exact a fine; to inflict a forfeiture. It is a word originally juridical, but adopted by other writers, and is used by Spenser of punishments in general. Sometimes with the particle *in* before the fine.—They shall *amerce* him *in* an hundred shekels of silver, and give them unto the father of the damsel, because he hath brought up an evil name upon a virgin of Israel. *Deut.* xxii. 19. Sometimes it is used, in imitation of the Greek construction, with the particle *of*:

Millions of spirits, for his fault *amerc'd*
Of heav'n, and from eternal splendours flung
For his revolt.

Milton.

AME'RCER, *f.* He that sets a fine upon any misdemeanour; he that decrees or inflicts any pecuniary punishment or forfeiture.

AME'RCEMENT, or AME'RCIAMENT, *f.* The pecuniary punishment of an offender, who stands at the mercy of the king, or other lord in his court. *Cowell.*—All *amercements* and fines that shall be imposed upon them, shall come unto themselves. *Spenser.*

AMERCMENT, in law, is to be at the king's mercy with regard to the *quantum* of a fine imposed. By *magna charta*, c. 14. no man shall have a larger amercement imposed upon him than his circumstances or personal estate will bear, saving to the land-owner his land, to the trader his merchandize, and to the husbandman his team and instruments of husbandry: in order to ascertain which, the great charter also directs, that the amercement, which is always inflicted in general terms, shall be set or reduced to a certainty by the oath of a jury. In the court-leet and court-baron, this is usually done by *assessors*, or jurors sworn to *assesse*; that is, to tax and moderate the general amercement according to the particular circumstances of the offence and offender. In limitation of which, in courts superior to these, the ancient practice was, to inquire by a jury, when a fine was imposed upon any man, how much he was able to pay by the year, saving the maintenance of himself, his wife, and children. And, since the disuse of such inquest, it is never usual to assess a larger fine than a man is able to pay, without touching the implements of his livelihood, but to inflict corporal punishment, or a stated imprisonment, which is better than an excessive fine, for that amounts to imprisonment for life; and by the bill of rights it is particularly declared, that excessive fines ought not to be imposed. 4 *Black.* 372.

AME'RI, *f.* in botany. See INDIGOFERA.

AME'RICA, [from *Americus Vesputius*, who falsely assumed the honour of being the first discoverer of that continent.] One of the four quarters of the globe, and by far the largest; which, from its late discovery, is frequently denominated the *New World*. This vast country extends from the 80th degree of north to the 56th degree of south latitude; and, where its breadth is known, from the 35th to the 136th degree west longitude from London; stretching near 9000 miles in length, and in its greatest breadth 3690. It sees both hemispheres, has two summers and a double winter, and enjoys all the variety of climates which the earth affords. It is washed by the two great oceans. To the eastward it has the Atlantic, which divides it from Europe and Africa; to the west it has the Pacific or Great South Sea, by which it is separated from Asia. By these seas it carries on a direct and increasing commerce with the other three parts of the world.

It is with great reason believed, that the ancients had some imperfect notion of America; and many authors are quoted in confirmation of this opinion. In a book ascribed to Aristotle, we are told that the Carthaginians discovered an island far beyond the pillars of Hercules, large, fertile, and finely watered with navigable rivers, but uninhabited. This island was distant a few days sailing from the continent; its beauty induced the discoverers to settle there; but the policy of Carthage dislodged the colony, and laid a strict prohibition on all the subjects of the state not to attempt any future establishment. This account is also confirmed by an historian of no mean credit, who relates, that the Tyrians would have settled a colony on the new-discovered islands, but were opposed by the Carthaginians for state reasons. Seneca, and other authors, are also quoted in support of this belief. But, however this may be, nobody ever believed the existence of this continent so firmly as to go in quest of it; at least, there are no accounts well supported that America received any part of its first inhabitants from Europe prior to the 15th century. The Welsh fondly imagine, that their country contributed, in 1170, to people the New World, by the adventure of Madoc, son of Owen Gwynedd, who, on the death of his father, failed there, and colonized part of the country. All that is advanced in proof is, a quotation from one of the British poets, which proves no more than

than that he had distinguished himself by sea and land. It is pretended that he made two voyages; that, sailing west, he left Ireland so far to the north, that he came to a land unknown, where he saw many strange things; that he returned home, and, making a report of the fruitfulness of the new-discovered country, prevailed on numbers of the Welsh of each sex to accompany him on a second voyage, from which he never returned. The favourers of this opinion assert, that several Welsh words, such as *gwando*, "to hearken or listen;" the isle of *Cresfo*, or "welcome;" Cape Breton, from the name of Britain; *gwynndwr*, or, "the white water;" and *pengwin*, or, "the bird with a white head;" are to be found in the American language. But likeness of sound in a few words will not be deemed sufficient to establish the fact; especially if the meaning has been evidently perverted: for example, the whole penguin tribe have unfortunately not only black heads, but are not inhabitants of the northern hemisphere; the name was also bestowed on them by the Dutch, à *pinguedine*, from their excessive fatness; but the inventor of this, thinking to do honour to his country, inconsiderately caught at a word of European origin, and unheard of in the New World. It may be added, that the Welsh were never a naval people; that the age in which Madoc lived was peculiarly ignorant in navigation; and the most which they could have attempted must have been a mere coasting voyage.

The Norwegians seem to claim a share of the glory, on grounds rather better than the Welsh. By their settlements in Iceland and in Greenland, they had arrived within so small a distance of the New World, that there is at least a possibility of its having been touched at by a people so versed in maritime affairs, and so adventurous, as the ancient Normans were. The proofs are much more numerous than those produced by the British historians; for the discovery is mentioned in several of the Icelandic manuscripts. The period was about the year 1002, when it was visited by one Biorn; and the discovery pursued to greater effect by Leif, the son of Eric, the discoverer of Greenland. It does not appear that they reached farther than Labrador; on which coast they met with the Esquimaux, on whom they bestowed the name of *Skrælingues*, or dwarfish people, from their small stature. They were armed with bows and arrows, and had leathern canoes, such as they have at present. All this is probable; nor should the tale of the German, called *Tuckil*, one of the crew, invalidate the account. He was one day missing; but soon returned, leaping and singing, with every mark of joy, on discovering the inebriating fruit of his country, the grape. Torseus even says, that he returned in a state of intoxication. To convince his commander, he brought several bunches, who, from that circumstance, named the country *Vinland*. It is not to be denied, that North America produces the true vine; but it is found in far lower latitudes than our adventurers could reach in the time employed in their voyages, which was comprehended in a very small space. There appears no reason to doubt of the discovery; but, as the land was never colonized, nor any advantages made of it, it may fairly be conjectured, that they reached no farther than the barren country of Labrador. In short, it is from a much later period that we must date the real discovery of America.

Towards the close of the fourteenth century, the navigation of Europe was scarcely extended beyond the limits of the Mediterranean. The mariner's compass had been invented and in common use for more than a century; yet, with the help of this sure guide, prompted by the most ardent spirit of discovery, and encouraged by the patronage of princes, the mariners of those days rarely ventured from the sight of land. They acquired great applause by sailing along the coast of Africa and discovering some of the neighbouring islands; and, after pushing their researches with the greatest industry and perseverance for more than half a century, the Portuguese, who were

the most fortunate and enterprising, extended their discoveries southward no farther than the equator.

The rich commodities of the East had for several ages been brought into Europe by the way of the Red Sea and the Mediterranean; and it had now become the object of the Portuguese to find a passage to India, by sailing round the southern extremity of Africa, and then taking an eastern course. This great object engaged the general attention of mankind, and drew into the Portuguese service adventurers from every maritime nation in Europe.

Among the foreigners whom the fame of the discoveries made by the Portuguese had allured into their service, was Christopher Colon, or Columbus, a subject of the republic of Genoa. Neither the time nor place of his birth are known with certainty; but he was descended of an honourable family, though reduced to indigence by various misfortunes. His ancestors having betaken themselves for subsistence to a sea-faring life, Columbus discovered, in his early youth, the peculiar character and talents which mark out a man for that profession. His parents, instead of thwarting this original propensity of his mind, seem to have encouraged and confirmed it, by the education which they gave him. After acquiring some knowledge of the Latin tongue, the only language in which science was taught at that time, he was instructed in geometry, cosmography, astronomy, and the art of drawing. To these he applied with such ardour and predilection, on account of their connection with navigation, his favourite object, that he advanced with rapid proficiency in the study of them. Thus qualified, in the year 1461, he went to sea at the age of fourteen, and began his career on that element which conducted him to so much glory. His early voyages were limited principally to those places which had before been discovered, in which nothing very remarkable happened, except that in a sea-fight, off the coast of Portugal, with some Venetian coasters, the vessel on-board which he served took fire, together with one of the enemy's, to which it was fast grappled; upon which he threw himself into the sea, laid hold of a floating oar, and by the support of it, and his dexterity in swimming, he reached the shore, though more than six miles distant, and thus preserved a life designed for great undertakings.

Soon after this he went to Lisbon, where he married a daughter of Bartholomew Perestrelo, one of the captains employed by prince Henry in his early voyages, and who had discovered and planted the islands of Porto Santo and Madeira. The journals and charts of this experienced navigator, his father-in-law, fell into his hands, and he, with avidity, availed himself of the valuable information they contained. His impatience to visit the places which Perestrelo had seen and described, became irresistible; and he made a voyage to Madeira, and spent several years in trading with that island, the Canaries, the Azores, the settlements in Guinea, and all other places which the Portuguese had discovered on the continent of Africa.

By the experience acquired during such a variety of voyages, Columbus became one of the most skilful navigators of Europe. But his ambition did not suffer him to rest satisfied with that praise. He aimed at something more. A project had been conceived of finding out a passage by sea to the East Indies. The accomplishment of this became a favourite object with Columbus. The Portuguese sought this route by steering towards the south, in hope of arriving at India, by turning to the east, after they had sailed round the farther extremity of Africa; which passage was afterwards effected in 1497, by Vasco de Gama, a Portuguese navigator. Columbus contemplated a shorter and more direct passage to the East Indies, by sailing towards the west, across the Atlantic Ocean. The principles and arguments which induced him to adopt this opinion, then considered as chimerical, were highly rational and philosophical. The sphericity and magnitude of the earth, were at that period ascertained with some

degree of accuracy. From this it was evident, that the continents of Europe, Asia, and Africa, formed but a small part of the terraqueous globe. It appeared likewise extremely probable, that the continent on the one side of the globe was balanced by a proportional quantity of land in the other hemisphere. These conclusions concerning the existence of another continent, drawn from the figure and structure of the globe, were confirmed by the observations and conjectures of modern navigators, and from pieces of timber artificially carved, canes of an enormous size, trees torn up by the roots, and the dead bodies of two men with singular features, which had been discovered and taken up, floating before a westerly wind, or driven on the coasts of the Azores. The force of this united evidence, arising from theoretical principles and practical observations, led Columbus to conclude, that by sailing directly towards the west, across the Atlantic Ocean, new countries, which probably formed a part of the vast continent of India, must infallibly be discovered. As early as the year 1474, he communicated his ingenious theory to Paul, a physician of Florence, eminent for his knowledge of cosmography. He warmly approved of the plan; suggested several facts in confirmation of it, and encouraged Columbus to persevere in an undertaking so laudable, and which must redound so much to the honour of his country, and the benefit of Europe.

Columbus now became impatient to bring to the test of experiment the truth of his system, and to set out upon a voyage of discovery. The first step towards this was to secure the patronage of some of the considerable powers of Europe. With this view he laid his scheme before the senate of Genoa, and, making his native and beloved country the first tender of his service, offered to sail, under the banners of the republic, in quest of new regions which he expected to discover. But they, incapable of forming just ideas of his principles, inconsiderately rejected his proposal as chimerical. He then submitted his plan to the Portuguese, who perfidiously attempted to rob him of the honour of accomplishing it, by privately sending another person to pursue the same track which he had proposed. But the pilot, who was thus basely employed to execute Columbus's plan, had neither the genius nor the fortitude of its author. Contrary winds arose; no land appeared; his courage failed; and he returned to Lisbon, execrating a plan which he had not abilities to execute. On discovering this flagrant treachery, Columbus immediately quitted the kingdom in disgust, and landed in Spain, towards the close of the year 1484. Here he resolved to propose it in person to Ferdinand and Isabella, who at that time governed the united kingdoms of Castile and Arragon. He, in the mean time, sent his brother Bartholomew to England, to propose his plan to Henry VII.

After experiencing a series of mortifying disappointments, during eight tedious years, Columbus, in deep anguish, withdrew from court, determined to repair to England as his last resource. At this juncture the affairs of Spain, which had been perplexed in consequence of a war with the Moors, took a favourable turn. Quintanilla and Santangel, two powerful, vigilant, and discerning, patrons of Columbus, seized this favourable opportunity to make one more effort in behalf of their friend. They addressed themselves to Isabella, with such forcible arguments as produced the desired effect. They dispelled all Isabella's doubts and fears: she ordered Columbus, who had proceeded on his journey, to be instantly recalled; declared her resolution to employ him on his own terms; and, regretting the low state of her finances, generously offered to pledge her own jewels, in order to raise as much money as might be needed in making preparations for the voyage. Santangel, in a transport of gratitude, kissed the queen's hand; and, in order to save her from having recourse to such a mortifying expedient for procuring money, engaged to advance, immediately, the sum that was requisite.

Columbus had proceeded some leagues on his voyage to

England, when the messenger from Isabella overtook him. He returned with joy mingled with some degree of fear, lest he should again be disappointed. The manner of his reception by the queen was, however, such as quickly dispelled his fears. A negotiation commenced, and was forwarded with dispatch, and an agreement was finally entered into and signed, on the 7th of April, 1492. The chief articles of it were, 1. Ferdinand and Isabella, as sovereigns of the ocean, constituted Columbus their high-admiral in all the seas, islands, and continents, which should be discovered by his industry; and stipulated, that he and his heirs for ever should enjoy this office, with the same powers and prerogatives which belonged to the high-admiral of Castile, within the limits of his jurisdiction. 2. They appointed Columbus their viceroy in all the islands and continents which he should discover; but if, for the better administration of affairs, it should be necessary to establish a separate governor in any of those countries, they authorized Columbus to name three persons, of whom they would chuse one for that office; and the dignity of viceroy, with all its immunities, was likewise to be hereditary in the family of Columbus. 3. They granted to Columbus, and his heirs for ever, the tenth of the free profits accruing from the productions and commerce of the countries which he should discover. 4. They declared, if any controversy or law-suit should arise, with respect to any mercantile transaction, in the countries which shall be discovered, it should be determined by the sole authority of Columbus, or of judges to be appointed by him. 5. They permitted Columbus to advance one-eighth part of what should be expended in preparing for the expedition, and in carrying on commerce with the countries which he should discover, and intitled him, in return, to an eighth part of the profit.

Though the name of Ferdinand appears conjoined with that of Isabella in this transaction, his distrust of Columbus was so violent, that he refused to take any part of the enterprise, as king of Arragon. As the whole expence of the expedition was to be defrayed by the crown of Castile, Isabella reserved for her subjects of that kingdom an exclusive right to all the benefits which might redound from its success.

After all the efforts of Isabella and Columbus, the armament was suitable, neither to the dignity of the power who equipped it, nor to the importance of the service to which it was destined. It consisted of three vessels; the largest, a ship of no considerable burden, was commanded by Columbus, as admiral, who gave it the name of *Santa Maria*. Of the second, called the *Pinta*, Martin Pinzon was captain, and his brother Francis pilot. The third, named the *Niña*, was under the command of Vincent Yanez Pinzon. These two last-mentioned were light vessels, hardly superior in burden or force to large boats. This little squadron was victualled for twelve months, and had on-board ninety men, mostly sailors, together with a few adventurers, who followed the fortune of Columbus, and some gentlemen of Isabella's court, whom she appointed to accompany him. The sum employed in fitting out this squadron did not exceed 4000l. sterling.

On the 3d of August, 1492, being Friday, Columbus set sail, in the presence of a vast crowd of spectators, who offered fervent supplications to heaven for his success, which they rather wished than expected. He steered directly for the Canary islands, and, in the short run thither, found his ships crazy and ill appointed, and very unfit for so long and dangerous a navigation as he had undertaken. After resitting them as well as he could, he left the Canaries on the 6th of September, and here properly commenced the voyage of discovery. He held his course due west, and immediately left the usual track of navigation, and stretched into unknown and unfrequented seas. By the 14th of September, the fleet was about 200 leagues west of the Canaries, at a greater distance from land than any Spaniard had been before that time.

Columbus early discovered, from the spirit of his followers,

lowers, that he must prepare to struggle, not only with the unavoidable difficulties which might be expected from the nature of his undertaking, but with such also as were likely to arise from the ignorance and timidity of the people under his command. All the art and address he was master of was hardly sufficient to quell the mutinous disposition of his sailors, who grew the more turbulent in proportion as their distance from home increased. What most astonished Columbus, during the voyage, was the variation of the magnetic needle. He observed that it did not point exactly to the polar star, but varied towards the west. This appearance, then one of the mysteries of nature, though now familiar, filled the companions of Columbus with terror. They were now in the midst of a trackless ocean; nature herself seemed to be altered, and the only guide they had left was about to fail them. Columbus, with no less quickness than ingenuity, invented a reason for this appearance, which, though it did not satisfy himself, seemed so plausible to them, that it dispelled their fears and silenced their murmurs.

On the evening of the 11th of October, Columbus was so confident, from various appearances, of being near land, that he ordered the sails to be furled, and the ships to lie to, and strict watch to be kept lest they should be driven on-shore in the night. During this interval of suspense and expectation, no man shut his eyes, all kept on deck, gazing intently towards that quarter where they expected to discover the land, which had so long been the object of their wishes. A little before midnight, Columbus, from the fore-castle, discovered a light at a distance; and, shortly after, the joyful sound of *land! land!* was heard from the Pinta, which always kept a-head of the other ships. At the dawn of day, an island was seen from every ship, at the distance of about two leagues north, whose verdant aspect indicated a most delightful country. The crews of all the ships, with tears of joy and transports of congratulation, unitedly sang *Te Deum*; as a hymn of thanksgiving to God. They then, with feelings of self-condemnation, mingled with reverence, threw themselves at the feet of Columbus, begged him to forgive their ignorance, incredulity, and insolence, which had given him so much unnecessary disquiet; acknowledged his superior abilities, and promised obedience in future.

At sun-rising, the boats were manned and armed, and they rowed towards the island with their colours displayed, with warlike music and other martial pomp. As they approached the coast, they saw it covered with a multitude of people, whom the novelty of the spectacle had drawn together, whose attitudes and gestures expressed wonder and astonishment at the strange objects before them. Columbus was the first European who set foot in the New World which he had discovered. He landed in a rich dress, and with a naked sword in his hand. His men followed, and, kneeling down, they all kissed the ground which they had so long desired to see. They next erected a crucifix, and, prostrating themselves before it, returned thanks to God for conducting their voyage to so happy an issue. They then took a solemn and formal possession of the country for the crown of Castile and Leon.

The dress of the Spaniards, their beards, their arms, the vast machines with which they traversed the ocean, the thundering roar of the cannon, accompanied with lightning and smoke, filled the natives with surprise and terror, and they began to consider them as children of the sun, who had descended to visit mortals here below. The Spaniards were hardly less amazed in their turn. The productions of the island were different from any thing they had seen in Europe. The inhabitants appeared in the simple innocence of nature, entirely naked. Their black hair, long and uncurled, floated upon their shoulders, or was bound in tresses round their heads. They had no beards, and every part of their body was perfectly smooth. Their complexion was of a dusky copper colour; their features singular rather than disagreeable, and their aspect gentle and timid. They were shy at first, through fear,

but soon became familiar with the Spaniards, and with transports of joy received from them various kinds of trinkets, in return for which they gave provisions, and some cotton yarn, the only commodity of value they could produce. Thus in the first interview between the inhabitants of the old and new worlds, every thing was conducted amicably, and to their mutual satisfaction.

The island on which Columbus first landed he called San Salvador. It is one of that large cluster of islands known by the name of the Lucaya or Bahama islands, and is above 3000 miles west of the Canaries. He afterwards touched at several islands in the same cluster, inquiring every where for gold, which he thought was the only object of commerce worth his attention. In steering southward, he discovered the islands of Cuba and Hispaniola, abounding in all the necessaries of life, and inhabited by a humane and hospitable people.

On his return to Spain he was overtaken by a storm, which had nearly proved fatal to his ships and their crews. At a crisis when all was given up for lost, Columbus had presence of mind enough to retire into his cabin, and to write upon parchment a short account of his voyage. This he wrapped in an oiled cloth, which he inclosed in a cake of wax, put it into a tight cask, and threw it into the sea, in hopes that some fortunate accident might preserve a deposit of so much importance to the world. He arrived at Palos, in Spain, whence he had sailed the year before, on the 15th of March, 1493. He was welcomed with all the acclamations which the populace are ever ready to bestow on great and glorious characters; and the court received him with marks of the greatest respect.

In September, of this year, (1493), Columbus sailed upon his second voyage to America; during the performance of which he discovered the islands of Dominica, Margarite, Guadaloupe, Montserrat, Antigua, Porto Rico, and Jamaica; and returned to Spain in 1496.

In 1498, he sailed a third time for America; and on the first of August discovered the continent, at the mouth of the river Orinoco. He then coasted along westward, making other discoveries, for 200 leagues, to Cape Vela, from which he crossed over to Hispaniola, where he was seized by a new Spanish governor, and sent home in chains.

In 1502, Columbus made his fourth, and last, voyage to Hispaniola; thence he went over to the continent; discovered the bay of Honduras; thence sailed along shore easterly 200 leagues, to Cape Gracias a Dios, Veragua, Porto Bello, and the Gulf of Darien, searching, in vain, for a passage to the East Indies. During this voyage, he was shipwrecked on the island of Jamaica, where he suffered almost inconceivably from the cruelty of the inhabitants, the mutiny of his men, and especially from the infamous conduct of the governor of Hispaniola. He returned to Spain in 1504. On his arrival he received the fatal news of the death of his patroness, queen Isabella.

The jealous and avaricious Spaniards, not immediately receiving those golden advantages from these new discoveries which they had promised, and lost to the feelings of humanity and gratitude, suffered their esteem and admiration of Columbus to degenerate into ignoble envy. The latter part of his life was therefore made wretched by the cruel persecutions of his enemies. Queen Isabella, his friend and patroness, was no longer alive to afford him relief. He sought redress from Ferdinand, but in vain. Disgusted with the ingratitude of a monarch whom he had served with so much fidelity and success, exhausted with hardships, and broken with the infirmities which these brought upon him, Columbus ended his active and useful life at Valladolid, on the 20th of May, 1506, in the 59th year of his age. He died with a composure of mind suited to the magnanimity which distinguished his character, and with sentiments of piety becoming that supreme respect for religion which he manifested in every occurrence of his life. He was grave though courteous in his deportment, circumspect in his words and actions, irreproachable in his morals, and exemplary in all the duties of his religion.

Among

Among other adventurers to the new world, in pursuit of gold, was Americus Vesputius, a Florentine gentleman, whom Ferdinand had appointed to draw sea-charts, and to whom he had given the title of chief pilot. This man accompanied Ojeda, an enterprising Spanish adventurer, to America; and having, with much art, and some degree of elegance, drawn up an amusing history of his voyage, he published it to the world. It circulated rapidly, and was read with admiration. In his narrative, he had insinuated that the glory of having first discovered the new world belonged to him. This was in part believed, and the country began to be called after the name of its supposed first discoverer. The unaccountable caprice of mankind has perpetuated the error; so that now, by the universal consent of all nations, this new quarter of the globe is called America. The bold pretensions of a fortunate impostor have, after him, thus robbed the discoverer of the new world of a distinction which belonged to him. The name of Americus has supplanted that of Columbus; and mankind are left to regret an act of injustice, which, having been sanctioned by time, they can never redress.

GENERAL DESCRIPTION of the AMERICAN CONTINENT.

AMERICA is not of equal breadth throughout its whole extent; but is divided into two great continents, called *North and South America*, by an isthmus 1500 miles long, and which at Darien, about lat. 9° N. is only sixty miles over. This isthmus forms, with the northern and southern continents, a vast gulph, in which lie a great number of islands, called the *West Indies*, in contradistinction to the eastern parts of Asia, which are called the *East Indies*.

Between the New World and the Old, there are several very striking differences; but the most remarkable is the general predominance of cold throughout the whole extent of America. Though we cannot, in any country, determine the precise degree of heat merely by the distance of the equator, because the elevation above the sea, the nature of the soil, &c. affect the climate; yet, in the ancient continent, the heat is much more in proportion to the vicinity to the equator than in any part of America. Here the rigour of the frigid zone extends over half that which should be temperate by its position. Even in those latitudes where the winter is scarcely felt on the old continent, it reigns with great severity in America, though during only a short period. Nor does this cold, prevalent in the new world, confine itself to the temperate zones; but extends its influence to the torrid zone also, considerably mitigating the excess of its heat. Along the eastern coast, the climate, though more similar to that of the torrid zone in other parts of the earth, is nevertheless considerably milder than in those countries of Asia and Africa which lie in the same latitude. From the southern tropic to the extremity of the American continent, the cold is said to be much greater than in parallel northern latitudes even of America itself.

For this remarkable difference between the climate of the new continent and the old, various causes have been assigned by different authors. The following is the opinion of Dr. Robertson on this subject: "Though the utmost extent of America towards the north be not yet discovered, we know that it advances nearer to the pole than either Europe or Asia. The latter have large seas to the north, which are open during part of the year; and, even when covered with ice, the wind that blows over them is less intensely cold than that which blows over land in the same latitudes. But, in America, the land stretches from the river St. Laurence towards the pole, and spreads out immensely to the west. A chain of enormous mountains, covered with snow and ice, runs through all this dreary region. The wind passing over such an extent of high and frozen land, becomes so impregnated with cold, that it acquires a piercing keenness, which it retains in its pro-

gress through warmer climates; and is not entirely mitigated until it reaches the gulph of Mexico. Over all the continent of North America, a north-westerly wind and excessive cold are synonymous terms. Even in the most sultry weather, the moment that the wind veers to that quarter, its penetrating influence is felt in a transition from heat to cold no less violent than sudden. To this powerful cause we may ascribe the extraordinary dominion of cold, and its violent inroads into the southern provinces in that part of the globe.

"Other causes, no less remarkable, diminish the active power of heat in those parts of the American continent which lie between the tropics. In all that portion of the globe, the wind blows in an invariable direction from east to west. As this wind holds its course across the old continent, it arrives at the countries which stretch along the western shore of Africa, inflamed with all the fiery particles which it hath collected from the sultry plains of Asia, and the burning sands in the African deserts. The coast of Africa is accordingly the region of the earth which feels the most fervent heat, and is exposed to the unmitigated ardour of the torrid zone. But this same wind, which brings such an accession of warmth to the countries lying between the river of Senegal and Caffraria, traverses the Atlantic Ocean before it reaches the American shore. It is cooled in its passage over this vast body of water; and is felt as a refreshing gale along the coasts of Brazil and Guiana, rendering those countries, though amongst the warmest in America, temperate, when compared with those which lie opposite to them in Africa. As this wind advances in its course across America, it meets with immense plains covered with impenetrable forests; or occupied by large rivers, marshes, and stagnant waters, where it can recover no considerable degree of heat. At length it arrives at the Andes, which run from north to south through the whole continent. In passing over their elevated and frozen summits, it is so thoroughly cooled, that the greater part of the countries beyond them hardly feel the ardour to which they seem exposed by their situation. In the other provinces of America, from Terra Firma westward to the Mexican empire, the heat of the climate is tempered, in some places, by the elevation of the land above the sea; in others, by their extraordinary humidity; and in all, by the enormous mountains scattered over this tract. The islands of America in the torrid zone are either small or mountainous, and are fanned alternately by refreshing sea and land breezes.

"The causes of the extraordinary cold towards the southern limits of America, and in the seas beyond it, cannot be ascertained in a manner equally satisfying. It was long supposed, that a vast continent, distinguished by the name of *Terra Australis Incognita*, lay between the southern extremity of America and the antarctic pole. The same principles which account for the extraordinary degree of cold in the northern regions of America, were employed in order to explain that which is felt at Cape Horn and the adjacent countries. The immense extent of the southern continent, and the rivers which it poured into the ocean, were mentioned and admitted by philosophers as causes sufficient to occasion the unusual sensation of cold, and the still more uncommon appearances of frozen seas in that region of the globe. But the imaginary continent to which such influence was ascribed having been searched for in vain, and the space which it was supposed to occupy having been found to be an open sea, new conjectures must be formed with respect to the causes of a temperature of climate so extremely different from that which we experience in countries removed at the same distance from the opposite pole.

"The most obvious and probable cause of this superior degree of cold towards the southern extremity of America, seems to be the form of the continent there. Its breadth gradually decreases as it stretches from St. Antonio southwards, and from the bay of St. Julian to the straits of Magellan its dimensions are much contracted. On the

east and west sides, it is washed by the Atlantic and Pacific oceans. From its southern point, it is probable that an open sea stretches to the antarctic pole. In whichever of these directions the wind blows, it is cooled before it approaches the Magellanic regions, by passing over a vast body of water; nor is the land there of such extent, that it can recover any considerable degree of heat in its progress over it. These circumstances concur in rendering the temperature of the air in this district of America more similar to that of an insular, than to that of a continental, climate; and hinder it from acquiring the same degree of summer-heat with places in Europe and Asia in a corresponding northern latitude. The north wind is the only one that reaches this part of America, after blowing over a great continent. But, from an attentive survey of its position, this will be found to have a tendency rather to diminish than augment the degree of heat. The southern extremity of America is properly the termination of the immense ridge of the Andes, which stretches nearly in a direct line from north to south, through the whole extent of the continent. The most sultry regions in South America, Guiana, Brazil, Paraguay, and Tucuman, lie many degrees to the east of the Magellanic regions. The level country of Peru, which enjoys the tropical heats, is situated considerably to the west of them. The north wind, then, though it blows over land, does not bring to the southern extremity of America an increase of heat collected in its passage over torrid regions; but, before it arrives there, it must have swept along the summit of the Andes, and come impregnated with the cold of that frozen region."

Another particularity in the climate of America, is its excessive moisture in general. In some places, indeed, on the western coast, rain is not known; but, in all other parts the moistness of the climate is as remarkable as the cold. The forests wherewith it is every where covered, no doubt, partly occasion the moisture of its climate; but the most prevalent cause is the vast quantity of water in the Atlantic and Pacific oceans, with which America is environed on all sides. Hence those places where the continent is narrowest are deluged with almost perpetual rains, accompanied with violent thunder and lightning, by which some of them, particularly Porto Bello, are rendered in a manner uninhabitable.

This extreme moisture of the American climate is productive of much larger rivers than there are in any other part of the world. The Danube, the Nile, the Indus, or the Ganges, are not comparable to the Mississippi, the river St. Laurence, or that of the Amazons; nor are such large lakes to be found any where as those which North America affords. To the same cause we are also partly to ascribe the excessive luxuriance of all kinds of vegetables in almost all parts of this country. In the southern provinces, where the moisture of the climate is aided by the warmth of the sun, the woods are almost impervious, and the surface of the ground is hid from the eye, under a thick covering of shrubs, herbs, and weeds. In the northern provinces, the forests are not encumbered with the same luxuriance of vegetation; nevertheless, they afford trees much larger of their kind than what are to be found any where else.

With regard to population in America, there are no data from which we can estimate the number of its inhabitants with any degree of accuracy. All calculations must proceed on uncertain grounds. The population of most of those countries which have been settled by Europeans has not been ascertained; who then is capable of estimating the number of inhabitants in those numerous countries which have been very particularly explored, and those which are altogether unknown to any European or other civilized nation? and such are those vast regions west, north-west, and north, of the Mississippi and the lakes, and immense countries in the interior parts of South America. The number of provinces, kingdoms, and even of nations, is unknown. We can therefore hardly guess at the number of inhabitants.

It has been common in estimating the population of the whole world to give 150 millions to America. The calculations of P. Riccioli, make them 300 millions. Sufimilch, in one part of his work, computes them at 100 millions, in another at 150 millions. M. de Pauw says, that political arithmeticians do not reckon more than 100 millions; but it is his own opinion that there are not more than from thirty to forty millions of "real Americans." We know not the principles upon which either of these authors grounded their calculations. Some of them are far beyond the truth; and M. de Pauw seems to have erred on the other hand.

Let us suppose the continent of America to contain fourteen millions of square miles; including the islands, fifteen millions. The United States contain one million square miles, or one fifteenth part of the American continent and islands. We will suppose (merely for the purpose of calculation), that every other part of America is as populous as the United States. Probably there may be some parts, particularly the West-India islands, and some provinces in Spanish America, which are more populous, but there are many other parts which are by no means so populous. The probability is, that the other parts of America, collectively considered, are not nearly so thickly inhabited as the territory of the United States. There is certainly no reason to believe that they are more populous. American population is thin: and vast tracts of deserts, marshes, and mountains, are uninhabited. In the United States we reckon four millions of inhabitants, Anglo-Americans, Negroes, Mulattoes, and Indians, within the jurisdiction of the general government. Besides these, there may be about 50,000 Indians independent of the United States, and subject to their own princes. The whole population of the United States we reckon at 4,050,000. If then we suppose America to contain fifteen millions of square miles, and that in every part it is equally as populous as the United States, that is, that there are in every million of square miles 4,050,000 inhabitants, the whole number will be 60,750,000.

That America was peopled very anciently and soon after the flood, is very probable: 1. Because the aboriginal Americans, till they became acquainted with Europeans, were ignorant of those arts and inventions, such, among others, as those of wax and oil for light, which being very ancient in Europe and Asia, on the one hand, are, on the other, most useful, not to say necessary, and when once discovered are never forgotten. 2. Because the polished nations of the new world, and particularly those of Mexico, preserve in their traditions and paintings the memory of the creation of the world, the building of the tower of Babel, the confusion of languages, and the dispersion of the people, though blended with some fables, and had no knowledge of the events which happened afterwards in Asia, Africa, or in Europe, many of which were too remarkable to escape the memory. 3. Because neither was there among the Americans any knowledge of the people of the old continent, nor among the latter any account of the passage of the former to the new world. These reasons render it at least probable that America was peopled early after the flood.

On the two questions how and from whence America was first peopled, much has been said. Those who call in question the authority of the sacred writings say, the Americans are not descendants from Adam, that he was the father of the Asiatics only, and that God created other men to be the patriarchs of the Europeans, Africans, and Americans. But this is one among the many weak hypotheses of unbelievers, and is wholly unsupported by history. It is contrary to the tradition of the Americans, who, in their paintings, and in their hymns, called themselves the descendants of those who escaped from the general deluge. The Mexicans, Toltecas, and several other nations, were agreed in this point. They all said their ancestors came from other parts into those countries; they pointed out the road they came, and even preserved the

names, true or false, of their first progenitors, who, after the confusion of languages, separated from the rest of mankind. These traditions, with many others, considered in connection with the sacred writings, must convince us that we ought to seek among the descendants of Noah for the first peoplers of America.

But who were they? To recite all the opinions given in answer to this question, would lead us far beyond the limits of our plan. Dr. Robertson and the abbé Clavigero have extensively and learnedly investigated the subject; and we cannot expect to afford the reader more satisfaction than to give him the result of their enquiries. Dr. Robertson, having recapitulated and canvassed the most plausible opinions on the subject, comes to the following conclusions:

America, he says, was not peopled by any nation from the ancient continent which had made any considerable progress in civilization; because, when America was first discovered, its inhabitants were unacquainted with the necessary arts of life, which are the first essays of the human mind toward improvement; and if they had ever been acquainted with them, for instance, the plough, the loom, and the forge, their utility would have been so great and obvious, that it is impossible they should have been lost. Therefore the ancestors of the first settlers in America were uncivilized and unacquainted with the necessary arts of life.

America could not have been peopled by any colony from the more southern nations of the ancient continent; because none of the rude tribes of these parts possessed enterprize, ingenuity, or power, sufficient to undertake such a distant voyage: but more especially, because, that in all America there is not an animal, tame or wild, which properly belongs to the warm or temperate countries of the eastern continent. The first care of the Spaniards, when they settled in America, was to stock it with all the domestic animals of Europe. The first settlers of Virginia and New England brought over with them horses, cattle, sheep, &c. Hence it is obvious that the people who first settled in America did not originate from those countries where these animals abound, otherwise, having been accustomed to their aid, they would have supposed them necessary to the improvement, and even support, of civil society. And since the animals in the northern regions of America correspond with those found in Europe in the same latitudes, while those in the tropical regions are indigenous, and widely different from those which inhabit the corresponding regions on the eastern continent, it is more than probable that all the original American animals were of those kinds which inhabit northern regions only, and that the two continents, towards the northern extremity, are so nearly united as that these animals might pass from one to the other.

It having been established beyond a doubt, by the discoveries of Capt. Cook in his last voyage, that at Kamtschatka, in about latitude 66° north, the continents of Asia and America are separated by a strait only eighteen miles wide, and that the inhabitants on each continent are similar, and frequently pass and repass in canoes from one continent to the other; from these and other circumstances it is rendered highly probable, that America was first peopled from the north-east parts of Asia. But since the Esquimaux Indians are manifestly a separate species of men, distinct from all the nations of the American continent, in language, in disposition, and in habits of life; and in all these respects bear a near resemblance to the northern Europeans, it is believed that the Esquimaux Indians emigrated from the north-west parts of Europe. Several circumstances confirm this belief. As early as the ninth century the Norwegians discovered Greenland, and planted colonies there. The communication with that country, after long interruption, was renewed in the last century. Some Lutheran and Moravian missionaries, prompted by zeal for propagating the Christian faith, have ventured to settle in this frozen region. From them we learn, that the north-west coast of Greenland is separated from Ame-

rica but by a very narrow strait, if separated at all; and that the Esquimaux of America perfectly resemble the Greenlanders in their aspect, dress, mode of living, and probably language. By these decisive facts, not only the consanguinity of the Esquimaux and Greenlanders is established, but the possibility of peopling America from the north-west parts of Europe. On the whole, it appears rational to conclude, that the progenitors of all the American nations, from Cape Horn to the southern limits of Labrador, from the similarity of their aspect, colour, &c. migrated from the north-east parts of Asia; and that the nations that inhabit Labrador, Esquimaux, and the parts adjacent, from their unlikeness to the American nations, and their resemblance to the northern Europeans, came over from the north-west parts of Europe.

Such is the opinion of Dr. Robertson, on the question before us; and, for want of information, it is in several respects inaccurate and without foundation. The opinion of the abbé Clavigero, who was a native of America, and had much better advantages for knowing its history than Dr. Robertson, and who also is a later writer, is far less exceptionable, and has much better grounds for its support. He explains his opinion in the following conclusions:

The Americans are descended from different nations, or from different families dispersed after the confusion of tongues. No person will doubt of the truth of this who has any knowledge of the multitude and great diversity of the American languages. In Mexico alone thirty-five have already been discovered. In South America still more are known. In the beginning of the last century the Portuguese counted fifty in Maragnon. Between some of these languages, there is indeed a great affinity; but others are as different from each other as the English and the Hebrew. It is a truth, that no living or dead languages can differ more than the languages of the Mexicans, Otomies, Tarascas, Mayas, and Miztecas, five languages prevailing in different provinces of Mexico. It would therefore be absurd to say, that languages so different were different dialects of one original. Is it probable, or even possible, that a nation should alter its primitive language to such a degree, or multiply its dialects so variously, as that there should not be, even after many centuries, if not some words common to all, at least an affinity between them, or some traces left of their origin?

The Americans do not derive their origin from any people now existing as a nation on the eastern continent; at least there is no reason to affirm that they do. This inference is founded on the same argument with the preceding; since, if the Americans are descendants from any of these nations, it would be possible to trace their origin by some marks in their languages, in spite of the antiquity of their separation: but any such traces have not yet been discovered, although most diligent and attentive search has been made, as appears from the work of Dominican Garcia. We have, says Clavigero, leisurely compared the Mexican and other American languages with many others which are now living, and with those which are dead, but have not been able to discover the least affinity between them. This argument is strong with respect to the Americans, as they shew great firmness and constancy in retaining their languages. The Mexicans preserve their language among the Spaniards, and the Otomies retain their difficult dialect among the Spaniards and Mexicans, after communication with both for more than two centuries and an half.

If the Americans descended from different families dispersed soon after the confusion of tongues, as we believe, and have since been separated from those others who peopled the countries on the eastern continent, authors will labour in vain to seek, in the language or customs of the Asiatics, for the origin of the people of America. But the most difficult point in the problem of the population of America remains to be solved, and that is, how did the inhabitants and animals originally pass to America, and from what parts did they come? Among the various
opinions

opinions of authors upon this point, the following is the abbé Clavigero's:

The men and animals of America passed there from the old continent. This is confirmed by the sacred writings. Moses, who declares Noah the common father of all men who survived the deluge, says expressly, that in that general inundation of the earth all its quadrupeds, birds, and reptiles, perished, except a few of the several species, which were saved alive in the ark, to re-peopple the earth with their kind. The repeated expressions which the sacred historian uses to signify its universality, do not permit us to doubt, that all quadrupeds, birds, and reptiles, which are in the world, descended from those few individuals which were saved from the general inundation.

The first inhabitants of America might pass there in vessels by sea, or travel by land or by ice. 1. They might either pass there in vessels designedly, if the distance by water were but small, or be carried upon it accidentally by favourable winds. 2. They might pass by land, on the supposition of the union of the continents. 3. They might also make that passage over the ice of some frozen arm of the sea.

The ancestors of the nations which peopled *Anahuac*, (now called New Spain,) might pass from the northern countries of Europe into the northern parts of America, or, which is more probable, from the most eastern parts of Asia to the most western parts of America. This conclusion is founded on the constant and general tradition of those nations, which unanimously say, that their ancestors came into *Anahuac* from the countries of the north and north-west. This tradition is confirmed by the remains of many ancient edifices, built by these people in their migrations. In a journey made by the Spaniards in 1606, from New Mexico unto the river which they call *Tizon*, 600 miles from that province towards the north-west, they found there some large edifices, and met with some Indians who spoke the Mexican language, and who told them, that a few days journey from that river, towards the north, was the kingdom of *Tollan*, and many other inhabited places, whence the Mexicans migrated. In fact, the whole people of *Anahuac* have usually affirmed, that towards the north were the kingdoms and provinces of *Tollan*, *Aztlan*, *Copalla*, and several others, which have all Mexican names. *Boturini* says, that in the ancient paintings of the *Toltecas* was represented the migration of their ancestors through Asia and the northern countries of America, until they established themselves in the country of *Tollan*; and even endeavours to ascertain, in his general history, the route they pursued in their travels.

With respect to the other nations of America, as there is no tradition among them concerning the way by which their ancestors came to the new world, we can say nothing certain of them. It is possible, that they all passed by the same way in which the ancestors of the Mexicans passed; but it is far more probable that they passed by a very different route. We conjecture, that the ancestors of the nations of South America went there by the way in which the animals proper to hot countries passed; and that the ancestors of those nations inhabiting *Esquimaux* and *Labrador*, and the countries adjacent, passed thither from the north-west part of Europe. The difference of character which is discoverable in the three above-mentioned classes of aboriginal Americans, and the situation of the countries which they occupied, afford ground to suspect that they had different origins, and that their ancestors came there by different routes.

The quadrupeds and reptiles of the new world must have passed there by land. This fact is manifest from the improbability and inconsistency of all other opinions. St. Augustin solves the difficulty of peopling the islands with wild beasts and destructive animals by supposing, either that the angels transported them thither, (a solution, which, though it cuts off every difficulty in the passage of animals to the new world, would not be satisfactory in the present age;) or that they might swim to the islands; or that they

might have been carried there by men for the sake of hunting; or that they might have been formed there by the Creator in the beginning. Others have imagined that beasts might pass over some frozen strait or arm of the sea. But, as neither of these opinions can be supported, the probability is, that the quadrupeds as well as the reptiles which were found in America passed thither by land, and of course that the two continents were formerly united. This was the opinion of *Acosta*, *Grotius*, *Buffon*, and other writers of credit. That this earth has experienced great changes since the deluge will not admit of a doubt. Earthquakes have swallowed up large tracts of land in some places; subterraneous fires have thrown up others; the sea in some places has been forced to retreat many miles from the shore; in other places it has made encroachments; and in many instances separated territories which were formerly united. Very considerable tracts of land have been also formed at the mouths of rivers. We have many examples of all these revolutions: *Sicily* was formerly united to the continent; the straits of *Gibraltar*, as *Diodorus*, *Strabo*, and other ancient authors, affirm, were formed by a violent irruption of the ocean upon the land between the mountains *Abyla* and *Calpe*. The people of *Ceylon* have a tradition, that a similar irruption of the sea separated their island from the peninsula of *India*. The same is believed by the inhabitants of *Malabar* with respect to the isles of *Maldivia*, and by the *Malayans* with respect to *Sumatra*. *Ceylon*, as *Buffon* asserts, has lost thirty or forty leagues of land, by the sea; and *Tongres*, a place in the Low Countries, has gained thirty leagues of land from the sea; and *Florida* and the southern American States have gained as much from the bay of *Mexico*, and the islands between North and South America. The northern part of *Egypt* owes its existence to inundations of the Nile; and the province of *Yellow-River* in *China*, and part of *Louisiana* in America, have both been formed by the mud of rivers. The peninsula of *Yucatan* has every appearance of having once formed a part of the bed of the sea. In the strait which separates America from Asia, many islands are found which probably were the mountains belonging to that part of the land which we suppose to have been swallowed up by earthquakes; and this is rendered possible by the multitude of volcanoes discovered in the peninsula of *Kamtchatka*. The sinking of that land, however, and the separation of the two continents, was probably occasioned by those extraordinary earthquakes mentioned in the histories of the Americans, which formed an era almost as memorable as that of the deluge.

The quadrupeds and reptiles of America passed by different places from the one continent to the other. Among the American beasts there are many whose natures are averse to cold; such are apes, dantes, crocodiles, &c. There are others formed to inhabit cold countries; such are martins, rein-deer, and gluttons. The former could not go to America through any country in the frigid zone; their natures would not have admitted it; they would have perished in their passage. We cannot indeed imagine what inducement they could have to quit a climate congenial to their nature, and undertake a journey they knew not whether, through a region whose cold they could not endure. How did they know there was a country friendly to their natures in America? The apes which are in New Spain passed there, certainly, from South America. Time was when they did not inhabit that country; and it is known that they came from the south. The centre of their population is the country under the equator, and fourteen or fifteen degrees on each side of it. It decreases as you depart from this tract on either side, till you arrive at the tropics, when it ceases, and none are found, except in some few districts, which, from the peculiarity of their situation, are as hot as the equinoctial country. None can imagine that this species of animals travelled to the new world through the cold regions of the north: nor can we believe that they were transported thither by men; for, not to mention

mention that some of them are of a ferocious disposition, and very unlikely to be selected for companions on a long voyage, to people a new country, there is another still greater difficulty: as they could not have been conducted over the seas and countries of the north, on account of the cold, they must have been transported from the warm countries of the old, to the warm countries of the new, world, over a sea subject to a climate not dissimilar to the native country of those quadrupeds, that is, by the countries of the southern parts of Asia, to about the same latitudes in America, over the Indian and Pacific oceans; or from the western countries of Africa, to the eastern countries of America, over the Atlantic ocean. If, therefore, men transported those animals from the one to the other world, they did it across those seas. But was this navigation accidental or designed? If the former, how, and why, did they carry so many animals with them? If the latter, if they were determined to pass from the old to the new continent, who gave them intelligence of the new world? Who shewed them the situation of those countries? How did they venture to cross such vast seas without a compass? In what vessels did they pass? If they landed there happily, why does there not remain, among the Americans, some memory of their constructions? But it is needless to start more objections; these already mentioned can never be answered.

Besides, in the torrid zone, and the warm climates that border upon it, in the new world, crocodiles are common animals which require a hot or temperate climate, and live alternately on land or in sweet water: how did such animals pass there? Not by the north; they could not endure the cold. No one will believe they were transported by men: or that they swam thither 2000 miles through an ocean of salt water. There remains no other solution but that of admitting an ancient union between the equinoctial countries of America and those of Africa; and a connection of the northern countries of America with Europe on the east, and Asia on the west: so that there has probably been a period, since the flood, when there was but *one* continent. The beasts of cold climes passed over the northern isthmuses, which probably connected Europe, America, and Asia; and the animals and reptiles peculiar to hot countries passed over the isthmus that connected South America with Africa. For the reasons already mentioned induce us to believe that there was formerly a tract of land, which united the most eastern part of Brazil to the most western part of Africa; and that all the space of land may have been sunk by violent earthquakes, leaving only some traces of it in that chain of islands of which Cape de Verd, Fernando, de Norona, Ascension, and St. Matthew's, islands, make a part; and also in those many sand-banks discovered by different navigators, and particularly by de Bauche, who founded that sea with great exactness. These islands and sand-banks may, probably, have been the highest parts of that sunken isthmus. In like manner it is probable the north-western part of America was united to the north-eastern part of Asia by a neck of land which has been sunk or washed away, and the north-eastern parts of America to the north-western parts of Europe, by Greenland, Iceland, &c.

On the whole, we cannot but believe that the quadrupeds and reptiles of the new world passed there by land, and by different routes, from the old continent. All other suppositions are subject to heavy difficulties; and this is not without some, which however are not altogether insurmountable. The greatest is the improbability of an earthquake so great as to sink a space of land for more than 1500 miles in length, which, according to our supposition, united Africa and South America. But we do not ascribe this stupendous revolution to a single shock; it may have been effected by a succession of earthquakes, similar to those which lately happened in Calabria. It is well known that they are common in the climates where we suppose the isthmus to have been. It is not impossible

nor improbable, that such an effect should be produced by earthquakes, nor is history unfurnished with such examples to our purpose. The earthquake which was felt in Canada in 1663, overwhelmed a chain of mountains of free-stone more than 300 miles long, and the whole of that immense tract was changed into a plain. How great then must have been the convulsion which was occasioned by those extraordinary earthquakes, mentioned in the histories of America, when the world was thought to be coming to an end!

It may farther be objected to this system, that, if beasts passed by land from one continent to the other, it is not easy to assign the cause why some species passed there without leaving a single individual in the old continent; and, on the contrary, that some entire species should remain in the old continent, and not a single individual of them pass to America. But this objection operates with equal force against all other opinions, except that which employs angels in the transportation of beasts. But, suppose it did not, we have a satisfactory answer to it. All the quadrupeds of the earth are not yet known; we cannot therefore say how many are in the one which are not in the other continent. The knowledge of the best-informed zoologists is very imperfect, and they differ among themselves. The count de Buffon numbers only 200 species of quadrupeds; Bomare, who wrote a little after him, makes them 265; but to say how many more there may be, and of what kinds they are, until we have examined the interior regions of Africa, of a great part of Tartary, the country of the Amazons, and the vast territory west of the Mississippi, and various other unexplored and extensive countries, which together constitute a great part of the whole globe, would be mere conjecture. No argument, therefore, can be inferred from the difference of the animals in the two continents against our system, till the animals in these unexplored regions shall have been examined. We have dwelt the longer on this subject, as it must be interesting to every inquisitive mind, and the discussion of it is blended with much useful information.

Having stated the present population of America, from the best data we could find, and given the most probable accounts of the manner in which it was originally peopled, we shall now describe the character, manners, &c. of its inhabitants.

The present Americans, whose number we have reckoned at about 60 millions, may be divided into two general classes. First, the proper Americans, commonly called Indians, sometimes Aborigines, or those who are descended from the first inhabitants of the new world, and who have not mixed their blood with the inhabitants of the old continent. Secondly, those who have migrated, or have been transported to America, since its discovery by Columbus, and their descendants. The former may be subdivided into three classes; first, the South American Indians, who came over in the manner we have supposed, from the northern and western parts of Africa, and the southern parts of Asia and Europe. Secondly, the Mexicans and all the Indians south of the lakes and west of the Mississippi. Thirdly, the inhabitants of Esquimaux, Labrador, and the countries around them. The latter may also be distinguished into three classes: First, Europeans of many different nations, who have migrated to America, and their descendants, of unmixed blood. In this class we include the Spaniards, English, Scotch, Irish, French, Portuguese, Germans, Dutch, Swedes, &c. both in North and South America. Secondly, Africans, who have been transported to America and its islands, and their descendants. Thirdly, the mixed breeds, called by the Spaniards *Castas*, by the English *Mulattoes*, that is, those who are descended from an European and an American, or from an European and African, or from an African and American. Leaving the second class, viz. the migrants to America since its discovery by Columbus, and their descendants, to be described when we shall treat of the countries they respectively inhabit, we shall, under this article, confine ourselves

ourselves to the proper aboriginal Americans or Indians. With respect to the South Americans, various have been the accounts given of them. Some historians exalt them to the rank of the best and happiest people on earth; others seem unwilling to give them a place among human beings. We presume these historians, who differ so widely, spoke of different nations; and on this ground, with proper allowances for exaggeration on both sides, we may reconcile them. Columbus gives the following account of the Indians of Hispaniola, to Ferdinand and Isabella: "I swear to your majesties, that there is not a better people in the world than these; more affectionate, affable, and mild; they love their neighbours as themselves; their language is the sweetest, the softest, and the most cheerful, for they always speak smiling; and, although they go naked, let your majesties believe me, their customs are very becoming; and their king, who is served with great majesty, has such engaging manners, that it gives great pleasure to see him, and also to consider the great retentive faculty of that people, and their desire of knowledge, which invites them to ask the causes and effects of things."

Las Casas, the first bishop of Chiapa, who resided several years in different parts of America, speaks thus of them: "The Americans are a people of a bright and lively genius, easy to be taught, and to apprehend every good doctrine, extremely ready to embrace our faith, and the people, of all others in the world, who feel least embarrassment by it." In another place, this writer says, "The Indians have as good an understanding, and acute a genius, as much docility and capacity for the moral and speculative sciences, and are, in most instances, as rational in their political government, as appears from many of their very prudent laws, and are as far advanced in our faith and religion, in good customs and civilization, where they have been taught by persons of religious and exemplary life, and are arriving at refinement and polish as fast as any nation ever did since the times of the apostles."

Dr. Robertson, speaking of the Mexicans and Peruvians, whom he is not disposed to rank with those nations which merit the name of civilized, has the following remarks: "When compared with other parts of the new world, Mexico and Peru may be considered as polished states. Instead of small, independent, hostile, tribes, struggling for subsistence amidst woods and marshes, strangers to industry and arts, unacquainted with subordination, and almost without the appearance of regular government, we find countries of great extent subjected to the dominion of one sovereign, the inhabitants collected together in cities, the wisdom and foresight of rulers employed in providing for the maintenance and security of the people, the empire of laws in some measure established, the authority of religion recognised, many of the arts essential to life brought to some degree of maturity, and the dawn of such as are ornamental beginning to appear." These are testimonies respecting the Indians who inhabit the more northern parts of South America, and the islands; who appear to have made greater advances in civilization than those farther south, concerning whom our information is very imperfect.

Charlevoix, in his history of Paraguay, has collected from the Jesuits perhaps the best information respecting the more southern Indians. Comparing his particular descriptions of the numerous nations who inhabit the southern division of South America, we give the following as the leading traits in their general character. They are generally of an olive complexion, some darker, others lighter, and some as white as the Spaniards. Their stature is rather below than above the middling size; though some nations rank among the tallest of the human species; most of them are thick legged and jointed, and have round and flat faces. Almost all the men and children, in the warm climates, and in the summer, in cold regions, go quite naked. The women wear no more covering than the most relaxed modesty seems absolutely to require.

Every nation have a different dialect, and a different mode of adorning themselves. The clothing of such as make use of it, is made of the skins of beasts, of feathers sewed together, and in the southern and colder regions, where they raise sheep, of wool manufactured into stuffs and blankets. They are represented as almost universally addicted to drunkenness. There seems to be no other vice common to them all. A few of them are cannibals, and some nations are idolaters; in general they have some notion of a Supreme Being, and have words in their various languages to express their ideas of him. They believe in the immortality of the soul, and have some imperfect ideas of future rewards and punishments. They are universally addicted to various superstitions, and have much to do with witches and evil spirits. Father Pastor, a Jesuit, one day visited one of the old women of the Aisipone nation, a reputed witch, and at the point of death, and told her, that, if she died without baptism, her soul would be eternally tormented by the devils. She very calmly answered, that they had been her friends for a long time, and she was therefore very sure they would do her no harm. A great proportion of these people lead a wandering life, are extremely indolent, dirty, and wretched, living on fish, and the flesh of the various wild animals, birds, and even reptiles, which inhabit the forests. "All the Indians of South America," says Charlevoix, "have hot stomachs," which can digest all sorts of food, and in great quantities, and they are in general "excessively voracious." Their notions of religion and government, with a few exceptions, are very rude. Some nations live compactly in towns, and cultivate the earth, raising, among other productions, wheat, which they bruise between two stones, and make into cakes. Some nations are represented as dull, cruel, and inconstant; others as fierce, cunning, and thievish; others as humane, ingenuous, and hospitable; and in general they are kind and attentive to strangers, so long as they are well used by them; and we seldom read of their being first in a quarrel with those who pass their territories, or sojourn among them. The astonishing success of the Jesuits in converting such multitudes of them to their faith, is a convictive proof of their capacity to receive instruction; of their docility, humanity, and friendly dispositions. All accounts agree that the middle and southern parts of South America are very thinly inhabited, being interspersed with extensive ridges of mountains, immense barren plains, and numerous marshes.

As to the second class of American Indians, who formerly inhabited, and who yet inhabit, Mexico and the country south of the lakes and west of the Mississippi, and who came over, as we have supposed, from the north-east parts of Asia; they seem, from whatever cause, to be advanced somewhat higher in the scale of human beings than the South Americans, if we except the Peruvians, who appear to have made greater progress in civilization than even the Mexicans. Concerning the nations of the vast country of Anahuac or New Spain, composing a large portion of the second class of the proper Americans, the abbé Clavigero has the following observations: "We have had intimate commerce for many years with the Americans, have lived several years in a seminary destined for their instruction, had some Indians among our pupils, had particular knowledge of many American rectors, many nobles, and numerous artists; attentively observed their character, their genius, their dispositions, and manner of thinking; and have examined, besides, with the utmost diligence, their ancient history; their religion, their government, their laws, and their customs; after such long experience and study of them, from which we imagine ourselves able to decide without danger of erring, we declare that the mental qualities of the American Indians are not in the least degree inferior to those of the Europeans; that they are capable of all, even the most abstract sciences, and that, if equal care and pains were taken in their education, we should see rise among them philosophers, mathematicians, and divines, who would

rival the first in Europe. But it is not possible to make great progress in the sciences, in the midst of a life of misery, servitude, and oppression. Their ancient government, their laws, and their arts, evidently demonstrate that they suffered no want of genius."

This same author, who appears to be a competent judge, describes the Mexicans as being of a good stature, rather exceeding the middle size; well-proportioned in all their limbs; as having a fine olive complexion; narrow foreheads; black eyes; clean, firm, regular, white teeth; thick, black, coarse, glossy hair; thin beards, and generally no hair on their legs, thighs, and arms. They are neither very handsome nor the reverse, but hold a middle place between the extremes. Some of the women are fair and beautiful. Deformities are scarcely known among them. Their senses are very acute, especially that of sight, which they enjoy unimpaired to the greatest age. They are moderate eaters, but much addicted to intemperance in drinking, which, as far as we know, is true of all the American Indians. They are patient of injuries and hardships, and grateful for benefits. Good faith is not so much respected as it deserves to be. They are naturally unsocial, serious, and austere, and are more anxious to punish crimes than to reward virtues. Generosity and perfect disinterestedness are striking traits in their character. Their religion is blended with much superstition; and some of the more ignorant are very prone to idolatry. The respect paid by children to their parents, and by the young to the old, among those people, is highly commendable. Parents are fond of their children. The affection of husbands for their wives is less than the wives for their husbands; and it is very common for men to love their neighbours' wives better than they do their own. Courage and cowardice seem alternately to affect their minds, and it is difficult to determine which predominates. They can meet dangers in war, and such as proceed from natural causes, with great intrepidity; but are panic-struck by the stern look of a Spaniard. On the whole, their character, like that of all other nations, is a mixture of good and bad. Of their morality, the following exhortation of a Mexican to his son may serve as a specimen: "My son, who art come into the light from the womb of thy mother like a chicken from the egg, and like it art preparing to fly through the world, we know not how long heaven will grant to us the enjoyment of that precious gem which we possess in thee; but, however short the period, endeavour to live exactly, praying God continually to assist thee. He created thee: thou art his property. He is thy father, and loves thee still more than I do; repose in him thy thoughts, and day and night direct thy sighs to him. Reverence and salute thy elders, and hold no one in contempt. To the poor and distressed be not dumb, but rather use words of comfort. Honour all persons, particularly thy parents, to whom thou owest obedience, respect, and service. Guard against imitating the examples of those wicked sons, who, like brutes that are deprived of reason, neither reverence their parents, listen to their instruction, nor submit to their correction; because whoever follows their steps will have an unhappy end, will die in a desperate or sudden manner, or will be killed and devoured by wild beasts.

"Mock not, my son, the aged or the imperfect. Scorn not him whom you see fall into some folly or transgression, nor make him reproaches; but restrain thyself, and beware lest thou fall into the same error which offends thee in another. Go not where thou art not called, nor interfere in that which does not concern thee. Endeavour to manifest thy good breeding in all thy words and actions. In conversation, do not lay thy hands upon another, nor speak too much, nor interrupt nor disturb another's discourse. When any one discourses with thee, hear him attentively, and hold thyself in an easy attitude, neither playing with thy feet, nor putting thy mantle to thy mouth, nor spitting too often, nor looking about you here and there, nor rising up frequently if thou art sitting;

for such actions are indications of levity and low breeding." He proceeds to mention several particular vices which are to be avoided, and concludes: "Stal not, nor give thyself to gaming; otherwise thou wilt be a disgrace to thy parents, whom thou oughtest rather to honour for the education they have given thee. If thou wilt be virtuous, thy example will put the wicked to shame. No more, my son; enough hath been said in discharge of the duties of a father. With these counsels I wish to fortify thy mind. Refuse them not, nor act in contradiction to them; for on them thy life and all thy happiness depend."

Although so much cannot be said with truth, perhaps, in favour of the more northern Indians, whom we have included in the second class, owing to the inferiority of their advantages, yet we are far from thinking them inferior, in point of corporeal or mental endowments, to the Mexicans. In their complexion, size, and form, they are not in general unlike the Mexicans. In social and domestic virtues, in agriculture, arts, and manufactures, they are far behind the Mexicans; in their hospitality, equal; and in their eloquence in council, and bravery in war, perhaps superior. Their mode of life, and the state of society among them, afford few objects for the display either of their literary or political abilities.

M. Buffon has given an humiliating picture of the Aborigines of North America, in the following words: "In the American savage, the organs of generation are small and feeble. He has no hair, no beard, no ardour for the female. Though nimbler than the European, because more accustomed to running, his strength is not so great. His sensations are less acute; and yet he is more timid and cowardly. He has no vivacity, no activity of mind. The activity of his body is not so much an exercise or spontaneous motion, as a necessary action produced by want. Destroy his appetite for victuals and drink, and you will at once annihilate the active principle of all his movements: he remains in stupid repose, on his limbs or couch, for whole days. It is easy to discover the cause of the scattered life of these savages, and of their estrangement from society. They have been refused the most precious spark of nature's fire: they have no ardour for women, and, of course, no love to mankind. Unacquainted with the most lively and most tender of all attachments, their other sensations of this nature are cold and languid. Their love to parents and children is extremely weak. The bonds of the most intimate of all societies, that of the same family, are feeble; and one family has no attachment to another. Hence no union, no republic, no social state, can take place among them. The physical cause of love gives rise to the morality of their manners. Their heart is frozen, their society cold, and their empire cruel. They regard their females as servants destined to labour, or as beasts of burden, whom they load unmercifully with the produce of their hunting, and oblige, without pity or gratitude, to perform labours which often exceed their strength. They have few children, and pay little attention to them. Every thing must be referred to the first cause: they are indifferent, because they are weak; and this indifference to the sex is the original stain which disgraces nature, prevents her from expanding, and, by destroying the germs of life, cuts the root of society. Hence man makes no exception to what has been advanced. Nature, by denying him the faculty of love, has abused and contracted him more than any other animal." Mr. Jefferson's answer to M. Buffon, is so full of the most valuable information on this subject, that it must not be omitted in this place. "Of the Indians of South America," says Mr. Jefferson, "I know nothing; for I would not honour with the appellation of knowledge, what I derive from the fables published of them. These I believe to be just as true as the fables of *Æsop*. This belief is founded on what I have seen of man, white, red, and black, and what has been written of him by authors, enlightened themselves, and writing amidst an enlightened people. The Indian of North America being more within

our reach, I can speak of him somewhat from my own knowledge, but more from the information of others better acquainted with him, and on whose truth and judgment I can rely. From these sources I am able to say, in contradiction to this representation, that he is neither more defective in ardour, nor more impotent with his female, than the white reduced to the same diet and exercise: that he is brave, when an enterprise depends on bravery; education with him making the point of honour consist in the destruction of an enemy by stratagem, and in the preservation of his own person free from injury; or perhaps this is nature, while it is education which teaches us to honour force more than fineness: that he will defend himself against an host of enemies, always choosing to be killed, rather than to surrender, though it be to the whites, who he knows will treat him well: that in other situations also he meets death with more deliberation, and endures tortures with a firmness unknown almost to religious enthusiasm with us: that he is affectionate to his children, careful of them, and indulgent in the extreme: that his affections comprehend his other connections, weakened, as with us, from circle to circle, as they recede from the center: that his friendships are strong and faithful to the uttermost; a remarkable instance of which appeared in the case of the late colonel Byrd, who was sent to the Cherokee nation to transact some business with them. It happened that some of our disorderly people had just killed one or two of that nation. It was therefore proposed in the council of the Cherokees that colonel Byrd should be put to death, in revenge for the loss of their countrymen. Among them was a chief called Silouee, who, on some former occasion, had contracted an acquaintance and friendship with colonel Byrd. He came to him every night, in his tent, and told him not to be afraid, they should not kill him. After many days deliberation, however, the determination was, contrary to Silouee's expectation, that Byrd should be put to death, and some warriors were dispatched as executioners. Silouee attended them, and, when they entered the tent, he threw himself between them and Byrd, and said to the warriors, "this man is my friend: before you get at him, you must kill me." On which they returned, and the council respected the principle so much as to recede from their determination.

The sensibility of the American savage is remarkably keen, since even the warriors weep most bitterly on the loss of their children, though in general they endeavour to appear superior to human events: and his vivacity and activity of mind is equal to ours in the same situation; and hence his eagerness for hunting, and for games of chance. The women are submitted to unjust drudgery. This I believe is the case with every barbarous people. With such, force is law. The stronger sex therefore imposes on the weaker. It is civilization alone which replaces women in the enjoyment of their natural equality. That first teaches us to subdue the selfish passions, and to respect those rights in others which we value in ourselves. Were we in equal barbarism, our females would be equal drudges. The man with them is less strong than with us, but their women stronger than ours; and both for the same obvious reason; because our man and their woman is habituated to labour, and formed by it. With both races, the sex which is indulged with ease is least athletic. An Indian man is small in the hand and wrist, for the same reason for which a sailor is large and strong in the arms and shoulders, and a porter in the legs and thighs. They raise fewer children than we do. The causes of this are to be found, not in a difference of nature, but of circumstance. The women very frequently attending the men in their parties of war and hunting, child-bearing becomes extremely inconvenient to them. It is said, therefore, that they have learnt the practice of procuring abortion by the use of some vegetable; and that it even extends to prevent conception for a considerable time after. During these parties they are exposed to numerous hazards, to excessive exertions, to the greatest extremities

of hunger. Even at their homes the nation depends for food, through a certain part of every year, on the gleanings of the forest: that is, they experience a famine once in every year. With all animals, if the female be badly fed, or not fed at all, her young perish: and, if both male and female be reduced to like want, generation becomes less active, less productive. To the obstacles then of want and hazard, which nature has opposed to the multiplication of wild animals, for the purpose of restraining their numbers within certain bounds, those of labour and of voluntary abortion are added with the Indian. No wonder then if they multiply less than we do. Where food is regularly supplied, a single farm will shew more of cattle, than a whole country of forests can of buffaloes. The same Indian women, when married to white traders, who feed them and their children plentifully and regularly, who exempt them from excessive drudgery, who keep them stationary and unexposed to accident, produce and raise as many children as the white women. Instances are known, under these circumstances, of their rearing a dozen children. An inhuman practice once prevailed in this country of making slaves of the Indians. It is a fact well known with us, that the Indian women, so enslaved, produced and raised as numerous families as either the whites or blacks among whom they lived. It has been said, that Indians have less hair than the whites, except on the head. But this is a fact of which fair proof can scarcely be had. With them it is disgraceful to be hairy on the body. They say it likens them to hogs. They therefore pluck the hair as fast as it appears. But the traders who marry their women, and prevail on them to discontinue this practice, say, that nature is the same with them as with the whites. Nor, if the fact be true, is the consequence necessary which has been drawn from it. Negroes have notoriously less hair than the whites; yet they are more ardent. But, if cold and moisture be the agents of nature for diminishing the races of animals, how comes she all at once to suspend their operation as to the physical man of the new world, and to let loose their influence on his moral faculties? How has this combination of the elements and other physical causes, so contrary to the enlargement of animal nature in this new world, these obstacles to the development and formation of great germs, been arrested and suspended, so as to permit the human body to acquire its just dimensions; and by what inconceivable process has their action been directed on his mind alone? To judge of the truth of this, to form a just estimate of their genius and mental powers, more facts are wanting, and great allowance to be made for those circumstances of their situation which call for a display of particular talents only. This done, we shall probably find that they are formed, in mind as well as in body, on the same model with the "Homo sapiens Europæus." The principles of their society forbidding all compulsion, they are to be led to duty and to enterprise by personal influence and persuasion. Hence eloquence in council, bravery and address in war, become the foundations of all consequence with them. To these acquirements all their faculties are directed. Of their bravery and address in war we have multiplied proofs, because we have been the subjects on which they were exercised. Of their eminence in oratory we have fewer examples, because it is displayed chiefly in their own councils. Some, however, we have of very superior lustre. I may challenge the whole orations of Demosthenes or Cicero; and of any more eminent orator, if Europe has furnished a more eminent, to produce a single passage superior to the speech of Logan, a Mingo chief, to lord Dunmore, when governor of this state. And, as a testimony of their talents in this line, I beg leave to introduce it, first stating the incidents necessary for understanding it. In the spring of the year 1774, a robbery and murder was committed on an inhabitant of the frontiers of Virginia, by two Indians of the Shawanee tribe. The neighbouring whites, according to their custom, undertook to punish this outrage

in a summary way. Col. Cresap, a man infamous for the many murders he had committed on those much-injured people, collected a party, and proceeded down the Kan-haway in quest of vengeance. Unfortunately a canoe of women and children, with one man only, was seen coming from the opposite shore, unarmed, and unsuspecting an hostile attack from the whites. Cresap and his party concealed themselves on the bank of the river, and, the moment the canoe reached the shore, singled out their objects, and, at one fire, killed every person in it. This happened to be the family of Logan, who had long been distinguished as a friend to the whites. This unworthy return provoked his vengeance: he accordingly signalized himself in the war which ensued. In the autumn of the same year, a decisive battle was fought at the mouth of the Great Kan-haway, between the collected forces of the Shawanees, Mingoes, and Delawares, and a detachment of the Virginia militia. The Indians were defeated, and sued for peace. Logan, however, disdained to be seen among the suppliants. But, lest the sincerity of a treaty should be distrusted from which so distinguished a chief absented himself, he sent by a messenger the following speech to be delivered to Lord Dunmore:

"I appeal to any white man to say, if ever he entered Logan's cabin hungry, and he gave him not meat; if he ever came cold and naked, and he clothed him not. During the course of the last long and bloody war, Logan remained idle in his cabin, an advocate for peace. Such was my love for the whites, that my countrymen pointed as they passed, and said, 'Logan is the friend of white men.' I had even thought to have lived with you, but for the injuries of one man. Col. Cresap, the last spring, in cold blood, and unprovoked, murdered all the relations of Logan, not sparing even my women and children. There runs not a drop of my blood in the veins of any living creature. This called on me for revenge. I have sought it: I have killed many: I have fully glutted my vengeance. For my country, I rejoice at the beams of peace. But do not harbour a thought that mine is the joy of fear. Logan never felt fear. He will not turn on his heel to save his life. Who is there to mourn for Logan?—Not one."

Before we condemn the Indians of this continent as wanting genius, we must consider that letters have not yet been introduced among them. Were we to compare them in their present state with the Europeans north of the Alps, when the Roman arms and arts first crossed those mountains, the comparison would be unequal, because at that time, those parts of Europe were swarming with numbers; because numbers produce emulation, and multiply the chances of improvement, and one improvement begets another. Yet I may safely ask, how many good poets, how many able mathematicians, how many great inventors in arts or sciences, had Europe, north of the Alps, then produced? And it was sixteen centuries after this before a Newton could be formed. I do not mean to deny, that there are varieties in the race of man, distinguished by their powers both of body and mind. I believe there are, as I see to be the case in the races of other animals. I only mean to suggest a doubt, whether the bulk and faculties of animals depend on the side of the Atlantic on which their food happens to grow, or which furnishes the elements of which they are compounded? Whether nature has enlisted herself as a Cis or Trans-Atlantic partisan?

No people in the world have higher notions of military honour than the American Indians. The fortitude, the calmness, and even exultation, which they manifest while under the extremest torture, is owing to their education, to their exalted ideas of military glory, and their rude notions of future happiness, which they believe they shall forfeit by the least manifestation of fear, or uneasiness, under their sufferings. They are as bitter and determined in their resentments as they are sincere in their friendships, and often pursue their enemies several hun-

dred miles through the woods, surmounting every difficulty, in order to be revenged.

The following fact of an Algonquin woman, is a remarkable proof of their innate thirst of blood. That nation being at war with the Iroquois, she happened to be taken prisoner, and was carried to one of the villages belonging to them. Here she was stripped naked, and her hands and feet bound with ropes in one of their cabins. In this condition she remained ten days, the savages sleeping round her every night. The eleventh night, while they were asleep, she found means to disengage one of her hands, with which she immediately freed herself from the ropes, and went to the door. Though she had now an opportunity of escaping unperceived, her revengeful temper could not let slip so favourable an opportunity of killing one of her enemies. The attempt was manifestly at the hazard of her own life; yet, snatching up a hatchet, she killed the savage that lay next her; and, springing out of the cabin, concealed herself in a hollow tree, which she had observed the day before. The groans of the dying person soon alarmed the other savages, and the young ones immediately set out in pursuit of her. Perceiving, from her tree, that they all took their course one way, and that no savage was near her, she left her sanctuary, and, flying by an opposite direction, ran into a forest without being perceived. The second day after this happened, her footsteps were discovered; and they pursued her with such expedition, that the third day she discovered her enemies at her heels. Upon this she threw herself into a pond of water; and, diving among some weeds and bulrushes, she could just breathe above water without being perceived. Her pursuers, after making the most diligent search, were forced to return. For thirty-five days this woman held on her course through woods and deserts, without any other sustenance than roots and wild berries. When she came to the river St. Lawrence, she made with her own hands a kind of wicker raft, on which she crossed it. As she went by the French for Trois Rivières, without well knowing where she was, she perceived a canoe full of savages; and, fearing they might be Iroquois, ran again into the woods, where she remained till sun-set. Continuing her course soon after, she saw Trois Rivières; and was then discovered by a party whom she knew to be Hurons, a nation in alliance with the Algonquins. She then squatted down behind a bush, called out to them that she was not in a condition to be seen, because she was naked. They immediately threw her a blanket, and then conducted her to the fort, where she recounted her story.

In their public councils, the Indians observe the greatest decorum. In the foremost rank sit the old men, who are the counsellors; then the warriors; and next the women and children. As they keep no records, it is the business of the women to notice every thing that passes, to imprint it on their memories, and tell it to their children. They are, in short, the records of the council; and, with surprising exactness, preserve the stipulations of treaties entered into a hundred years back. Their kindness and hospitality are scarcely equalled by any civilized nation. Their politeness in conversation is even carried to excess, since it does not allow them to contradict anything that is asserted in their presence. In short, there appears to be much truth in Dr. Franklin's observation: "We call them savages, because their manners differ from our's, which we think the perfection of civility; they think the same of their's." Society among the American Indians, we are sorry to say, has not been improved, but in most instances corrupted, by their intercourse with Europeans. It is believed by many, that the wars with them generally originate in the injustice, avarice, and pride, of their opposers and vanquishers. None, however, can justify their savage mode of carrying on a war, when once it has commenced. If the guilty, or those who should conceal and defend the guilty, were the sole objects of their vengeance, we could not condemn them. But when those who never did or

meant them an injury, when defenceless women, and children, and even babes, are made the victims of their shocking barbarity, we cannot but deeply lament their want of that humanity, and just discrimination between the innocent and the guilty, which are the peculiar fruits of civilization. We wish we could say, that they never had any examples of indiscriminate barbarity from their European neighbours, who ought to have taught them better.

The Indians many times treat their prisoners in the most cruel and barbarous manner; but they often use them with the greatest humanity, feeding and clothing them, even better than themselves, and adopting them as fathers and mothers, sons and daughters, brothers and sisters, and treating them in all respects as such. There have been instances of whites, thus adopted, while young, who have become chiefs of the nations that adopted them. Compulsion has frequently been found necessary to separate from their Indian relations, those white prisoners who have resided a few years with them; and many men and women, who have been ransomed and delivered up by the Indians to their white parents or relations, have returned back to their Indian friends, and, of choice, married and settled among them.

Mr. Stewart, a late enterprising traveller into the country west of the Mississippi, who took his course west-south-west from the posts on the lakes, and penetrated to the head of the Missouri, and thence due west, till he arrived within about 500 miles of the Pacific Ocean, informs us, that beyond the Missouri he met with many powerful nations of Indians, who were in general courteous and hospitable. The nations which he visited to the westward appeared to be a polished civilized people, having regularly-built towns, and enjoying a state of society not far removed from the European; and, in order to be perfectly equal, wanting only the use of iron and steel. Their clothing is of skins, cut in an elegant manner, and in many respects preferable to the garments in use among the whites. Adjacent to these nations is a vast range of mountains, which may be called the *Alleghany* of the western parts of America, and serves as a barrier against the too frequent incursions of the coast Indians, who, Mr. Stewart relates, appear to be inveterate enemies to the tribes eastward of the mountains.

The American Indians are unacquainted with letters, and their history is preserved in some few instances by hieroglyphic paintings and sculpture, but principally by tradition. They often discover great ingenuity in communicating information to the absent. The following instance of Indian hieroglyphic writing, Dr. Mitchell was himself an eye-witness of. Being in company with several other gentlemen, as they were proceeding up Onondago river, to an Indian treaty, they overtook several canoes of Senaka Indians, who encamped with them at night near fort Brewington; and, the next day proving rainy, they continued in company till the weather became so favourable as to permit them to cross the Oneida lake. During the storm, one of the Indian canoes stove, and became unfit for service. The commissioners took the crew on-board their boat, and carried them to a landing-place some distance up Wood Creek. Here one of them, before he left the water, took the following method to let his companions, who were left behind, know when and whither they had proceeded. He took a piece of wood, and hewed it flat and smooth, and then raked his fire for a suitable coal, with which he rudely delineated, on the slab, the figure of an Indian carrying a gun reversed on his shoulder. In front of him he drew a crooked line, which reached to a man with a long coat and a cocked hat, and holding a cane in his hand; and behind him a framed house. He then took a strait pole, and tied some weeds and grass upon one end of it, and fixed the other in the earth, in such a manner, that, in the position the sun then was, which was six o'clock in the morning, it cast no shadow; or, in other words, he pointed it exactly towards the sun. The meaning of all, was this: "Sufquewewah

(the name of the Indian) left this spot at six o'clock in the morning, or when the sun was in the place where the pole pointed, and has proceeded up Wood Creek, (which is remarkably crooked,) to the settlement where the commissioners of the state of New York are assembled to hold a treaty with the Indians." All these *insignia* were arranged so conspicuously on the margin of the creek, that his companions behind could scarcely avoid observing them as they passed.

In the interior parts of America various monuments of art have been found, which discover greater ingenuity in their construction than the present generation of Indians appear to possess. Two miles west of the Genesee river, in the state of New York, we have been informed, by the Rev. Mr. Kirkland, missionary to the Six Nations, who visited this place in 1788, are the remains of an ancient Indian fort. It encloses about four acres; is encompassed with a ditch eight feet wide and five or six deep, and has six gateways. Its form is circular, except on one part, which is defended by nature with a high bank, at the foot of which is a fine stream of water; there is an appearance of there having been a deep covered way through the middle of the bank to the water. Some of the trees on the bank and in the ditch look as if they had been growing 150 or 200 years. Half a mile south, on an eminence, are the ruins of another Indian fortified town, of smaller dimensions, and more advantageously situated for defence. The old Indians say, these forts were built before the Senakas were admitted into confederacy with the Mohawks, Onondagos, Oneidas, and Cayogas, and while the Senakas were at war with the Mississaugas, and other Indians, on the great lakes, which Mr. Kirkland conjectures, from various accounts that he received from different tribes, was at least 300 years ago.

A few miles from the above-mentioned forts, at a place which the Senakas call Tegateenedaghque, signifying a town with a fort at each end, are the remains of two other forts, constructed nearly in the same form, with six gates, a ditch, and a stream of water, and a covered way to it. Near the northern fort are the ruins of a funeral pile, six feet high, and twenty or thirty feet diameter, where were buried 800 Indians, who, according to tradition, fell in a famous battle fought at this place, between the Senakas, who were the victors, and the western Indians. The weapons of war then in use were bows and arrows, the spear or javelin pointed with bone, and the war-club, or death-mall. When the former sort of weapons were expended, they came to close engagement with the latter. The warriors wore a sort of jacket made of willow sticks, or of moose wood, laced tight round their bodies; on their heads they wore a cap of the same kind, but commonly wove double, the better to secure them against a mortal blow from the death-mall. The battle above-mentioned was fought some of the Indians say 300, some 400, and some 500, lives or ages ago, and long before the arrival of the Europeans. They commonly reckon a life, or an age, one hundred winters or colds.

Mr. Kirkland observes, that there are similar vestiges of ancient fortified towns throughout the extensive territories of the Six Nations; and, by Indian report, in various other parts, and particularly on a branch of the Delaware river, which appear to be very ancient. He adds, "I find on inquiring, that a tradition prevails among the Indians in general, that all Indians came from the west." This is a confirmation of the opinion that this second class of Indians, of whom we have been speaking, and of which the Six Nations make a part, came over from the north-east of Asia, to the north-west coast of America, whence they migrated south towards Mexico, and eastward into the present territory of the United States.

Judging of the ancient Indians from the traditional accounts of them, and the ruins we have been describing, we are led to conceive of them as a more civilized, ingenious, and warlike, people than their descendants at the present time. We are at a loss for the causes of their degeneracy,

generacy, unless we mention as such the introduction of spirituous liquors among them, a deep sense of their inferiority in military skill to the white people, and their chagrin and broken-heartedness at the loss of their lands, and being forced to give place to their supposed enemies.

The third class of American Indians, viz. those who inhabit Esquimaux, Labrador, and the countries around, are much less known than either of the afore-mentioned classes. Those who profess to be best acquainted with them say, they differ in size and shape from the other American Indians, and resemble the Laplanders and Samoides of Europe, from whom it is conjectured they descended.

In the years 1771 and 1772, Mr. Hearne, an ingenious young gentleman, travelled many hundred miles into these dreary countries; and, in his journal, draws a plain and artless picture of the savage modes of life, the scanty means of subsistence, and the singular wretchedness in almost every respect, of the various tribes, who, without fixed habitations, pass their lives in roving over dreary deserts and frozen lakes, of the extensive tract of continent thro' which he passed. The following extracts from his Journal will give the reader a better and more just idea of these Indians, than has hitherto been furnished from any other source:

"We arrived at the Copper-mine river on the 13th of July 1771, at about forty miles from its exit into the sea. On our arrival at the river, the Indians dispatched three men before, as spies, to see if any Esquimaux Indians were about the river; and, on the 15th of the same month, as I was continuing my survey, I met the spies, who informed me there were five tents of Esquimaux on the west side of the river, and, by their accounts of the distance, I judged they were about twelve miles off. On receiving this news, no more attention was paid to my survey, but their whole thought was engaged on planning the best method of stealing on them the ensuing night, and killing them while asleep. The better to complete their design it was necessary to cross the river, and, by the account of the spies, no place was so proper for that purpose as where we were, it being fine and smooth, and at some distance from any cataract. Accordingly, after they had put their guns, targets, spears, &c. in order, we were ferried over the river, the doing of which (as we had only three canoes) took up a considerable time. It must be observed that, before we set out on the west side, all the men painted their targets, some with the image of the sun, others with the moon, others with different kinds of birds and beasts of prey, and some had the images of fairies and other imaginary beings on them, which, according to their silly imaginations, are inhabitants of the different elements, as the earth, sea, air, &c. By a strict enquiry into the reason of this superstition, I found that each man had the image of that being painted on his target, which he relied most on for success in the intended battle with the Esquimaux: and some were contented with a single representation, whilst others, doubtful, I suppose, of the power of any single being, would have their targets covered to the very margin with hieroglyphics, quite unintelligible.

"This piece of superstition being completed, we began to advance towards the tents of the Esquimaux, always walking in low grounds, and being very careful how we crossed any hills, for fear of being seen by the inhabitants. The number of my gang being so far superior to the five tents of Esquimaux, and the warlike manner in which they were equipped, in proportion to what might be expected of the poor Esquimaux, rendered a total massacre inevitable, unless kind Providence should work a miracle for their preservation. The land was so situated that we walked under cover of the hills till we came within 200 yards of their tents, where the Indians that were with me lay some time in ambush, watching the motions of the Esquimaux. The Indians advised me to stay here till the fight was over, with which I would by no means comply, for I thought, when the Esquimaux were surprised, they would fly every way for refuge, and if they found me

alone, not knowing me from an enemy, they would lay violent hands on me when there was none to assist. I therefore determined to accompany them, assuring them at the same time that I would have no hand in the murder unless I found it necessary for my own safety. They seemed highly pleased with my proposal, and directly fixed a spear and bayonet for me, but I had no target. By the time this was all settled it was near one o'clock in the morning, when, finding all the Esquimaux asleep in their tents, they ran on them without being discovered, until they came close to their very doors. They then began the cruel massacre, while I stood neuter in the rear, and in a few seconds a scene truly shocking presented itself to my view. For, as the poor unhappy victims were surprised in the midst of their sleep, they had neither power nor time to make any resistance, but men, women, and children, ran out of their tents quite naked. But, alas! where could they fly for shelter! They every soul fell a sacrifice to Indian barbarity, in all near thirty. The shrieks and groans of the poor expiring souls were truly horrible, and this was much increased by the sight of one poor girl (about eighteen years old) whom they killed so near to me, that, when the first spear was struck into her, she fell down and twisted about my feet and legs, and it was with much difficulty I disengaged myself from her dying grasps. As the Indians pursued her, I solicited for her life; but so far was it from being granted, that I was not fully assured of my own being in entire safety for offering to speak in her behalf. When I begged her life, the two fellows that followed her made no reply, till they had both their spears through her fixed into the ground: they then both looked me sternly in the face, and began to upbraid me, by asking if I wanted an Esquimaux wife; at the same time paying no regard to the loud shrieks of the poor girl, who was twining round the spears like an eel. Indeed I was obliged at last to desire that they would be more expeditious in dispatching her out of her misery, lest otherwise I should be obliged out of pity to assist in performing that friendly office. The brutish manner in which they used the bodies, which they had deprived of life, is too shocking, and would be too indecent to describe; and the terror of mind I was in from such a situation is so much easier to be conceived than described, that I shall not attempt it. When they had completed this most inhuman murder, we observed seven more tents on the opposite side of the river. The Indians of these tents were soon in great confusion, but did not offer to make their escape. The Indians who were with me fired many shot at them across the river, but the poor Esquimaux were so unacquainted with the nature of guns, that when the bullets struck the rocks they ran in great bodies to see what was sent them, and seemed curious in examining the pieces of lead which they found flatted on the rocks, till at last one man was shot through the leg, after which they embarked in their canoes, with their wives and children, and paddled to a shoal in the river. When my Indians had made all their observations on the bodies, as above-mentioned, and had plundered their tents of all their copper-work (which they and the Copper Indians used instead of iron), they assembled at the top of an high hill, standing in a circle with their spears erect in the air, and gave shouts of victory, calling *Tima! Tima!* by way of derision to the surviving Esquimaux who were standing on the shoal. We then went up the river about half a mile, to the place where our canoes and baggage were, with an intent to cross over and plunder the other seven tents. It taking up a considerable time to get all across the river, as we had only three canoes, and being entirely under cover of the rocks, the poor Esquimaux, whom we left on the shoal, thought we were gone about our own business, and had returned to their tents again. And the land was so situated on the east side, that the Indians went under cover of the hills until they were within a hundred yards of their tents, where they saw the Esquimaux busy in tying up their bundles. They ran on them again with great fury; but,

having

having their canoes ready, they all embarked, and reached the shoals before-mentioned, except one poor old man, who, being too attentive in tying up his things, had not time to reach his canoe, but fell a sacrifice to their fury. After the Indians had plundered these tents of what they thought worth their notice, they threw their tent-poles into the river, broke their stone-kettles, and did all they could to distress the poor survivors. We found an aged woman at a small distance up the river, snaring of salmon, whom they butchered in the same manner, every man having a thrust at her with his spear."

The other extract is as follows: "This day, January the 11th, 1772, as the Indians were hunting, some of them saw a strange snow-shoe track, which they followed, and at a considerable distance came to a little hut, where they found a young woman sitting alone. They brought her to the tents, and on examining her found that she was one of the western dog-ribbed Indians, and had been taken prisoner by the Arathapescow Indians, in the summer of 1770; and when the Indians, who took her prisoner, were near this place in 1771, she eloped from them, with an intent to return to her own country. But it being so far off, and when she was taken prisoner having come all the way in canoes, with the windings of rivers and lakes, she had forgot the way, and had been in this little hut ever since the beginning of fall. By her account of the moons passed since her elopement, it appears to have been the middle of last July when she left the Arathapescow Indians, and she had not seen a human face since. She had supported herself by snaring rabbits, partridges, and squirrels, and was now in good health, and I think as fine a woman, of a real Indian, as I have seen in any part of North America. She had nothing to make snares of but the sinews of rabbits legs and feet, which she twisted together for that purpose; and of the rabbits-skins had made a neat and warm winter's clothing. The stock of materials she took with her when she eloped, consisted of about five inches of an iron hoop for a knife, a stone steel, and other hard stones for flints, together with fire-tackle, as tinder, &c. about an inch and an half of the shank of the shoing of an arrow, of iron, of which she made an awl. She had not been long at the tents, before half a score of men wrestled to see who should have her for a wife. She says, that when the Arathapescow Indians took her prisoner they stole upon the tents in the night, when all the inhabitants were asleep, and murdered every soul except herself and three other young women. Her father, mother, and husband, were in the same tent with her, and they were all killed. Her child, of about five months old, she took with her, wrapt in a bundle of her own clothing, undiscovered, in the night. But when she arrived at the place where the Arathapescows had left their wives, which was not far off, it being then day-break, these Indian women immediately began to examine her bundle, and, having there found the child, took it from her and killed it immediately. The relation of this shocking scene only served the savages of my gang for laughter. Her country is so far to the westward, that she says she never saw any iron or other metal till she was taken prisoner; those of her tribe making their hatchets and chisels of deer's horns, and knives of stone and bone; their arrows are shod with a kind of slate, bone, and deer's horns, and their instruments to make their wood-work are nothing but beaver's teeth. They have frequently heard of the useful materials that the nations to the east of them are supplied with from the English, but instead of drawing nearer to be in the way of trading for iron-work, &c. are obliged to remove farther back to avoid the Arathapescow Indians, as they make surprising slaughter among them every year, both winter and summer."

The Esquimaux, according to Mr. Pennant, are distinguished from the tribes south of them, chiefly by their dress, their canoes, and their instruments of chase. He divides them into two varieties. About Prince William's

Sound they are of the largest size. As we advance northward they decrease in height, till they dwindle into the dwarfish tribes, which occupy some of the coasts of the icy sea, and the maritime parts of Hudson's Bay, of Greenland, and Labrador. Their dwarfishness is doubtless occasioned by the scantiness of their provisions, and the severity of their climate. Beyond the 67th degree of north latitude, according to Capt. Ellis's account, there are no inhabitants. The Arctic countries in America, Asia, and Greenland, if inhabited at all, have very few inhabitants; and those are of a dwarfish kind, scattered on the banks of rivers, lakes, and seas, and subsist miserably upon fish, and the flesh of the animals which inhabit those frozen regions, with the skins of which they clothe themselves.

Mr. Crantz gives it as his opinion, that the Esquimaux came originally from the north-east regions of Great Tartary, between the icy sea and Mungalia; because he observes a greater affinity between them and the Calmucs, Tunguses, and Kamikadales, who inhabit those regions, than between them and the Laplanders, the Samoiedes, and Ostiacks, who inhabit the north-west parts of Europe, whence, it has generally been conjectured, the Esquimaux migrated. It is his opinion also, that Greenland was settled in the 14th century, from the north-eastern parts of America; for, till that period, Greenland appears not to have had any inhabitants. The route which the first migrants took, he supposes was first into Tartary, after the dispersion of the nations, thence into Kamtschaka, thence across the strait which separates the two continents, whence they spread themselves unmolested, into the then uninhabited country round Hudson's Bay, and down as far south as Canada; and here they were found in the 11th century by the Norwegians, in their Wineland. Afterwards these more southerly regions were conquered by the more numerous and powerful tribes south of the lakes, and the Esquimaux were forced to retire as far north as the 60th degree of north latitude. Here Capt. Ellis found the Esquimaux in his voyage to Hudson's Bay, and discovered that they had the same aspect, dress, boats, hunting and fishing implements, habitations, manners, and usages, as the Greenlanders. They are often pursued and hunted by the other Indians, who live about the south and west shores of Hudson's Bay, and who appear to be quite a different people.

The newly-discovered American Indians about Nootka Sound disguise themselves after the manner of the ancient Scythians, in dresses made of the skins of wolves and other wild beasts, and even wear the heads fitted to their own. These habits they use in the chase to circumvent the animals of the field.

Concerning the religion of the Indians much has been said, and much that has no foundation. In general it may be said, that they all have an idea of a Supreme Being, whom they worship under different names, and with a great variety of superstitious rites and ceremonies. Some, particularly the nations of the Algonquin language, call their Supreme God, the *Great Hare*; some *Michabou*, and others *Atahocan*. The Being opposed to this *first spirit*, whom they considered as the creator and governor of the world, they style the *Great Tyger*. The name of the Hurons' supreme god, or more properly their god of war, is *Areskoui*; of the Iroquois, *Ageskouse*; but most of the nations south of the lakes, as far as Louisiana, denominate their supreme god, the *Great*, the *Good*, or the *Grand Spirit*, to whom they ascribe a kind of omnipresence, and whom they invoke as their guardian. To their evil geni they never address themselves, except to entreat them not to do them any injury; and to appease their wrath they often sacrifice to them. Mr. Kirkland mentions a small lake, which he visited, situated at the foot of a precipice, nearly fifty feet perpendicular height, in the territory of the Six Nations, in which, the old Indians affirm, resided formerly a demon in the shape of a dragon, and that he

had been seen frequently to disgorge balls of liquid fire. To appease his wrath, they said, many a sacrifice of tobacco had been made at the lake by the fathers.

With regard to the general character of the Indian nations, M. de Pauw reasons in the following manner:—
 “As the most ancient histories agree in representing every race of men rising gradually out of savage life to the first rudiments of arts, and of society, there is just reason to believe, that the first men were thrown on this globe without other notions or advantages than those which are found in ordinary savages; containing, in themselves the elements of perfectibility, they were at a mighty distance from the attainment: in their creation, brutal and unenlightened, they owe to themselves their manners, their laws, and their sciences. They had no common model, no fixed rule of conduct; accordingly, they have differed very much, as well in the means of attaining to civilized life, as in the institutions on which their civilization depended: climate has governed them full as much as reason; the different degrees of heat and cold have clearly inspired legislators with opposite ideas: on comparing the legislative codes of the temperate with those of the torrid zone, or its neighbourhood, all is contrast, nothing analogous. It is agriculture that has led man by the hand from a savage state to a politic constitution: the more cultivated the soil, the more abundant the harvest, the sooner will the cultivators humanize. The first effect of agriculture is to render men sedentary; from that moment they are half civilized; from hence we may determine the classes in which the several species of savages should be placed, in proportion to their comparative distance from moral perfection. Cultivators are the first by pre-eminence, though the last in time, because their subsistence is the least precarious, their mode of life the least turbulent; they have time to invent and to perfect their instruments; they have leisure to think, and to reflect. Pastors come next, but differ from the former, in that, being obliged to look out for fresh pastures, and attend their flocks, they are never established. The Tartars, Arabians, Moors, and Laplanders, are those of this class the best known; from their manners are to be collected the best ideas we can have of this mode of life, intermediate between the savage and civil, and at an equal distance from the two points. The third class consists of those who live on the roots and fruits of the earth, without culture; their manners depend much on the quality of the productions, and the fertility of the soil; those who had the cocoa and the palm-tree, were more at their ease, and less savage, than those whose first resource was in the beech-mast and acorn. Those who live on fish form the fourth class; their mode of life differs little from that of the pastors, except that the latter have a resource in their tamed cattle, while the fishers depend on chance or dexterity for their subsistence. Hunters constitute the last order, and are of all the most savage; wandering, unassured of their subsistence, they must dread the union and multiplication of similar tribes as the greatest of evils; because game, much less abundant than fish, decreases in every country in proportion as the number of men increases. The savage hunter's scene of action is the wilderness; he avoids every human habitation, and gets to a greater distance at every step from social life. If he builds a hut, it is rather for a retreat than a dwelling; never at peace with either men or animals, his instinct is ferocious, his manners rude; the more his thoughts are employed on the means of procuring subsistence, the less he reflects on the means of his improvement; he is, in human kind, what the carnivorous beast is among quadrupeds, solitary and unsocial.

“That America and its inhabitants should continue savage to so late a period as the fifteenth century, has been a subject of wonder to our greatest philosophers. To suppose, with Buffon, an after-creation, or with others, a modern deluge, is a mere assertion; an assumption of a cause to answer a particular purpose. In coun-

tries temperate in climate, and rich in vegetables, society has been established infinitely sooner than in the cold and barren. One sees it pass, and, as it were, travel from Asia into Egypt; thence into Greece, and so in gradation into Italy, Gaul, and Germany, following the degrees of natural or cultivable advantages in each particular country. Where property is undetermined, men fight with fury to prevent its establishment; as every establishment tends to contract their means of subsistence. Where property is fixed, men fight with equal fury to defend or enlarge it; in either case, men are so hostile to each other, that the highest effort of virtue is, to bring one's self to love them: nay, such is our propensity to disturb each other, that even in the most polished societies, the primitive instincts of man break through all restraints, and the philosopher in theory is a savage in practice. In the Peloponnesian war, the petty states of Greece were so many tribes of savages in malignity, treachery, and every species of barbarity; with this difference in favour of the untutored savage, that he fights that he may eat; the Greeks fought to prevent each other from eating. But the character of war, we are told, has been humanized since those times; that is, we advance to battle without motive or rancour; carnage is tempered by etiquette, and we make peace to draw breath, and begin again. But are the causes of war more legitimate, or do fewer men fall by the sword? The *jus gentium*, so happily defined in books, is a dead letter in the field: did it prevent the humane, the generous, Turenne, from burning, wasting, and destroying, until he had converted the Palatinate, the finest province of Germany, into a desert? Could a Huron or an Iroquois have done more?

SETTLEMENT OF NORTH AMERICA.

NORTH AMERICA was discovered in the reign of Henry VII. a period when the arts and sciences had made very considerable progress in Europe. Many of the first adventurers were men of genius and learning, and were careful to preserve authentic records of such of their proceedings as would be interesting to posterity. These records afford ample documents for American historians. Perhaps no people on the globe can trace the history of their origin and progress with so much precision as the inhabitants of North America; particularly that part of them who inhabit the territory of the United States.

The fame which Columbus had acquired by his first discoveries on this western continent, spread through Europe, and inspired many with the spirit of enterprise. As early as 1496, four years only after the first discovery of America, John Cabot, a Venetian, obtained a commission from Henry VII. to discover unknown lands and annex them to the crown. In the spring he sailed from England with two ships, carrying with him his three sons. In this voyage, which was intended for China, he fell in with the north side of Terra Labrador, and coasted northerly as far as the 67th degree of latitude. The next year he made a second voyage to America, with his son Sebastian, who afterwards proceeded in the discoveries which his father had begun. On the 24th of June, 1497, he discovered Bonavista, on the north-east side of Newfoundland. Before his return he traversed the coast from Davis's Straits to Cape Florida.

In 1502, Sebastian Cabot fell in with Newfoundland; and, on his return, carried three of the natives of that island to Henry VII. In the spring of 1513, John Ponce sailed from Porto Rico northerly, and discovered the continent in 30° 8' north latitude. He landed in April, a season when the country round was covered with verdure, and in full bloom. This circumstance induced him to call the country *Florida*, which, for many years was the common name for North and South America. In 1516, Sir Sebastian Cabot and Sir Thomas Pert explored the coast as far as Brazil in South America. This vast extent of country, the coast whereof was thus explored, remained unclaimed and unsettled by any European power, (except

(except by the Spaniards in South America) for almost a century from the time of its discovery.

It was not till the year 1524 that France attempted discoveries on the American coast. Stimulated by his enterprising neighbours, Francis I. who possessed a great and active mind, sent John Verrazano, a Florentine, to America, for the purpose of making discoveries. He traversed the coast from latitude 28° to 50° north. In a second voyage, some time after, he was lost. The next year Stephen Gomez, the first Spaniard who came upon the American coast for discovery, sailed from Groyne, in Spain, to Cuba and Florida, thence northward to Cape Razo, in latitude 46° degrees north, in search of a north-west passage to the East Indies.

In the spring of 1534, by the direction of Francis I. a fleet was fitted out at St. Malo's, in France, with design to make discoveries in America. The command of this fleet was given to James Cartier. He arrived at Newfoundland in May of this year. Thence he sailed northerly; and, on the day of the festival of St. Lawrence, he found himself in about latitude $48^{\circ} 30'$ north, in the midst of a broad gulf, which he named St. Lawrence. He gave the same name to the river which empties into it. In this voyage, he sailed as far north as latitude 51° , expecting in vain to find a passage to China. The next year he sailed up the river St. Lawrence 300 leagues, to the great and swift Fall. He called the country New France; built a fort, in which he spent the winter, and returned in the following spring to France.

In 1542, Francis la Roche, lord of Robewell, was sent to Canada, by the French king, with three ships and 200 men, women, and children. They wintered there in a fort which they had built, and returned in the spring. About the year 1550, a large number of adventurers failed for Canada, but were never after heard of. In 1598, the king of France commissioned the marquis de la Roche to conquer Canada, and other countries not possessed by any Christian prince. We do not learn, however, that la Roche ever attempted to execute his commission, or that any further attempts were made to settle Canada during this century. On the 12th of May, 1539, Ferdinand de Soto, with 900 men, besides seamen, sailed from Cuba, having for his object the conquest of Florida. On the 30th of May he arrived at Spirito Santo, from whence he travelled northward 450 leagues from the sea. Here he discovered a river a quarter of a mile wide and 19 fathoms deep, on the bank of which he died and was buried, May 1542, aged forty-two years. Alverdo, his successor, built seven brigantines, and the year following embarked upon the river. In seventeen days he proceeded down the river 400 leagues, where he judged it to be fifteen leagues wide. From the largeness of the river at that place of his embarkation, he concluded its source must have been at least 400 leagues above, so that the whole length of the river, in his opinion, must have been more than 800 leagues. As he passed down the river, he found it opened by two mouths into the gulph of Mexico. These circumstances led us to conclude, that this river, so early discovered, was the one which we now call the *Mississippi*. On the 6th of January, 1549, king Henry VII. granted a pension for life to Sebastian Cabot, in consideration of the important services he had rendered to the kingdom by his discoveries in America.

The admiral of France, Chatillon, early in the year 1562, sent out a fleet under the command of John Ribalt. He arrived at Cape Francis, on the coast of Florida, near which, on the first of May, he discovered and entered a river which he called *May* river. It is more than probable that river is the same which we now call St. Mary's, which forms a part of the southern boundary of the United States. As he coasted northward, he discovered eight other rivers, one of which he called *Port Royal*, and sailed up it several leagues. On one of the rivers he built a fort, and called it *Charles*, in which he left a colony under the direction of captain Albert. The severity of Albert's

measures excited a mutiny, in which, to the ruin of the colony, he was slain. Two years after, Chatillon sent René Laudonier, with three ships, to Florida. In June he arrived at the river May, on which he built a fort, and, in honour to his king, Charles IX. he called it *Carolina*. In August, this year, Capt. Ribalt arrived at Florida the second time, with a fleet of seven vessels to recruit the colony, which, two years before, he had left under the direction of the unfortunate Capt. Albert. The September following, Pedro Melandes, with six Spanish ships, pursued Ribalt up the river on which he had settled, and, overpowering him in numbers, cruelly massacred him and his whole company. Melandes, having in his way taken possession of the country, built three forts, and left them garrisoned 1200 soldiers. Laudonier, and his colony on May river, receiving information of the fate of Ribalt, took the alarm, and escaped to France.

A fleet of three ships, sent from France to Florida, in 1567, under the command of Dominique de Gourges. The object of this expedition was to dispossess the Spaniards of that part of Florida which they had cruelly and unjustifiably seized three years before. He arrived on the coast of Florida in April, 1568, and soon after made a successful attack upon the forts. The recent cruelty of Melandes and his company, excited revenge in the breast of Gourges, and roused the unjustifiable principle of retaliation. He took the forts; put most of the Spaniards to the sword; and, having burned and demolished all their fortresses, returned to France. During the fifty years next after this event, the French enterprised no settlements in America. In 1576, Capt. Frobisher was sent to find out a north-west passage to the East Indies. The first land which he made on the coast was a cape, which, in honour to the queen, he called *Queen Elizabeth's Foreland*. In coasting northerly he discovered the straits which bear his name. He prosecuted his search for a passage into the western ocean, till he was prevented by the ice, and then returned to England. In 1579, Sir Humphrey Gilbert obtained a patent from queen Elizabeth, for lands not yet possessed by any Christian prince, provided he would take possession within six years. With this encouragement he sailed for America, and on the first of August, 1583, anchored in Conception Bay. Afterwards he discovered and took possession of St. John's Harbour, and the country south. In pursuing his discoveries, he lost one of his ships on the shoals of Sablon; and, on his return home, a storm overtook him, in which he was unfortunately lost, and the intended settlement was prevented.

In 1584, two patents were granted by queen Elizabeth, one to Adrian Gilbert, the other to Sir Walter Raleigh, for lands not possessed by any Christian prince. By the direction of Sir Walter, two ships were fitted and sent out, under the command of Philip Amidas and Arthur Barlow. In July they arrived on the coast, and anchored in a harbour seven leagues west of the Roanoke. On the 13th of July, they, in a formal manner, took possession of the country, and, in honour of their virgin queen Elizabeth, they called it *Virginia*. Till this time the country was known by the general name of Florida. After this Virginia became the common name for all North America. The next year, 1585, Sir Walter Raleigh sent Sir Richard Greenville to America, with seven ships. He arrived at Wococon Harbour in June. Having stationed a colony of more than a hundred people at Roanoke, under the direction of Capt. Ralph Lane, he coasted northerly as far as Chesapeake Bay, and returned to England. The colony under Capt. Lane endured extreme hardships, and must have perished, had not Sir Francis Drake fortunately returned to Virginia, and carried them to England, after having made several conquests for the queen in the West Indies and other places. A fortnight after, Sir Richard Greenville arrived with new recruits; and, although he did not find the colony which he had before left, and knew not but they had perished, he had the rashness to leave fifty men at the same place. The next year,

1587, Sir Walter sent another company to Virginia, under governor White, with a charter and twelve assistants. In July he arrived at Roanoke. Not one of the second company remained. He determined, however, to risk a third colony. Accordingly he left 115 people at the old settlement, and returned to England. August 13, this year, *Manto* was baptised in Virginia. He was the first native Indian who received that ordinance in that part of America. On the 18th of the same month, Mrs. Dare was delivered of a daughter, whom she called *Virginia*. She was the first child that was born of English parents in North America. In 1590, governor White came over to Virginia with supplies and recruits for his colony; but, to his great grief, not a man was to be found. They had all miserably famished with hunger, or were massacred by the Indians. In the spring of 1602, Bartholomew Gosnold, with thirty-two persons, made a voyage to North Virginia, and discovered and gave names to Cape Cod, Martha's Vineyard, and Elizabeth Islands, and to Dover Cliff. Elizabeth Island was the place which they fixed for their first settlement. But the courage of those who were to have tarried sailing, they all went on-board and returned to England. All the attempts to settle this continent which were made by the Dutch, French, and English, from its discovery to the present time, a period of 110 years, proved ineffectual. The Spaniards only, of all the European nations, had been successful. There is no account of there having been one European family, at this time, in all the vast extent of coast from Florida to Greenland. In 1603, Martin Pring and William Brown were sent by Sir Walter Raleigh, with two small vessels, to make discoveries in North Virginia. They came upon the coast, which was broken with a multitude of islands, in latitude $43^{\circ} 30'$ north. They coasted southward to Cape Cod Bay; thence round the cape into a commodious harbour in latitude $41^{\circ} 25'$, where they went ashore and tarried seven weeks, during which time they loaded one of their vessels with saffaras, and returned to England. The same year Bartholomew Gilbert, in a voyage to South Virginia, in search of the third colony which had been left there by governor White in 1587, having touched at several of the West-India islands, landed near Chesapeake Bay, where, in a skirmish with the Indians, he, and four of his men, were unfortunately slain. The rest, without any further search for the colony, returned to England.

France being at this time in a state of tranquillity, in consequence of the edict of Nantz in favour of the protestants, passed by Henry IV. and of the peace with Philip king of Spain and Portugal, was induced to pursue her discoveries in America. Accordingly the king signed a patent in favour of De Mons, in 1603, of all the country from the 40th to the 46th degrees of north latitude, under the name of *Acadia*. The next year De Mons ranged the coast from St. Lawrence to Cape Sable, and quite round to Cape Cod.

In May, 1605, George's Island and Pentecost Harbour were discovered by Capt. George Weymouth. In May he entered a large river in latitude $40^{\circ} 20'$, (variation $11^{\circ} 15'$ west,) which Mr. Prince, in his Chronology, supposes must have been Sagadahok; but, from the latitude, it was more probably the Piscataqua. Capt. Weymouth carried with him to England five of the natives.

In the spring of 1606, James I. by patent, divided Virginia into two colonies. The southern included all lands between the 34th and 41st degrees of north latitude. This was styled the first colony, under the name of South Virginia, and was granted to the London Company. The northern, called the second colony, and known by the general name of North Virginia, included all lands between the 38th and 45th degrees north latitude, and was granted to the Plymouth Company. Each of these colonies had a council of thirteen men to govern them. To prevent disputes about territory, the colonies were prohibited to plant within an hundred miles of each other. There appears to be an inconsistency in these grants, as

the lands lying between the 38th and 41st degrees are covered by both patents. Both the London and Plymouth companies enterprised settlements within the limits of their respective grants: with what success will now be mentioned. Mr. Piercy, brother of the earl of Northumberland, in the service of the London Company, went over with a colony to Virginia, and discovered Powhatan, now James-river. In the mean time the Plymouth Company sent Capt. Henry Challons, in a vessel of fifty-five tons, to plant a colony in North Virginia; but in his voyage he was taken by a Spanish fleet and carried to Spain.

The London Company, in the spring of 1607, sent Capt. Christopher Newport, with three vessels, to South Virginia. On the 26th of April he entered Chesapeake Bay, and landed, and soon after gave to the most southern point the name of *Cape Henry*, which it still retains. Having elected Mr. Edward Wingfield president for the year, they next day landed all their men, and began a settlement on James-river, at a place which they called James-town. This is the first town that was settled by the English in North America. The June following Capt. Newport sailed for England, leaving with the president 104 persons. In August following died Capt. Bartholomew Gosnold, the first projector of this settlement, and one of the council. The following winter James-town was burnt.

During this time the Plymouth Company fitted out two ships, under the command of admiral Rawley Gilbert. They sailed for North Virginia on the 31st of May, with one hundred planters, and Capt. George Popham for their president. They arrived in August, and settled about nine or ten leagues to the southward of the mouth of Sagadahok river. A great part of the colony, however, disheartened by the severity of the winter, returned to England in December, leaving their president, Capt. Popham, with only forty-five men. It was in the fall of this year, that the famous Mr. Robinson, with part of his congregation, who afterwards settled at Plymouth, in New England, removed from the north of England to Holland to avoid the cruelties of persecution, and for the sake of enjoying "purity of worship and liberty of conscience." This year a small company of merchants at Dieppe and St. Malo's founded Quebec; or rather the colony which they sent built a few huts there, which did not take the form of a town until the reign of Lewis XIV.

The Sagadahok colony suffered incredible hardships after departure of their friends, in December, 1608. In the depth of winter, which was extremely cold, their storehouse caught fire and was consumed, with most of their provisions and lodgings. Their misfortunes were increased, soon after, by the death of their president. Rawley Gilbert was appointed to succeed him. Lord-chief-justice Popham made every exertion to keep this colony alive, by repeatedly sending them supplies. But the circumstance of his death, which happened this year, together with that of president Gilbert's being called to England to settle his affairs, broke up the colony, and they all returned with him to England. The unfavourable reports which these first unfortunate adventurers propagated respecting the country, prevented any further attempts to settle in North Virginia for several years after.

The London Company, in 1608, sent Capt. Nelson, with two ships and 120 persons, to James-town; and in 1609, Capt. John Smith, afterwards president, arrived on the coast of South Virginia, and by sailing up a number of the rivers discovered the interior country. In September, Capt. Newport arrived with seventy persons, which increased the colony to 200 souls. Mr. Robinson and his congregation, who had settled at Amsterdam, removed this year to Leyden, where they remained more than eleven years, till a part of them came over to New England. The council for South Virginia having resigned their old commission, requested and obtained a new one; in consequence of which they appointed Sir Thomas West lord de la War, general of the colony; Sir Thomas Gates, his lieutenant; Sir George Somers, admiral; Sir Thomas Dale, high marshal;

marshal; Sir Ferdinand Wainman, general of the horse; and Capt. Newport, vice-admiral. In June, Sir Thomas Gates, admiral Newport, and Sir George Somers, with seven ships and a ketch and pinnace, having 500 souls on-board, men, women, and children, sailed from Falmouth for South Virginia. In crossing the Bahama gulph, on the 24th of July, the fleet was overtaken by a violent storm, and separated. Four days after, Sir George Somers ran his vessel ashore on one of the Bermudas islands, which, from this circumstance, have been called the *Somers Islands*. The people on-board, 150 in number, all got safe on-shore, and there remained until the following May. The remainder of the fleet arrived at Virginia in August. The colony was now increased to 500 men. Capt. Smith, then president, a little before the arrival of the fleet, had been very badly burnt, by means of some powder which had accidentally caught fire. This unfortunate circumstance, together with the opposition he met with from those who had lately arrived, induced him to leave the colony and return to England, which he accordingly did. Francis West, his successor in office, soon followed him, and George Percy was elected president.

The year following, the South Virginia or London Company sealed a patent to lord De la War, constituting him governor and captain-general of South Virginia. He soon after embarked for America with Capt. Argal and 150 men, in three ships. The unfortunate people, who, the year before, had been shipwrecked on the Bermudas islands, had employed themselves during the winter and spring, under the direction of Sir Thomas Gates, Sir George Somers, and admiral Newport, in building a sloop to transport themselves to the continent. They embarked for Virginia on the 10th of May, with about 150 persons on-board, leaving two of their men behind, who chose to stay, and landed at James-town on the 23d of the same month. Finding the colony, which, at the time of Capt. Smith's departure, consisted of 500 souls, now reduced to sixty, and those in a distressed and wretched situation, they, with one voice, resolved to return to England; and for this purpose, on the 7th of June, the whole colony repaired on-board their vessels, broke up their settlement, and sailed down the river on their way to their native country. Fortunately, lord De la War, who had embarked for James-town the March before, met them the day after they sailed, and persuaded them to return with him to James-town, where they arrived and landed the 10th of June. The government of the colony of right devolved on lord De la War. From this time we may date the effectual settlement of Virginia.

As early as the year 1608 or 1609, Henry Hudson, an Englishman, under a commission from the king his master, discovered Long Island, New York, and the river which still bears his name, and afterwards sold the country, or rather his right, to the Dutch. Their writers, however, contend that Hudson was sent out by the East-India company, in 1609, to discover a north-west passage to China; and that, having first discovered Delaware Bay, he came and penetrated Hudson's River as far as latitude 43°. It is said, however, that there was a sale, and that the English objected to it, though for some time they neglected to oppose the Dutch settlement of the country. In 1610, Hudson sailed again to this country, then called by the Dutch *New Netherlands*; and, four years after, the States-General granted a patent to sundry merchants for an exclusive trade on the north river, who, in 1614, built a fort on the west side, near Albany. From this time we may date the settlement of New York.

Conception Bay, on the island of Newfoundland, was settled in the year 1610, by about forty planters, under governor John Guy, to whom king James had given a patent of incorporation.

Champlain, a Frenchman, had begun a settlement at Quebec, in 1608; St. Croix, Mount Mansel, and Port-Royal, were settled about the same time. These settlements remained undisturbed till 1613, when the Virgi-

nians, hearing that the French had settled within their limits, sent Capt. Argal to dislodge them. For this purpose he sailed to Sagadahoc, took their forts at Mount Mansel, St. Croix, and Port-Royal, with their vessels, ordnance, cattle, and provisions, and carried them to James-town, in Virginia. Quebec was left in possession of the French.

In 1614, Capt. John Smith, with two ships and forty-five men and boys, made a voyage to North Virginia, to make experiments upon a gold and copper mine. His orders were, to fish and trade with the natives, if he should fail in his expectations with regard to the mine. To facilitate this business, he took with him *Tantum*, an Indian, perhaps one that Capt. Weymouth carried to England in 1605. In April he reached the island Monahigan, in latitude 43° 30'. Here Capt. Smith was directed to stay and keep possession, with ten men, for the purpose of making a trial of the whaling business; but, being disappointed in this, he built seven boats, in which thirty-seven men made a very successful fishing voyage. In the mean time, the captain himself, with eight men only, in a small boat, coasted from Penobscot to Sagadahoc, Acocisco, Passataquack, Tragabizanda, now called Cape Ann, thence to Acomak, where he skirmished with some Indians; thence to Cape Cod, where he sent his Indian, Tantum, ashore, and left him, and returned to Monahigan. In this voyage he found two French ships in the bay of Massachusetts, who had come there six weeks before, and, during that time, had been trading very advantageously with the Indians. It was conjectured that there were, at this time, 3000 Indians upon the Massachusetts islands. In July, Capt. Smith embarked for England in one of the vessels, leaving the other under the command Capt. Thomas Hunt, to equip for a voyage to Spain. After Capt. Smith's departure, Hunt perfidiously allured twenty Indians (one of whom was *Squanto*, afterwards so serviceable to the English) to come on-board his ship at Patuxit, and seven more at Naust, and carried them to the island of Malaga, where he sold them, for twenty pounds each, to be slaves for life. This conduct, which fixes an indelible stigma upon the character of Hunt, excited in the breasts of the Indians such an inveterate hatred of the English, as that, for many years after, all commercial intercourse with them was rendered exceedingly dangerous. Capt. Smith arrived at London the last of August, where he drew a map of the country, and called it *New England*. From this time North Virginia assumed the name of *New England*, and the name *Virginia* was confined to the southern colony. Between the years 1614 and 1620, several attempts were made by the Plymouth Company to settle New England, but by various means they were all rendered ineffectual. During this time, however, an advantageous trade was carried on with the natives. In the year 1617, Mr. Robinson and his congregation, influenced by several weighty reasons, meditated a removal to America. Various difficulties intervened to prevent the success of their designs, until the year 1620, when a part of Mr. Robinson's congregation went over and settled at Plymouth. At this time commenced the settlement of New England.

In order to preserve the chronological order in which the several colonies, not grown into independent states, were first settled, it will be necessary just to mention, that, the next year after the settlement of Plymouth, Capt. John Mason obtained of the Plymouth council a grant of a part of the present state of New Hampshire. Two years after, under the authority of this grant, a small colony fixed down near the mouth of Piscataqua river. From this period we may date the settlement of New Hampshire.

In 1627, a colony of Swedes and Fins came over and landed at Cape Henlopen; and afterwards purchased of the Indians the land from Cape Henlopen to the Falls of Delaware, on both sides the river, which they called *New Swedeland Stream*. On this river they built several forts, and

and made settlements. On the 19th of March, 1628, the council for New England sold to Sir Henry Roswell, and five others, a large tract of land, lying round Massachusetts Bay. The June following, Capt. John Endicott, with his wife and company, came over and settled at Nahunkeag, now called Salem. This was the first settlement made in Massachusetts Bay. Plymouth, indeed, which is now included in the commonwealth of Massachusetts, was settled eight years before, but at this time it was a separate colony, under a distinct government, and continued so until the second charter of Massachusetts was granted by William and Mary, in 1691; by which Plymouth, the province of Main, and Sagadahok, were annexed to Massachusetts.

In the reign of Charles I. June 13, 1633, lord Baltimore, a Roman Catholic, applied for and obtained a grant of a tract of land upon Chesapeake Bay, about 140 miles long and 130 broad. Soon after this, in consequence of the rigour of the laws of England against the Roman Catholics, lord Baltimore, with a number of his persecuted brethren, came over and settled it; and, in honour of queen Henrietta Maria, they called it Maryland.

The first grant of Connecticut was made by Robert earl of Warwick, president of the council of Plymouth, to lord Say and Seal, to lord Brook, and others, in the year 1631. In consequence of several smaller grants made afterwards by the patentees to particular persons, Mr. Fenwick made a settlement at the mouth of Connecticut river, and called it *Saybrook*. Four years after, a number of people from Massachusetts Bay came and began settlements at Hartford, Wethersfield, and Windfor, on Connecticut river. Thus commenced the English settlement of Connecticut.

Rhode Island was first settled in consequence of religious persecution. Mr. Roger Williams, who was among those who early came over to Massachusetts, not agreeing with some of his brothers in sentiment, was very unjustifiably banished the colony, and went with twelve others, his adherents, and settled at Providence, in 1635. From this beginning arose the colony, now state, of Rhode Island.

On the 20th of March, 1664, Charles II. granted to the duke of York, what is now called New Jersey, then a part of a large tract of country known by the name of New Netherland. Some parts of New Jersey were settled by the Dutch as early as about 1615.

In 1662, Charles II. granted to Edward earl of Clarendon, and seven others, almost the whole territory of the three southern states, North and South Carolinas and Georgia. Two years after he granted a second charter, enlarging their boundaries. The proprietors, by virtue of authority vested in them by their charter, engaged Mr. Locke to frame a system of laws for the government of their intended colony. Notwithstanding these preparations, no effectual settlement was made till the year 1669, (though one was attempted in 1667,) when governor Sayle came over with a colony, and fixed on a neck of land between Ashley and Cooper rivers. Thus commenced the settlement of Carolina, which then included the whole territory between 29 degrees and 36° 30' north latitude, together with the Bahama islands, lying between latitude 22° and 27° north.

The royal charter for Pennsylvania was granted to William Penn, on the 4th of March, 1681. The first colony came over the next year, and settled under the proprietor, William Penn, who acted as governor from October, 1682, to August, 1684. The first assembly in the province of Pennsylvania was held at Chester, on the 4th of December, 1682. Thus William Penn, a quaker, justly celebrated as a great and good man, had the honour of laying the foundation of the present populous and very flourishing state of Pennsylvania.

The proprietary government in Carolina was attended with so many inconveniences, and occasioned such violent dissensions among the settlers, that the parliament of Great Britain was induced to take the province under their immediate care. The proprietors (except lord Granville) accepted of 22,500l. sterling, from the crown, for the property and jurisdiction. This agreement was ratified by act of parliament, in 1729. A clause in this act reserved to lord Granville his eighth share of the property and arrears of quit-rents, which continued legally vested in his family till the revolution, in 1776. Lord Granville's share made a part of the present state of North Carolina. About the year 1729, the extensive territory belonging to the proprietors was divided into North and South Carolina. They remained separate royal governments until they became independent states. For the relief of poor indigent people of Great Britain and Ireland, and for the security of Carolina, a project was formed for planting a colony between the rivers Savannah and Alamaha. Accordingly, application being made to George II. he issued letters patent, bearing date June 9, 1732, for legally carrying into execution the benevolent plan. In honour of the king, who greatly encouraged the plan, they called the new province *Georgia*. Twenty-one trustees were appointed to conduct the affairs relating to the settlement of the province. The November following, 115 persons, one of whom was general Oglethorpe, embarked for Georgia, where they arrived, and landed at Yamacraw. In exploring the country, they found an elevated pleasant spot of ground on the bank of a navigable river, upon which they marked out a town, and, from the Indian name of the river which passed by it, called it Savannah. From this period we may date the settlement of Georgia.

The country now called Kentucky was well-known to the Indian traders many years before its settlement. They gave a description of it to Lewis Evans, who published his first map of it as early as the year 1752. James Macbride, and some others, explored this country in 1754. Colonel Daniel Boone visited it in 1769.

Four years after, in 1773, colonel Boone and his family, with five other families, who were joined by forty men from Powle's Valley, began the settlement of Kentucky, which is now one of the most growing colonies, perhaps, in the world, and was erected into an independent state, by act of congress, December 6, 1790, and received into the union, June 1, 1792.

The tract of country called Vermont, before the late war, was claimed both by New York and New Hampshire. When hostilities commenced between Great Britain and her colonies, the inhabitants considering themselves as in a state of nature, as to civil government, and not within any legal jurisdiction, associated and formed for themselves a constitution of government. Under this constitution, they have ever since continued to exercise all the powers of an independent state. Vermont was not admitted into union with the other states till March 4, 1791; yet we may venture to date her political existence as a separate government, from the year 1777, because, since that time, Vermont has, to all intents and purposes, been a sovereign and independent state. The first settlement in this state was made at Bennington, as early as about 1764.

The extensive tract of country lying north-west of the Ohio river, within the limits of the United States, was erected into a separate temporary government, by an ordinance of congress, passed the 13th of July, 1787.

Thus we have given a summary account of the first discoveries and progressive settlement of North America, in their chronological order. The following recapitulation will comprehend the whole in one view.

Names

Names of Places. When settled.

Quebec,	1608
Virginia,	June 10, 1610
Newfoundland,	June, 1610
New York,	} about 1614
New Jersey,	
Plymouth,	1620
New Hampshire,	1623
Delaware,	} 1627
Pennsylvania,	
Massachusetts Bay,	1628
Maryland,	1633
Connecticut,	1635
Rhode Island,	1635
New Jersey,	1664
South Carolina,	1669
Pennsylvania,	1682
North Carolina,	about 1728
Georgia,	1732
Kentucky,	1773
Vermont,	about 1764
Territory N. W. of Ohio river	1787

By whom.

By the French.
By lord Dé la War.
By governor John Guy.
By the Dutch.
By part of Mr. Robinson's congregation.
By a small English colony near the mouth of Piscataqua river.
By the Swedes and Fins.
By captain John Endicot and company.
By lord Baltimore and a colony of Roman Catholics.
By Mr. Fenwick, at Saybrook, near the mouth of Connecticut river.
By Mr. Roger Williams and his persecuted brethren.
Granted to the duke of York by Charles II. and made a distinct government, and settled some time before this by the English.
By governor Sayle.
By William Penn, with a colony of Quakers.
Erected into a separate government, settled before by the English.
By general Oglethorpe.
By colonel Daniel Boon.
By emigrants from Connecticut and other parts of New England.
By the Ohio and other companies.

The above dates are from the periods when the first permanent settlements were made.

North America comprehends all that part of the western continent which lies north of the Isthmus of Darien, extending north and south from about the 10th degree north latitude to the north pole; and east and west from the Atlantic to the Pacific Ocean, between the 45th and 165th degrees west longitude from London. Beyond the 70th degree N. lat. few discoveries have been made. In July 1779, Capt. Cook proceeded as far as latitude 71°, when he came to a solid body of ice extending from continent to continent.

Of the bays, sounds, straits, and islands, except those in the United States, we know but little more than their names. Baffin's Bay, lying between the 70th and 80th degrees north latitude, is the largest and most northern that has yet been discovered in North America. It opens into the Atlantic Ocean through Baffin's and Davis's Straits, between Cape Chidley, on the Labrador coast, and Cape Farewell. It communicates with Hudson's Bay to the south, through a cluster of islands. In this capacious bay or gulph is James Island, the south point of which is called Cape Bedford; and the smaller islands of Waygate and Disko. Davis's Straits separate Greenland from the American continent, and are between Cape Walsingham, on James Island, and South Bay in Greenland, where they are about sixty leagues broad, and extend from the 67th to the 71st degrees of latitude above Disko island. The most southern point of Greenland is called Cape Farewell.

Hudson's Bay took its name from Henry Hudson, who discovered it in 1610. It lies between 51 and 69 degrees of north latitude. The eastern boundary of the bay is Terra de Labrador; the northern part has a straight coast, facing the bay, guarded with a line of isles innumerable. A vast bay, called the Archiwinnip Sea, lies within it, and opens into Hudson's Bay, by means of Gulph Hazard, through which the Beluga whales pass in great numbers. The entrance of the bay, from the Atlantic Ocean, after leaving, to the north, Cape Farewell and Davis's Straits, between Resolution isles on the north, and Button's isles, on the Labrador coast, to the south, forming the eastern extremity of Hudson's Straits.

The coasts are very high, rocky, and rugged, at top; in some places precipitous, but sometimes exhibit extensive beaches. The islands of Salisbury, Nottingham, and Digges, are very lofty and naked. The depth of water in the middle of the bay is 140 fathoms. From Cape Churchill to the south end of the bay are regular soundings; near the shore, shallow, with muddy or sandy bottom. To the northward of Churchill, the soundings are irregular.

lar, the bottom rocky, and in some parts the rocks appear above the surface at low water.

James's Bay lies at the bottom, or most southern part, of Hudson's Bay, with which it communicates, and divides New Britain from South Wales. To the north-westward of Hudson's Bay is an extensive chain of lakes, among which is Lake Menichlich, latitude 61°, longitude 105° W. North of this is Lake Dobount, to the northward of which lies the extensive country of the northern Indians. West of these lakes, between the latitudes of 60 and 66 degrees, after passing a large cluster of unnamed lakes, lies the lake or sea Arathapescow, whose southern shores are inhabited by the Arathapescow Indians. North of this, and near the Arctic circle, is Lake Edlande, around which live the Dog-ribbed Indians. Further north is Buffalo Lake, near which, is Copper Mine river, in lat. 72° N. and long. 119° W. of Greenwich. The Copper Mine Indians inhabit this country.

Between Copper Mine river, which, according to Mr. Herne, empties into the Northern Sea, where the tide rises twelve or fourteen feet, and which in its whole course is encumbered with shoals and falls, and the north-west coast of America, is an extensive tract of unexplored country. As we descend from north to south on the western coast of America, just south of the arctic circle, we come to Cape Prince of Wales, opposite East Cape on the eastern continent; and here the two continents approach nearest to each other. Proceeding southward, we pass Norton Sound, Cape Stephen's, Shoalness, Bristol Bay, Prince William's Sound, Cook's River, Admiralty Bay, and Port Mulgrave, Nootka Sound, &c. From Nootka Sound proceeding south, we pass the unexplored country of New Albion, thence to California, and New Mexico.

The vast tract of country, bounded west by the Pacific Ocean, south and east by California, New Mexico, and Louisiana; the United States, Canada, and the Atlantic Ocean, and extending as far north as the country is habitable (a few scattered English, French, and some other European, settlements excepted), is inhabited wholly by various nations and tribes of Indians. The Indians also possess large tracts of country within the Spanish, American, and British dominions. Those parts of North America not inhabited by Indians, belong, if we include Greenland, to Denmark, Great Britain, the American States, and Spain. Spain claims East and West Florida, and all west of the Mississippi, and south of the northern boundaries of Louisiana, New Mexico, and California. Great Britain claims all the country, inhabited by Europeans,

lying north and east of the United States, except Greenland, which belongs to Denmark. The remaining part is the territory of the Fifteen United States. The particular provinces and states of North America are as follow :

Provinces & States.	N ^o of Inhabitants.	Chief Towns.
<i>United States.</i>		
Vermont	85,539	Windfor, Rutland
New Hampshire	141,885	Portsmouth, Concord
Massachusetts	387,787	Boston, Salem, Newbury Port
District of Maine	96,540	Portland, Hallowell
Rhode Island	68,825	Newport, Providence
Connecticut	237,946	New Haven, Hartford
New York	340,120	New York, Albany
New Jersey	184,139	Trenton, Burlington, Brunswick
Pennsylvania	434,373	Philadelphia, Lancaster
Delaware	59,094	Dover, Wilmington, New-castle
Maryland	319,728	Annapolis, Baltimore
Virginia	747,610	Richmond, Petersburg, Norfolk
Kentucky	73,677	Lexington
North Carolina	393,751	Newbern, Edenton, Halifax
South Carolina	249,073	Charlestown, Columbia
Georgia	82,548	Savannah, Augusta
Territory S. of Ohio	35,691	Abingdon
Territories N.W. of Ohio		Marietta
<i>British Provinces.</i>		
New Britain	unknown	
Upper Canada	20,000	Kingston, Detroit, Niagara
Lower Canada	130,000	Quebec, Montreal
Cape Breton Isl.	1,000	Sidney, Louisburgh
New Brunswick	35,000	Fredericktown
Nova Scotia		Halifax
St. John's Isl. in 1783	5,000	Charlottetown
Newfoundland Isl.	7,000	Placentia, St. John's
<i>Denmark.</i>		
Greenland	10,000	New Herrnhut
<i>Spanish Provinces.</i>		
East Florida		Augustine
West Florida		Penacola
Louisiana		New Orleans
New Mexico		St. Fee
California		St. Juan
Mexico, or New Spain		Mexico

For particulars relating to the history and present state of the above provinces, see under their respective heads.

SOUTH AMERICA

FORMS a part of the globe, where the human mind is successively surpris'd with the sublime and astonishing works of nature; where rivers of amazing breadth flow through beautiful and widely-extended plains, and where lofty mountains, whose summits are covered with eternal snow, intercept the clouds, and hide their heads from the view of mortals. In some parts of this extensive region, nature hath bountifully bestowed her treasures, and given every thing necessary for the convenience and happiness of society. We have only to regret, that avaricious men have successively drenched with innocent blood these plains, which are so beautifully formed and enriched by the hand of nature; and that the rod of Spanish despotism has prevented the population of a country, which might have supported millions of beings in affluence.

South America is an extensive peninsula, connected with North America by the isthmus of Darien, and divided between Spain, Portugal, France, Holland, &c. as follows:

SPANISH DOMINIONS,	{ Terra Firma, Peru,
	{ Chili, & Paraguay.
PORTUGUESE,	- - - Brazil.
FRENCH,	- - - Cayenne.
DUTCH,	- - - Surinam.
ABORIGINES,	- - - { Amazonia,
	{ Patagonia.

Terra Firma is situated between 60° and 82° west longitude, and the equator and 12° north latitude; its length is 1400 miles, and its breadth 700: it is bounded on the north by the Atlantic Ocean, (called there the North Sea;) on the east by the Atlantic Ocean and Surinam; on the south by Amazonia and Peru; and on the west by the Pacific Ocean. It is here divided into two grand divisions, North and South; these are again subdivided into provinces. The northern division containing, 1. Darien, or Terra Firma Proper: 2. Carthagena: 3. St. Martha; 4. Venezuela: 5. Comana: 6. Paria, or New Andalusia. The southern division containing, 1. New Granada: 2. Popayan.

Peru is situated between the equator and 25° south latitude, and 60° and 81° west longitude; its length is 1800 miles, and its breadth, according to some authors, 390, and others 600 miles; but the latest and most authentic accounts state it at about 500. It is bounded on the north by Terra Firma, on the west by the Pacific Ocean, on the south by Chili, and on the east by the mountains called the Andes. The empire of Peru, at the time it was subdued, extended along the South Sea, from the river of Emeralds to Chili, and on the land-side to Popayan, according to some geographers. It contained within its extent that famous chain of mountains which rises in the Terra Magellanica, and is gradually lost in Mexico, in order to unite, as it should seem, the southern parts of America with the northern. It is now divided into three grand divisions or audiences: 1. Quito: 2. Lima; or Los Reyes; and 3. Los Charcos. As to its climate, mines, soil, and produce, they differ greatly in different parts of the country.

Chili is situated between 25° and 45° south latitude, and 65° and 85° west longitude; its length is 1260 miles, and its greatest breadth 580; it is bounded on the north by Peru; on the east by Paragua, or La Plata; on the south by Patagonia; and on the west by the Pacific Ocean. It lies on both sides of the Andes; Chili Proper lies on the west, and Cuyo or Cutio on the east. The principal towns in the former are St. Jago and Baldivia; in the latter, St. John de Frontiera. The first attempt of the Spaniards upon this country was made by Almagro in the year 1535, after he and Pizaro had completed the conquest of Peru.

Paraguay is situated between 12° and 37° south latitude, and 50° and 75° west longitude; its length is 1500 miles, and its breadth 1000. It is bounded on the north by Amazonia; on the east by Brasil; on the south by Patagonia; and on the west by Chili and Peru. It is divided into six provinces, viz. Paraguay, Parana, Guaira, Uragua, Tucuman, and Rio de la Plata. This country, besides an infinite number of small rivers, is watered by three principal ones, the Paragua, Uragua, and Parana, which, united near the sea, form the famous Rio de la Plata, or Plate river, which annually overflow their banks; and, on their recess, leave them enriched with a slime that produces the greatest plenty of whatever is committed to it. This vast tract is far from being wholly subdued or planted by the Spaniards. There are many parts in a great degree unknown to them, or to any other people in Europe. The principal province of which we have any knowledge, is that which is called Rio de la Plata, towards the mouth of the above-mentioned rivers. The Spaniards first discovered this country by sailing up the river La Plata in 1515, and founded the town of Buenos Ayres, so called on account of the excellence of the air.

Brasil is situated between the equator and 35° south latitude, and 60° west longitude; it is about 1560 miles in length, and 1000 in breadth; but, measuring along the coast, it is 2000 miles long, and is bordered with mountains that open from time to time, and form good harbours where vessels may lie in safety. It is bounded by the mouth of the river Amazon and the Atlantic Ocean on the north; and by the same ocean on the east; on the south by the river Plata; on the west by morasses, lakes, rivers,

rivers, and mountains, which separate it from Amazonia and the Spanish possessions. On the coast are three small islands, where ships touch for provisions on their voyage to the South Seas, viz. Fernando, St. Barbaro, and St. Catharine's. It was accidentally discovered by the Portuguese in 1500.

Cayenne is bounded north and east, by the Atlantic Ocean; south, by the Amazon river; and west, by Guiana or Surinam. It extends 240 miles along the coast of Guiana, and nearly 300 miles within land, lying between the equator and the 5th degree of north latitude. The land along the coast is low, and very subject to inundations during the rainy seasons, from the multitude of rivers which rush down from the mountains with great impetuosity. Here the atmosphere is very hot, moist, and unwholesome, especially where the woods are not cleared away; but on the higher parts, where the trees are cut down, and the ground laid out in plantations, the air is more healthy, and the heat great, mitigated by the sea breezes. The soil in many parts is very fertile, producing sugar, tobacco, Indian corn, fruits, and other necessities of life. The French took possession of this in 1635.

Surinam is the only province belonging to the Dutch on the continent of America, and is situated between 5° and 7° north latitude, having the mouth of the Oronoko and the Atlantic, on the north; Cayenne, on the east; Amazonia, on the south; and Terra Firma on the west. The Dutch claim the whole coast from the mouth of Oronoko to the river Marowynne, on which are situated their colonies of Essequibo, Demerara, Berbice, and Surinam. The latter begins with the river Saramacha, and ends with the Marowynne, including a length of coast of one hundred and twenty miles. A number of fine rivers pass through this country, the principal of which are Essequibo, Surinam, Demerara, Berbice, and Conya. Essequibo is nine miles wide at its mouth, and is more than 300 miles in length. Surinam is a beautiful river, three quarters of a mile wide, navigable for the largest vessels four leagues, and for smaller vessels sixty or seventy miles farther. Its banks, quite to the water's edge, are covered with evergreen mangrove trees, which render the passage up this river very delightful. The Demerara is about three quarters of a mile wide where it empties into the Surinam, is navigable for large vessels 100 miles; 100 miles farther are several falls of easy ascent, above which it divides into the south-west and south-east branches.

Amazonia is situated between the equator and 20° south latitude; its length is 1400 miles, and its breadth 900 miles: it is bounded on the north by Terra Firma and Guiana; on the east by Brazil; on the south by Paraguay; and on the west by Peru. The air is cooler in this country than could be expected, considering it is situated in the torrid zone. This is partly owing to the heavy rains which occasion the rivers to overflow their banks one half of the year, and partly to the cloudiness of the weather, which obscures the sun great part of the time he is above the horizon. During the rainy season the country is subject to dreadful storms of thunder and lightning.

Patagonia is situated between 35° and 54° south latitude; its length 1100 miles and its breadth 350: it is bounded north by Chili and Paragua; east by the Atlantic Ocean; south by the Straits of Magellan; west by the Pacific Ocean. The climate is said to be much colder in this country than in the north under the same parallels of latitude, which is imputed to the Andes, which pass through it, being covered with eternal snow: it is almost impossible to say what the soil would produce, as it is not at all cultivated by the natives. The northern parts are covered with wood, among which is an inexhaustible fund of large timber; but towards the south, it is said, there is not a single tree large enough to be of use to mechanics. There are, however, good pastures, which feed incredible numbers of horned cattle and horses, first carried there by the Spaniards, and now increased to an amazing degree.—For

the history and present state of each of these provinces, see under their respective names.

POLITICAL HISTORY, and REVOLUTION, of NORTH AMERICA.

WE have seen that America was originally peopled by uncivilized nations, who lived mostly by hunting and fishing. The Europeans, who first visited these shores, treating the natives as wild beasts of the forests, which have no property in the woods where they roam, planted the standard of their respective masters where they first landed, and in their names claimed the country by right of discovery. Prior to any settlement in North America, numerous titles of this kind were acquired by the English, French, Spanish, and Dutch, navigators, who came hither for the purposes of fishing and trading with the natives. Slight as such titles were, they were afterwards the causes of contention between the European nations. The subjects of different princes often laid claim to the same tract of country, because both had discovered the same river or promontory; or because the extent of their respective claims was undetermined. While the settlements in this vast uncultivated country were inconsiderable and scattered, and the trade of it confined to the bartering of a few trinkets for furs, a trade carried on by a few adventurers, the interfering of claims produced no important controversy among the settlers or the nations of Europe. But in proportion to the progress of population, and the growth of the American trade, the jealousies of the nations, which had made early discoveries and settlements on this coast, were alarmed; ancient claims were revived; and each power took measures to extend and secure its own possessions at the expence of a rival.

By the treaty of Utrecht in 1713, the English claimed a right of cutting logwood in the Bay of Campeachy, in South America. In the exercise of this right, the English merchants had frequent opportunities of carrying on a contraband trade with the Spanish settlements on the continent. To remedy this evil, the Spaniards resolved to annihilate a claim, which, though often acknowledged, had never been clearly ascertained. To effect this design they captured the English vessels, which they found along the Spanish Main, and many of the British subjects were doomed to work in the mines of Potosi. Repeated severities of this kind produced a war between England and Spain, in 1739. Porto Bello was taken from the Spaniards by admiral Vernon. Commodore Anson, with a squadron of ships, sailed to the South Seas, distressed the Spanish settlements on the western shore of America, and took a galleon laden with immense riches. But, in 1741, a formidable armament, destined to attack Carthage, under the command of lord Cathcart, returned unsuccessful, with the loss of upwards 12000 British soldiers and seamen; and the defeat of the expedition raised a clamour against the minister, Sir Robert Walpole, which produced a change in the administration. This change removed the scene of war to Europe, so that America was not immediately affected by the subsequent transactions, except that Louisburgh, the principal fortress of Cape Breton, was taken from the French by general Pepperell, assisted by commodore Warren with a body of New England troops. This war ended in 1748, by the treaty of peace signed at Aix-la-Chapelle, by which restitution was made, on both sides, of all places taken during the war.

Peace however was of short duration. The French possessed Canada, and had made considerable settlements in Florida, claiming the country on both sides of the Mississippi, by right of discovery. To secure and extend their claims, they established a line of forts from Canada to Florida. They had secured the important pass at Niagara, and erected a fort at the junction of the Allegany and Monongahela rivers, called Fort du Quebec. They took pains to secure the friendship and assistance of the natives; encroachments were made upon the English pos-

sessions,

feussions, and mutual injuries succeeded. The disputes among the settlers in America, and the measures taken by the French to command all the trade of the St. Lawrence river on the north, and of the Mississippi on the south, excited a jealousy in the English nation, which soon broke out in open war. The next year three other expeditions were undertaken in America against the French. One was conducted by general Monckton, who had orders to drive the French from their encroachments on the province of Nova Scotia. This expedition was attended with success. General Johnson was ordered with a body of troops to take possession of Crown Point, but he did not succeed. General Shirley commanded an expedition against the Fort at Niagara, but lost the season by delay.

In 1755, general Braddock marched against Fort du Quefne, but, in penetrating through the wilderness, he incautiously fell into an ambuscade, and suffered a total defeat. General Braddock was killed; but the enemy not pursuing the vanquished across the river, being eager in plundering the baggage of the dead, a part of his troops were saved by flight under the conduct of general Washington, at that time a colonel, who then began to exhibit proofs of those military talents, by which he afterwards conducted the armies of America to victory, and that country to independence. The ill success of these expeditions left the English settlements in America exposed to the depredations of both the French and Indians. But the war now raged in Europe and the East Indies, and engaged the attention of both nations in those quarters.

It was not until the campaign in 1758, that affairs assumed a more favourable aspect in America. But, upon a change of administration, Mr. Pitt was appointed minister, and the operations of war became more vigorous and successful. General Amherst was sent to take possession of Cape Breton; and, after a warm siege, the garrison of Louisburgh surrendered by capitulation. General Forbes was successful in taking possession of Fort du Quefne, which the French thought fit to abandon. But general Abercrombie, who commanded the troops destined to act against the French at Crown Point and Ticonderoga, attacked the lines at Ticonderoga, and was defeated with a terrible slaughter of his troops. After this defeat, he returned to his camp at Lake George. The next year, more effectual measures were taken to subdue the French in America. General Prideaux and Sir William Johnson began the operations of the campaign by taking the French fort near Niagara. General Amherst took possession of the forts at Crown Point and Ticonderoga, which the French had abandoned. But the decisive blow, which proved fatal to the French interests in America, was the defeat of the French army, and the taking of Quebec, by the brave general Wolfe. This hero was slain in the beginning of the action on the plains of Abram, and M. Montcalm, the French commander, likewise lost his life. The loss of Quebec was soon followed by the capture of Montreal by general Amherst, and Canada has remained ever since in possession of the English. Colonel Grant, in 1761, defeated the Cherokees in Carolina, and obliged them to sue for peace. The next year Martinico was taken by admiral Rodney and general Monckton; and also the island of Grenada, St. Vincent's, and others. The capture of these was soon followed by the surrender of the Havannah, the capital of the island of Cuba.

In 1763, a definitive treaty of peace was concluded at Paris, between Great Britain, France, and Spain; by which the English ceded to the French several islands which they had taken from them in the West Indies, but were confirmed in the possession of all North America on this side the Mississippi, except the island of Orleans. But this war, however brilliant the successes and glorious the event, proved the cause of great and unexpected misfortunes to Great Britain. Engaged with the combined powers of France and Spain during several years, her exertions were surprising, and her expence immense. To discharge the debts of the nation, the parliament was obliged to

have recourse to new expedients for raising money. Previous to the last treaty in 1763, the parliament had been satisfied to raise a revenue from the American colonies by a monopoly of their trade.

It will be proper here to observe, that there were four kinds of government established in the British American colonies. The first was a charter government, by which the powers of legislation were vested in a governor, council, and assembly, chosen by the people: Of this kind were the governments of Connecticut and Rhode Island. The second was a proprietary government, in which the proprietor of the province was governor; although he generally resided abroad, and administered the government by a deputy of his own appointment; the assembly only being chosen by the people: Such were the governments of Pennsylvania and Maryland, and originally of New Jersey and Carolina. The third kind was that of royal government, where the governor and council were appointed by the crown, and the assembly by the people: Of this kind were the governments of New Hampshire, New York, New Jersey (after the year 1702), Virginia, the Carolinas after the resignation of the proprietors in 1728, and Georgia. The fourth kind was that of Massachusetts's, which differed from all the rest. The governor was appointed by the king; so far it was a royal government; but the members of the council were elected by the representatives of the people. The governor, however, had a right to negative a certain number, but not to fill up vacancies thus occasioned.

This variety of governments created different degrees of dependence on the crown. In the royal government, to render a law valid, it was constitutionally required that it should be ratified by the king; but the charter governments were empowered to enact laws, and no ratification by the king was necessary. It was only required that such laws should not be contrary to the laws of England. The charter of Connecticut was express to this purpose.

Such was the state of the British colonies at the conclusion of the war in 1763. Their flourishing condition at this time was remarkable and striking: their trade had prospered in the midst of all the difficulties and distresses of a war in which they were so nearly and so immediately concerned. Their population continued on the increase, notwithstanding the ravages and depredations that had been so fiercely carried on by the French, and the native Indians in their alliance. They abounded with spirited and active individuals of all denominations. They were flushed with the uncommon prosperity that had attended them in their commercial affairs and military transactions. Hence they were ready for all kind of undertakings, and saw no limits to their hopes and expectations.

Their improvements in the necessary and useful arts did honour to their industry and ingenuity. Though they did not live in the luxury of Europe, they had all the solid and substantial enjoyments of life, and were not unacquainted with many of its elegancies and refinements. A circumstance much to their praise is, that notwithstanding their peculiar addition to those occupations of which lucre is the sole object, they were duly attentive to cultivate the field of learning; and they have ever since their first foundation been particularly careful to provide for the education of the rising progeny. Their vast augmentation of internal trade and external commerce, was not merely owing to their position and facility of communication with other parts; it arose also from their natural turn and temper, full of schemes and projects; ever aiming at new discoveries, and continually employed in the search of means of improving their condition. Their industry carried them into every quarter from whence profit could be derived. There was scarcely any port of the American hemisphere to which they had not extended their navigation. They were continually exploring new sources of trade, and were found in every spot where business could be transacted. To this extensive and incessant application to commerce, they added an equal vigilance in the

the administration of their affairs at home. Whatever could conduce to the amelioration of the soil they possessed, to the progress of agriculture, or to the improvement of their domestic circumstances, was attended to with so much labour and care, that it may be strictly said, that nature had given them nothing of which they did not make the most. In the midst of this solicitude and toil in matters of business, the affairs of government were conducted with a steadiness, prudence, and activity, seldom experienced, and never exceeded, in the best regulated countries of Europe.

At the beginning of the war with France, commissioners from many of the colonies had assembled at Albany, and proposed that a great council should be formed by deputies from the several colonies, which, with a general governor to be appointed by the crown, should be empowered to take measures for the common safety, and to raise money for the execution of their designs. This proposal was not relished by the British ministry; but, in place of this plan, it was proposed, that the governors of the colonies, with one or two of their council, should assemble and concert measures for the general defence; erect forts, levy troops, and draw on the treasury of England for the monies that should be wanted; but the treasury to be reimbursed by a tax on the colonies, to be laid by the British parliament. To this plan, which would imply an avowal of the right of parliament to tax the colonies, the provincial assemblies objected with unshaken firmness. Hence it seems that the British parliament, even before the war, had it in contemplation to exercise the right of taxing the colonies, without permitting them to be represented. The colonies, however, with an uncommon foresight and firmness, defeated these attempts, and the war was carried on by requisitions on the colonies for supplies of men and money, or by voluntary contributions.

But no sooner was peace concluded, than the English parliament resumed the scheme of taxing America; and, in March, 1764, a bill was passed, by which heavy duties were laid on goods imported by the colonists from such West-India islands as did not belong to Great Britain; at the same time that these duties were to be paid into the exchequer in specie: and, in the same session, another bill was framed to restrain the currency of paper-money in the colonies themselves. These acts, coming so close upon each other, threw the whole colonies into the utmost ferment. Vehement remonstrances were made to the ministry, and every argument made use that reason or ingenuity could suggest, but to no purpose. The Americans, thus finding all arguments vain, united in an agreement to import no more of the manufactures of Great Britain, but to encourage to the utmost of their power every thing of that kind among themselves. Previous to this, indeed, several regulations were passed in favour of the commerce of the colonies; but they had now imbibed such unfavourable sentiments of the British ministry, that they paid very little regard to any thing pretended to be done in their favour; or, if these acts made any favourable impression, it was quickly obliterated by the news of the stamp-act. The reason given for this act so exceedingly obnoxious was, that a sum might be raised sufficient for the defence of the colonies against a foreign enemy; but this pretence was so far from giving any satisfaction to the Americans, that it excited their indignation to the utmost degree. They not only asserted that they were abundantly able to defend themselves against any foreign enemy, but denied that England had any right to tax them at all, unless they were allowed the privilege of sending representatives to the British parliament.

It would be superfluous to enter into any of the arguments used by the contending parties on this important occasion. The stamp-act, after a violent opposition, was passed, and its reception in America was such as might have been expected. The news, and the act itself, first arrived at Boston, where the bells were muffled and rung a funeral peal. The act was first hawked about the streets

with a death's head affixed to it, and styled the "Folly of England, and the ruin of America;" and afterwards publicly burnt by the enraged populace. The stamps themselves were seized and destroyed; those who were to receive the stamp-duties were compelled to resign their offices; and such of the Americans as sided with government had their houses plundered and burnt.

It was now found absolutely necessary either to yield to the Americans, by repealing the obnoxious statutes, or to enforce them by arms. The ferment had diffused itself universally throughout the colonies. Non-importation agreements were every where entered into; and it was even resolved to prevent the sale of any more British goods after the present year. American manufactures, though dearer, as well as inferior in quality to the British, were universally preferred. An association was entered into against eating of lamb, in order to promote the growth of wool; and the ladies with cheerfulness agreed to renounce the use of every species of ornament manufactured in Britain. Such a general and alarming confederacy determined the ministry to repeal some of the most obnoxious statutes; and to this they were the more inclined by a petition from the first American congress, held at New York in October 1765.

The stamp-act was therefore repealed, to the universal joy of the Americans, and indeed to the general satisfaction of the English, whose manufactures had begun to suffer very severely in consequence of the American association against them. The ministry were conscious, that, in repealing this obnoxious act, they yielded to the Americans; and therefore, to support, as they thought, the dignity of Great Britain, it was judged proper to publish a declaratory bill, setting forth the authority of the mother-country over her colonies, and her power to bind them by laws and statutes *in all cases whatever*. This much diminished the joy with which the repeal of the stamp-act was received in America. It was considered as a proper reason to enforce any claims equally prejudicial to the stamp-act, which might hereafter be set up; a spirit of jealousy pervaded the whole continent, and a strong party was formed, watchful on every occasion to guard against the supposed encroachments of the British power.

It was not long before an occasion offered, in which the Americans manifested a spirit of absolute independency; and that, instead of being bound by the British legislature in all cases, they would not be controuled by it in the most trivial affairs. The Rockingham ministry had passed an act, providing the troops stationed in different parts of the colonies with such accommodations as were necessary for them. The assembly of New York, however, took upon them to alter the mode of execution prescribed by the act of parliament, and to substitute one of their own. This gave great offence to the new ministry, and rendered them, though composed of those who had been active against the stamp-bill, less favourable to the colonies than in all probability they would have otherwise been. An unlucky circumstance at the same time occurred, which threw every thing once more into confusion. One of the new ministry, Mr. Charles Townshend, having declared that he could find a way of taxing the Americans without giving them offence, was called upon to propose his plan. This was by imposing a duty upon tea, paper, painters' colours, and glass, imported into America. The undutiful behaviour of the New York assembly, and that of Boston, which had proceeded in a similar manner, caused this bill to meet with less opposition than it otherwise might have done. As a punishment to the refractory assemblies, the legislative power was taken from that of New York, until it should fully comply with the terms of the act. That of Boston at last submitted with reluctance. The bill for the new taxes was quickly passed, and sent to America in 1768.

A ferment much greater than that occasioned by the stamp-act now took place, which was further augmented by the news that a number of troops had been ordered to

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repair to Boston, to keep the inhabitants in awe. A dreadful alarm pervaded the whole town; and the people called on the governor to convene a general assembly, in order to remove their fears of the military; who they said were to be assembled to overthrow their liberties, and force obedience to laws to which they were entirely averse. The governor replied, that it was no longer in his power to call an assembly; having, in his last instructions from England, being required to wait the king's orders, the matter being then under consideration at home. Being thus refused, the people took upon themselves the formation of an assembly, which they called a *Convention*. The proceedings and resolutions of this were conformable to their former behaviour; but now they went a step farther, and, under pretence of an approaching rupture with France, ordered the inhabitants to put themselves in a posture of defence against any sudden attack of an enemy; and circular letters were directed to all the towns in the province, acquainting them with the resolutions that had been taken in the capital, and exhorting them to proceed in the same manner. The town of Hatfield alone refused its concurrence; but this served only to expose them to the censure and contempt of the rest. The convention thought proper to assure the governor of their pacific intentions, and renewed their request that an assembly might be called; but being refused any audience, and threatened with being treated as rebels, they at last thought proper to dissolve of themselves, and sent over to England a circumstantial account of their proceedings, with the reason of their having assembled in the manner already mentioned.

The expected troops arrived at Boston on the very day on which the convention broke up, and had some houses in the town prepared for their reception. Their arrival had a considerable influence on the people, and for some time seemed to put an end to the disturbances; but the seeds of discord had taken such deep root, that it was impossible to quench the flame. The late spirited behaviour in Boston had given the greatest offence in England; and, notwithstanding all the efforts of opposition, an address from both houses of parliament was presented to the king; in which the daring behaviour of the colony of Massachusetts's Bay was circumstantially set forth, and the most vigorous measures recommended for reducing them to obedience. The Americans, however, continued steadfast in the ideas they had adopted. Though the troops had for some time quieted the disturbances, yet the calm continued no longer than they appeared respectable on account of their number; but, as soon as this was diminished by the departure of a large detachment, the remainder were treated with contempt, and it was even resolved to expel them altogether. The country people took up arms for this purpose, and were to have assisted their friends in Boston; but, before the plot could be put in execution, an event happened which put an end to every idea of reconciliation betwixt the contending parties.

On the 5th of March 1770, a scuffle happened between some soldiers and a party of the town's people. The soldiers, while under arms, were pressed upon, insulted, and pelted, by a mob armed with clubs, sticks, and snow-balls covering stones; they were also dared to fire. In this situation, one of the soldiers, who had received a blow, in resentment fired at the supposed aggressor. This was followed by a single discharge from six others; so that three of the inhabitants were killed, and five dangerously wounded. The town was immediately in commotion; and such was the temper, force, and number, of the inhabitants, that nothing but an engagement to remove the troops out of the town, together with the advice of moderate men, prevented the townsmen from falling on the soldiers. The killed were buried in one vault, and in a most respectful manner, in order to express the indignation of the inhabitants at the slaughter of their bretheren, by soldiers quartered among them, in violation of their civil liberties. Captain Preston, who commanded the party which fired on the inhabitants, was committed to jail, and

afterwards tried; but the captain, and six of the men, were acquitted, and two only brought in guilty of manslaughter; for it appeared on the trial, that the soldiers were insulted, threatened, and pelted, before they fired: and it was also proved, that only seven guns were fired by the eight prisoners; these circumstances, therefore, induced the jury to make a favourable verdict. The result of the trial reflected great honour on John Adams, and Josiah Quincy, Esqrs. the counsel for the prisoners; and also on the integrity of the jury, who ventured to give an upright verdict, in defiance of popular opinions. The consequences of this tragical event sunk deep into the minds of the people, and were made subservient to important purposes. The anniversary of it was observed with great solemnity for thirteen years, when eloquent orators were successively employed to deliver an annual oration, to preserve the remembrance of it fresh in their minds. On these occasions the blessings of liberty, the horrors of slavery, the dangers of a standing army, the rights of the colonies, and a variety of such topics, were represented to the public view under their most pleasing and alarming forms. These annual orations administered fuel to the fire of liberty, and kept it burning with an incessant flame.

The determination of the Americans now continued, if possible, more firm than ever, until at last government, resolved to act with vigour, and at the same time to behave with as much condescension as possible, repealed all the duties lately laid on, that of tea alone excepted. This was left on purpose to maintain the dignity of the crown of England; and it was thought that it could not be productive of any discontent in America, as being an affair of very little moment, the produce of which was not expected to exceed 16,000*l*. The opposition, however, were strenuous in their endeavours to get this tax likewise abrogated; insisting, that the Americans would consider it only as an inlet to others; and that the repeal of all the rest, without this, would answer no good purpose. The event shewed that their opinion was well founded. The Americans opposed the tea-tax with the same violence as they had done all the rest: and, at last, on the news that salaries had been settled on the justices of the superior court of Boston, the governor was addressed on the subject; the measure was condemned in the strongest terms; and a committee selected out of the several districts of the colony appointed to enquire into it.

The new assembly proceeded in the most formal manner to disavow the supremacy of the British legislature; and accused the parliament of Britain of having violated the natural rights of the Americans in a number of instances. Copies of the transactions of this assembly were transmitted to every town in Massachusetts, exhorting the inhabitants to rouse themselves, and exert every nerve in opposition to the iron hand of oppression, which was daily tearing the choicest fruits from the fair tree of liberty. The disturbances were also greatly heightened by an accidental discovery that Mr. Hutchison, governor of Massachusetts's Bay, had written several confidential letters to people in power in England, complaining of the behaviour of the province, recommending vigorous measures against them, and, among other things, asserting, that "there must be an abridgement of what is called British liberty." Letters of this kind had some how or other fallen into the hands of the agent for the colony at London. They were immediately transmitted to Boston, where the assembly was sitting, by whom they were laid before the governor, who was thus reduced to a very mortifying situation. Losing every idea of respect or friendship for him as their governor, they instantly dispatched a petition to the king, requesting him to remove the governor and deputy-governor from their places; but to this they not only received no favourable answer, but the petition itself was declared groundless and scandalous.

Matters were now ripe for the utmost extremities on the part of the Americans; and they were brought on in the following manner: Though the colonists had entered into a non-

a non-importation agreement against tea as well as all other commodities from Britain, it had nevertheless found its way into America, though in smaller quantities than before. This was sensibly felt by the East-India company, who had now agreed to pay a large sum annually to government; in recompence for which compliance, and to make up their losses in other respects, they were empowered to export their tea free from any duty payable in Britain; and, in consequence of this permission, several ships freighted with the commodity were sent to North America, and proper agents appointed for the disposing of it. The Americans, now perceiving that the tax was thus likely to be enforced whether they would or not, determined to take every possible method to prevent the tea from being landed, as well knowing that it would be impossible to hinder the sale should the commodity once be brought on shore. For this purpose the people assembled in great numbers, forcing those to whom the tea was consigned to resign their offices, and to promise solemnly never to resume them; and committees were appointed to examine the accounts of merchants, and make public tests, declaring such as would not take them enemies to their country. In the midst of this confusion, three ships laden with tea arrived at Boston; but so much were the captains alarmed at the disposition which seemed to prevail among the people, that they offered, provided they could obtain the proper discharges from the tea-connegees, custom-house, and governor, to return to England without landing their cargoes. The parties concerned, however, tho' they durst not order the tea to be landed, refused to grant the discharges required. The ships, therefore, would have been obliged to remain in the harbour; but the people, apprehensive that if they remained there the tea would be landed in small quantities, and disposed of in spite of every endeavour to prevent it, resolved to destroy it at once. This resolution was executed with equal speed and secrecy. The very evening after the above-mentioned discharges had been refused, a number of people, dressed like Mohawk Indians, boarded the ships, and threw into the sea their whole cargoes, consisting of 342 chests of tea; after which, they retired without making any further disturbance, or doing any more damage. No tea was destroyed in other places, though the same spirit was every where manifested. At Philadelphia the pilots were enjoined not to conduct the vessels up the river; and at New York, though the governor caused some tea to be landed under the protection of a man of war, he was obliged to deliver it up to the custody of the people, to prevent its being sold.

The destruction of the tea at Boston, which happened in November, 1773, was the immediate prelude to the disasters attending civil discord. Government, finding themselves every where insulted and despised, resolved to enforce their authority by all possible means; and, as Boston had been the principal scene of the riots and outrages, it was determined to punish that city in an exemplary manner. Parliament was acquainted, by a message from his majesty, with the undutiful behaviour of the city of Boston, as well as of all the colonies; recommending, at the same time, the most vigorous and spirited exertions to reduce them to obedience. The parliament in its addresses promised a ready compliance; and indeed the Americans, by their outrageous behaviour, had now lost many of their partisans. It was proposed to lay a fine on the town of Boston, equal to the price of the tea which had been destroyed, and to shut up its port by armed vessels, until the refractory spirit of the inhabitants should be subdued; which it was thought must quickly yield, as a total stop would thus be put to their trade. The bill was strongly opposed, on the same grounds that the other had been; and it was predicted, that, instead of having any tendency to reconcile or subdue the Americans, it would infallibly exasperate them beyond any possibility of reconciliation. The petitions against it, presented by the colony's agent, pointed out the same consequence in the strong-

est terms, and in the most positive manner declared, that the Americans never would submit to it: but such was the infatuation attending every rank and degree of men, that it never was imagined the Americans would dare to resist the parent state openly, but would in the end submit implicitly to her commands. In this confidence a third bill was proposed, for the impartial administration of justice on such persons as might be employed in the suppression of riots and tumults in the province of Massachusetts Bay. By this act it was provided, that should any persons acting in that capacity be indicted for murder, and not able to obtain a fair trial in that province, they might be sent by the governor to England, or to some other colony, if necessary, to be tried for the supposed crime. These three bills having passed, the ministry proposed a fourth, relative to the government of Canada; which, it was said, had not yet been settled on any proper plan. By this bill the extent of that province was greatly enlarged; its affairs were put under the direction of a council, in which Roman Catholics were to be admitted; the Roman Catholic clergy were secured in their possessions, and the usual perquisites from those of their own profession. The council above-mentioned were to be appointed by the crown, to be removable at its pleasure; and to be invested with every legislative power, excepting that of taxation.

No sooner were these laws made known in America, than they cemented the union of the colonies almost beyond any possibility of dissolving it. The assembly of Massachusetts Bay had passed a vote against the judges accepting salaries from the crown, and put the question, Whether they would accept them as usual from the general assembly? Four answered in the affirmative; but Peter Oliver, the chief-justice, refused. A petition against him, and an accusation, were brought before the governor; but the latter refused the accusation, and declined to interfere in the matter; but, as they still insisted for what they called justice against Mr. Oliver, the governor thought proper to put an end to the matter by dissolving the assembly.

In this situation of affairs, a new alarm was occasioned by the news of the port-bill. This had been totally unexpected, and was received with the most extravagant expressions of displeasure among the populace; and while these continued, the new governor, general Gage, arrived from England. He had been chosen to this office on account of his being well acquainted in America, and generally agreeable to the people; but human wisdom could not now point out a method by which the flame could be allayed. The first act of his office, as governor, was to remove the assembly to Salem, a town seventeen miles distant, in consequence of the late act. When this was intimated to the assembly, they replied by requesting him to appoint a day of public humiliation for deprecating the wrath of heaven, but met with a refusal. When met at Salem, they passed a resolution, declaring the necessity of a general congress composed of delegates from all the provinces, in order to take the affairs of the colonies at large into consideration; and five gentlemen, remarkable for their opposition to the British measures, were chosen to represent that of Massachusetts Bay. They then proceeded with all expedition to draw up a declaration, containing a detail of the grievances they laboured under, and the necessity of exerting themselves against lawless power; they set forth the disregard shewn to their petitions, and the attempts of Great Britain to destroy their ancient constitution; and concluded with exhorting the inhabitants of the colony to obstruct, by every method in their power, such evil designs; recommending, at the same time, a total renunciation of every thing imported from Great Britain, till a redress of grievances could be procured. Intelligence of this declaration was carried to the governor on the very day it was completed; on which he dissolved the assembly. This was followed by an address from the inhabitants of Salem, in favour of those of Boston,

ton, and concluding with these remarkable words: "By shutting up the port of Boston, some imagine that the course of trade might be turned hither, and to our benefit; but nature, in the formation of our harbour, forbids our becoming rivals in commerce with that convenient mart; and, were it otherwise, we must be dead to every idea of justice, and lost to all feelings of humanity, could we indulge one thought to seize on wealth, and raise our fortunes on the ruin of our suffering neighbours."

It had been fondly hoped by the ministerial party at home, that the advantages which other towns of the colony might derive from the annihilation of the trade of Boston, would make them readily acquiesce in the measure of shutting up that port, and rather rejoice in it than otherwise; but the words of the address above-mentioned seemed to preclude all hope of this kind; and subsequent transactions soon manifested it to be totally vain. No sooner did intelligence arrive of the remaining bills passed in the session of 1774, than the cause of Boston became the cause of all the colonies. The port-bill had already occasioned violent commotions throughout them all. It had been reprobated in provincial meetings, and resistance, even to the last, had been recommended against such oppression. In Virginia, the first of June, the day on which the port of Boston was to be shut up, was held as a day of humiliation, and a public intercession in favour of America was enjoined. The style of the prayer was, that "God would give the people one heart and one mind, firmly to oppose every invasion of the American rights." The Virginians, however, did not content themselves with acts of religion. They recommended, in the strongest manner, a general congress of all the colonies; as fully persuaded, that an attempt to tax any colony in an arbitrary manner, was in reality an attack upon the whole, and must ultimately end in the ruin of them all.

The provinces of New York and Pennsylvania were less sanguine than the rest, being so closely connected in trade with Great Britain, that the giving it up entirely appeared a matter of the most serious magnitude, and not to be thought of but after every other method had failed. The intelligence of the remaining bills respecting Boston, however, spread a fresh alarm throughout the continent, and fixed those who had seemed to be the most wavering. The proposal of giving up all commercial intercourse with Britain was again proposed; contributions for the inhabitants of Boston were raised in every quarter; and they every day received addresses, commending them for the heroic courage with which they sustained their calamity.

The Bostonians, on their part, were not wanting in their endeavours to promote the general cause. An agreement was framed, which, in imitation of former times, they called a "Solemn League and Covenant." By this the subscribers most religiously bound themselves to break off all communication with Britain after the expiration of the month of August ensuing, until the obnoxious acts were repealed; at the same time they engaged neither to purchase nor use any goods imported after that time, and to renounce all connection with those who did, or who refused to subscribe to this covenant; threatening to publish the names of the refractory, which at this time was a punishment by no means to be despised. Agreements of a similar kind were almost instantaneously entered into throughout all America. General Gage indeed attempted to counteract the covenant by a proclamation, wherein it was declared an illegal and traitorous combination, threatening with the pains of law such as subscribed or countenanced it. But matters were too far gone for his proclamation to have any effect. The Americans retorted the charge of illegality; and insisted, that the law allowed subjects to meet in order to consider of their grievances, and associate for relief from oppression.

Preparations were now made for holding the general congress so often proposed. Philadelphia, as being the most considerable town, was pitched upon for the place of its meeting. The delegates, of whom it was to be com-

posed, were chosen by the representatives of each province; and were in number from two to seven for each colony, though no province had more than one vote. The first congress, which met at Philadelphia, in the beginning of September, 1774, consisted of fifty-one delegates. The novelty and importance of the meeting excited an universal attention; and their transactions were such as could not but tend to render them respectable.

The first act of congress was an approbation of the conduct of Massachusetts Bay, and an exhortation to continue in the same spirit with which they had begun. Supplies for the suffering inhabitants (whom indeed the operation of the port-bill had reduced to great distress) were strongly recommended; and it was declared, that in case of attempts to enforce the obnoxious acts by arms, all America should join to assist the town of Boston; and should the inhabitants be obliged, during the course of hostilities, to remove farther up the country, the losses they might sustain should be repaired at the public expence.

Matters thus went on, until every idea of reconciliation or friendship with Britain was lost. The Americans, without ceremony, began to seize on the military stores and ammunition belonging to government. This first commenced at Newport in Rhode Island, where the inhabitants carried off forty pieces of cannon appointed for the protection of the place; and, on being asked the reason of this proceeding, they replied, that the people had seized them lest they should be made use of against themselves. After this the assembly met, and resolved, that ammunition and warlike stores should be purchased with the public money. New Hampshire followed the example of Rhode Island, and seized a small fort, for the sake of the powder and military stores it contained. In Pennsylvania a convention was held, which expressed an earnest desire of reconciliation with the mother-country; though, at the same time, in the strongest manner declaring, that they were resolved to take up arms in defence of their just rights; and the people were exhorted to apply themselves with the greatest assiduity to the prosecution of such manufactures as were necessary for their defence and subsistence, such as salt, salt-petre, gunpowder, steel, &c.

As the disturbances had originated in the province of Massachusetts Bay, and there continued with the greatest violence, so this was the province where the first hostilities were formally commenced. In the beginning of February, 1775, the congress met at Cambridge; and, as no friends to Britain could now find admittance to that assembly, the only consideration was, how to make speedy preparations for war. Expertness in military discipline was recommended in the strongest manner, and several military institutions were enacted; among which, that of the *minute-men* was one of the most remarkable. These were chosen from the most active and expert among the militia; and their business was to keep themselves in constant readiness at the call of their officers; from which perpetual vigilance they derived their title. It was now easily seen, that a slight occasion would bring on hostilities, which could not but be attended with the most violent and certain destruction to the vanquished party; for both were so much exasperated by a long course of reproaches and literary warfare, that they seemed to be filled with the utmost inveteracy against each other.

On the 26th of February, general Gage, having been informed that a number of field-pieces had been brought to Salem, dispatched a party to seize them. Their road was obstructed by a river, over which was a draw-bridge. This the people had pulled up, and refused to let down: upon which the soldiers seized a boat to ferry them over; but the people cut out her bottom. Hostilities would immediately have commenced, had it not been for the interposition of a clergyman; who represented to the military, on the one hand, the folly of opposing such numbers; and to the people, on the other, that, as the day was far spent, the military could not execute their design, so that they might, without any fear, leave them the quiet possession

of the draw-bridge. This was complied with; and the soldiers, after having remained for some time at the bridge, returned without executing their orders.

The next attempt was attended with more serious consequences. General Gage having been informed that a large quantity of ammunition and military stores had been collected at Concord, about twenty miles from Boston, and where the provincial congress was sitting, sent a detachment, under the command of colonel Smith and major Pitcairn, to destroy the stores, and, as was reported, to seize Messrs. Hancock and Adams, the leading-men of the congress. They set out before day-break, on the 19th of April, marching with the utmost silence, and securing every one they met on the road, that they might not be discovered. But, notwithstanding all their care, the continual ringing of bells and firing of guns as they went along soon gave them notice that the country was alarmed. About five in the morning they had reached Lexington, fifteen miles from Boston, where the militia of the place were exercising. An officer called out to them to disperse; but some shots, it is said, being at that moment fired from a house in the neighbourhood, the military made a discharge, which killed and wounded several of the militia. The detachment then proceeded to Concord, where, having destroyed the stores, they were encountered by the Americans; and a scuffle ensued, in which several fell on both sides. The purpose of their expedition being thus accomplished, it was necessary for the king's troops to retreat, which they did through a continual fire kept upon them from Concord to Lexington. Here their ammunition was expended; and they would have been unavoidably cut off, had not a considerable reinforcement, commanded by lord Percy, luckily met them. The Americans, however, continued their attack with great fury; and the British would still have been in the utmost danger, had it not been for two field-pieces which lord Percy brought with him. By these the impetuosity of the Americans was checked, and the British made good their retreat to Boston, with the loss of 263 killed and wounded: that of the Americans was eighty-eight.

By this engagement the spirits of the Americans were so raised, that they meditated nothing less than the total expulsion of the British troops from Boston. An army of 20,000 men was assembled, who formed a line of encampment from Roxbury to Mystic, through a space of about thirty miles; and here they were soon after joined by a large body of Connecticut troops, under general Putnam, an old officer of great bravery and experience. By this formidable force was the town of Boston now kept blocked up. General Gage, however, had so strongly fortified it, that the enemy, powerful as they were, durst not make an attack; while, on the other hand, his force was by far too insignificant to meet such an enemy in the field. But, towards the end of May, a considerable reinforcement having arrived, with generals Howe, Burgoyne, and Clinton, he prepared to act with more decision; while the Americans, on their part, did every thing to oppose him.

A considerable height, known by the name of Bunker's Hill, just at the entrance of the peninsula of Charlestown, was so situated as to make the possession of it a matter of great consequence to either of the contending parties. Orders were therefore, June 16, issued by the provincial commanders, that a detachment of 1000 men should entrench upon this height. By some mistake, Breed's Hill, high and large like the other, but situated nearer Boston, was marked out for the entrenchments, instead of Bunker's Hill. The provincials proceeded to Breed's hill, and worked with so much diligence, that between midnight and the dawn of the morning, they had thrown up a small redoubt about eight rods square. They kept such a profound silence, that they were not heard by the British on-board their vessels, though very near. These, having derived their first information of what was going on from the sight of the work near completion, began an incessant firing upon them. The provincials bore this with firmness,

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and, though they were only young soldiers, continued to labour till they had thrown up a small breastwork, extending from the east side of the breastwork to the bottom of the hill. As this eminence overlooked Boston, general Gage thought it necessary to drive the provincials from it. About noon, therefore, he detached major-general Howe, and brigadier-general Pigot, with the flower of the army, consisting of four battalions, ten companies of the grenadiers, and ten of light infantry, with a proportion of field artillery, to effect this business. These troops landed at Moreton's Point, and, June 17, formed after landing, but remained in that position till they were reinforced by a second detachment of light infantry and grenadier companies, a battalion of land forces, and a battalion of marines, making in the whole near 3000 men. While the troops who first landed were waiting for this reinforcement, the provincials, for their farther security, pulled up some adjoining post and rail fences, and set them down in two parallel lines at a small distance from each other, and filled the space between with hay, which, having been lately mowed, remained on the adjacent ground.

The king's troops formed in two lines, and advanced slowly, to give their artillery time to demolish the American works. While the British were advancing to the attack, they received orders to burn Charlestown. This was not done because they were fired upon from the houses in that town, but from the military policy of depriving enemies of a cover in their approaches. In a short time this ancient town, consisting of about 500 buildings, chiefly of wood, was in one great blaze. The lofty steeple of the meeting-house formed a pyramid of fire above the rest, and struck the astonished eyes of numerous beholders with a magnificent but awful spectacle. In Boston, the heights of every kind were covered with the citizens, and such of the king's troops as were not on duty. The hills around the adjacent country, which afforded a safe and distinct view, were occupied by the inhabitants of the country.

Thousands, both within and without Boston, were anxious spectators of the bloody scene. The honour of British troops beat high in the breasts of many, while others, with a keener sensibility, felt for the liberties of a great and growing country. The British moved on but slowly, which gave the provincials a better opportunity for taking aim. The latter, in general, reserved themselves till their adversaries were within ten or twelve rods, but then began a furious discharge of small arms. The stream of the American fire was so incessant, and did so great execution, that the king's troops retreated in disorder and precipitation. Their officers rallied them, and pushed them forward with their swords, but they returned to the attack with great reluctance. The Americans again reserved their fire till their adversaries were near, and then put them a second time to flight. General Howe and the officers redoubled their exertions, and were at last successful, though the soldiers discovered a great aversion to going on. By this time the powder of the Americans began to fail. The British also brought some cannon to bear, which raked the inside of the breastwork from end to end. The fire from the ships, batteries, and field artillery, was redoubled. The redoubt was attacked on three sides at once. Under these circumstances a retreat from it was ordered, but the provincials delayed, and made resistance with their discharged muskets as if they had been clubs, so long that the king's troops, who easily mounted the works, had half filled the redoubt before it was given up to them.

While these operations were going on at the breastwork and redoubt, the British light infantry were attempting to force the left point of the former, that they might take the American line in flank. Though they exhibited the most undaunted courage, they met with an opposition which called for its greatest exertions. The provincials here, in like manner, reserved their fire till their adversaries were near, and then poured it upon the light infantry, in so true a direction, as mowed down their ranks.

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The engagement was kept up on both sides with great resolution. The persevering exertions of the king's troops could not compel the Americans to retreat, till they observed that their main body had left the hill. This, when begun, exposed them to new danger, for it could not be effected but by marching over Charlestown Neck, every part of which was raked by the shot of the Glasgow man of war, and two floating batteries. The incessant fire kept up across this neck prevented any considerable reinforcement from joining their countrymen who were engaged; but the few who fell on their retreat over the same ground proved, that the apprehensions of those provincial officers, who declined passing over to succour their companions, were without any solid foundation.

The number of Americans engaged amounted only to 1500. It was apprehended that the conquerors would push the advantages they had gained, and march immediately to American head quarters at Cambridge, but they advanced no farther than Bunker's Hill; there they threw up works for their own security. The provincials did the same on Prospect Hill in front of them. Both were guarding against an attack, and both were in a bad condition to receive one. The loss of the peninsula depressed the spirits of the Americans, and their great loss of men produced the same effect on the British. There have been few battles in modern wars, in which, all circumstances considered, there was a greater destruction of men than in this short engagement. The loss of the British, as acknowledged by general Gage, amounted to 1054. Nineteen commissioned officers were killed, and seventy more were wounded. The battle of Quebec in 1759, which gave Great Britain the province of Canada, was not so destructive to British officers as this affair of a slight entrenchment, the work only of a few hours. That the officers suffered so much, must be imputed to their being aimed at. None of the provincials in this engagement were riflemen, but they were all good marksmen. The whole of their previous military knowledge had been derived from hunting, and the ordinary amusements of sportsmen. The dexterity which by long habit they had acquired in hitting beasts, birds, and marks, was fatally applied to the destruction of British officers. From their fall much confusion was expected; they were therefore particularly singled out. Most of those who were near the person of general Howe were either killed or wounded, but the general, though he greatly exposed himself, was unhurt. The light infantry and grenadiers lost three-fourths of their men. Of one company not more than five, and of another not more than fourteen, escaped. The unexpected resistance of the Americans was such as wiped away the reproaches of cowardice, which had been cast on them by their enemies in Britain. The spirited conduct of the British officers merited and obtained great applause, but the provincials were justly entitled to a large portion of the same, for having made the utmost exertions of their adversaries necessary to dislodge them from lines, which were the work only of a single night. The Americans lost five pieces of cannon. Their killed amounted to 139. The wounded and missing to 314. Thirty of the former fell into the hands of the conquerors. They particularly regretted the death of general Warren.

This action at Breed's Hill, or Bunker's Hill, as it has been commonly called, produced many and very important consequences. The same determined spirit of resistance now every where appeared on the part of the Americans. The commencement of hostilities at Lexington determined the colony of New York, which had hitherto continued to waver, to unite with the rest; and, as the situation of New York renders it unable to resist an attack from the sea, it was resolved, before the arrival of a British fleet, to secure the military stores, send off the women and children, and to set fire to the city if it was still found incapable of defence. The exportation of provisions was every where prohibited, particularly to the British fishery on the banks of Newfoundland, or to such colonies of America as should

adhere to the British interest. Congress resolved on the establishment of an army, and of a large paper currency in order to support it. In the inland northern colonies, colonels Easton and Ethan Allen, without receiving any orders from congress, or communicating their design to any body, with a party of only 250 men, surprised the forts of Crown Point, Ticonderago, and the rest that form a communication betwixt the colonies and Canada. On this occasion 200 pieces of cannon fell into their hands, besides mortars and a large quantity of military stores, together with two armed vessels, and materials for the construction of others.

After the battle of Bunker's Hill, the provincials erected fortifications on the heights which commanded Charlestown, and strengthened the rest in such a manner that there was no hope of driving them from thence; at the same time that their activity and boldness astonished their adversaries, who had been accustomed to entertain too mean an opinion of their courage.

The British troops, thus shut up in Boston, were soon reduced to distress. Their necessities obliged them to attempt the carrying off the American cattle on the islands before Boston, which produced frequent skirmishes; but the provincials, better acquainted with the navigation of these shores, landed on the islands, destroyed or carried off whatever was of any use, burned the light house at the entrance of the harbour, and took prisoners the workmen sent to repair it, as well as a party of marines who guarded them. Thus the garrison was reduced to the necessity of sending out armed vessels to make prizes indiscriminately of all that came in their way, and of landing in different places to plunder for subsistence as well as they could.

The congress in the mean time continued to act with all the vigour which its constituents had expected. Articles of confederation and perpetual union were drawn up and solemnly agreed upon; and they proceeded formally to justify their conduct, in a declaration drawn up in terms remarkably expressive, and well calculated to excite attention.

"Were it possible," said they, "for men who exercise their reason, to believe that the divine Author of our existence intended a part of the human race to hold an absolute property in and unbounded power over others, marked out by His infinite goodness and wisdom as the objects of a legal domination, never rightfully resistable, however severe and oppressive; the inhabitants of these colonies might at least require from the parliament of Great Britain some evidence that this dreadful authority over them had been granted to that body: but a reverence for our Great Creator, principles of humanity, and the dictates of common sense, must convince all those who reflect upon the subject, that government was instituted to promote the welfare of mankind, and ought to be administered for the attainment of that end.

"The legislature of Great Britain, however, stimulated by an inordinate passion for power, not only unjustifiable; but which they know to be peculiarly reprobated by the very constitution of that kingdom; and despairing of success in any mode of contest where regard should be had to law, truth, or right; have at length, deserting those, attempted to effect their cruel and impolitic purpose of enslaving these colonies by violence, and have thereby rendered it necessary for us to close with their last appeal from reason to arms. Yet, however blinded that assembly may be, by their intemperate rage for unlimited domination, so to slight justice in the opinion of mankind, we esteem ourselves bound by obligations to the rest of the world to make known the justice of our cause."

After taking notice of the manner in which their ancestors left Britain, the happiness attending the mutual friendly commerce betwixt that country and her colonies, and the remarkable success of the late war, they proceed as follows: "The new ministry finding the brave foes of Britain, though frequently defeated, yet still contending, took up the unfortunate idea of granting them a hasty peace, and of then subduing her faithful friends.

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"These devoted colonies were judged to be in such a state as to present victories without bloodshed, and all the easy emoluments of statutable plunder. The uninterrupted tenor of their peaceable and respectful behaviour from the beginning of their colonization; their dutiful, zealous, and useful, services during the war, though so recently and amply acknowledged in the most honourable manner by his majesty, by the late king, and by parliament, could not save them from the intended innovations. Parliament was influenced to adopt the pernicious project; and, assuming a new power over them, has in the course of eleven years given such decisive specimens of the spirit and consequences attending this power, as to leave no doubt of the effects of acquiescence under it.

"They have undertaken to give and grant our money without our consent, though we have ever exercised an exclusive right to dispose of our own property. Statutes have been passed for extending the jurisdiction of the courts of admiralty, and vice-admiralty, beyond their ancient limits; for depriving us of the accustomed and inestimable rights of trial by jury, in cases affecting both life and property; for suspending the legislature of one of our colonies; for interdicting all commerce to the capital of another; and for altering fundamentally the form of government established by charter, and secured by acts of its own legislature; and solemnly confirmed by the crown; for exempting the murderers of colonists from legal trial, and in effect from punishment; for erecting in a neighbouring province, acquired by the joint arms of Great Britain and America, a despotism dangerous to our very existence; and for quartering soldiers upon the colonists in time of a profound peace. It has also been resolved in parliament, that colonists charged with committing certain offences shall be transported to England to be tried.

"But why should we enumerate our injuries in detail? By one statute it was declared, that parliament can of right make laws to bind us in all cases whatever. What is to defend us against so enormous, so unlimited, a power? Not a single person who assumes it is chosen by us, or is subject to our controul or influence; but, on the contrary, they are all of them exempt from the operation of such laws; and the American revenue, if not diverted from the ostensible purposes for which it is raised, would actually lighten their own burdens in proportion as it increases ours.

"We saw the misery to which such despotism would reduce us. We for ten years incessantly and ineffectually besieged the throne as supplicants; we reasoned, we remonstrated with parliament in the most mild and decent language; but administration, sensible that we should regard these measures as freemen ought to do, sent over fleets and armies to enforce them.

"We have pursued every temperate, every respectful, measure; we have even proceeded to break off all commercial intercourse with our fellow-subjects as our last peaceable admonition, that our attachment to no nation on earth would supplant our attachment to liberty: this we flattered ourselves was the ultimate step of the controversy; but subsequent events have shewn how vain was this hope of finding moderation in our enemies!

"The lords and commons, in their address in the month of February, said, that a rebellion at that time actually existed in the province of Massachusetts Bay; and that those concerned in it had been countenanced and encouraged by unlawful combinations and engagements entered into by his majesty's subjects in several of the colonies; and therefore they besought his majesty that he would take the most effectual measures to enforce due obedience to the laws and authority of the supreme legislature. Soon after the commercial intercourse of whole colonies with foreign countries was cut off by an act of parliament; by another, several of them were entirely prohibited from the fisheries in the seas near their coasts, on which they always depended for their subsistence; and large reinforcements of ships and troops were immediately sent over to general Gage.

"Fruitless were all the intreaties, arguments, and elo-

quence, of an illustrious band of the most distinguished peers and commoners, who nobly and strenuously asserted the justice of our cause, to stay, or even to mitigate, the heedless fury with which these accumulated outrages were hurried on. Equally fruitless was the interference of the city of London, of Bristol, and of many other respectable towns, in our favour."

After having reproached parliament, general Gage, and the British government in general, they proceeded thus: "We are reduced to the alternative of choosing an unconditional submission to tyranny or resistance by force. The latter is our choice. We have counted the cost of this contest, and find nothing so dreadful as voluntary slavery. Honour, justice, and humanity, forbid us tamely to surrender that freedom which we received from our gallant ancestors, and which our innocent posterity have a right to receive from us. Our cause is just; our union is perfect; our internal resources are great; and, if necessary, foreign assistance is undoubtedly attainable. We fight not for glory or conquest; we exhibit to mankind the remarkable spectacle of people attacked by unprovoked enemies. They boast of their privileges and civilization, and yet proffer no milder conditions than servitude or death. In our own native land, in defence of the freedom that is our birthright, for the protection of our property acquired by the honest industry of our forefathers and our own, against violence actually offered, we have taken up arms; we shall lay them down when hostilities shall cease on the part of our aggressors, and all danger of their being renewed shall be removed,—and not before."

These are some of the most striking passages in the declaration of congress on taking up arms against Great Britain, dated July 6, 1775. Without enquiring whether the principles on which it is founded are right or wrong, the determined spirit which it shews ought to have convinced us, that the conquest of America was an event scarcely ever to be expected. In every other respect an equal spirit was shewn; and the rulers of the British nation had the mortification to see those whom they styled *rebels* and *traitors* succeed in negotiations in which they themselves were utterly foiled. In the passing of the Quebec-bill, ministry had flattered themselves that the Canadians would be so much attached to them on account of restoring the French laws, that they would very readily join in any attempt against the colonists who had reprobated that bill in such strong terms: but in this they found themselves mistaken. A scheme had been formed for general Carleton, governor of the province, to raise an army of Canadians wherewith to act against the Americans; and, so sanguine were the hopes of administration in this respect; that they had sent 20,000 stand of arms, and a great quantity of military stores, to Quebec for the purpose. But the people, though they did not join the Americans, yet were found immovable in their purpose to stand neuter. The British administration next tried to engage the Indians in their cause. But, though agents were dispersed among them with large presents to the chiefs, the greatest part replied, that they did not understand the nature of the quarrel, nor could they distinguish whether those who dwelt in America or on the other side of the ocean were in fault: but they were surprised to see Englishmen ask their assistance against one another; and advised them to be reconciled, and not to think of shedding the blood of their brethren. To the representations of congress they paid more respect. These set forth, that the English on the other side of the ocean had taken up arms to enslave not only their countrymen in America, but the Indians also; and, if the latter should enable them to overcome the colonists, they themselves would soon be reduced to a state of slavery also. By arguments of this kind most of the savages were engaged to remain neuter; and thus the colonists were freed from a dangerous enemy. On this occasion the congress thought proper to hold a solemn conference with the different tribes of Indians. The speech made by them on the occasion is curious, but too long to

be fully inserted. The following is a specimen of the European mode of addressing these people:

"Brothers, Sachems, and Warriors!

"We, the delegates from the Twelve United Provinces, now sitting in general congress at Philadelphia, send their talk to you our brothers.

"Brothers and Friends, now attend!

"When our fathers crossed the great water, and came over to this land, the king of England gave them a talk, assuring them that they and their children should be his children; and that if they would leave their native country, and make settlements, and live here, and buy and sell, and trade with their brethren beyond the water, they should still keep hold of the same covenant-chain, and enjoy peace; and it was covenanted, that the fields, houses, goods, and possessions, which our fathers should acquire, should remain to them as their own, and be their children's for ever, and at their sole disposal.

"Brothers and Friends, open a kind ear!

"We will now tell you of the quarrel betwixt the counsellors of king George and the inhabitants and colonies of America.

"Many of his counsellors have persuaded him to break the covenant-chain, and not to send us any more good talks. They have prevailed upon him to enter into a covenant against us; and have torn asunder, and cast behind their back, the good old covenant which their ancestors and ours entered into, and took strong hold of. They now tell us they will put their hands into our pocket without asking, as though it were their own; and at their pleasure they will take from us our charters, or written civil constitution, which we love as our lives; also our plantations, our houses, and goods, whenever they please, without asking our leave. They tell us, that our vessels may go to that or this island in the sea, but to this or that particular island we shall not trade any more; and, in case of our non-compliance with these new orders, they shut up our harbours.

"Brothers, we live on the same ground with you; the same island is our common birth-place. We desire to sit down under the same tree of peace with you; let us water its roots, and cherish the growth, till the large leaves and flourishing branches shall extend to the setting sun, and reach the skies. If any thing disagreeable should ever fall out between us, the Twelve United Colonies, and you, the Six Nations, to wound our peace, let us immediately seek measures for healing the breach. From the present situation of our affairs, we judge it expedient to kindle up a small fire at Albany, where we may hear each other's voice, and disclose our minds fully to one another."

The other remarkable transactions of this congress were the ultimate refusal of the conciliatory proposal made by Lord North, of which such sanguine expectations had been formed by the English ministry; and appointing a generalissimo to command their armies, which were now very numerous. The person chosen for this purpose was Geo. Washington: a man so universally beloved, that he was raised to such an high station by the unanimous voice of congress: and his subsequent conduct shewed him every way worthy of it. Horatio Gates and Charles Lee, two English officers of considerable reputation, were also chosen; the former an adjutant-general, the second a major-general. Artemus Ward, Philip Schuyler, and Israel Putnam, were likewise nominated major-generals. Seth Pomeroy, Richard Montgomery, David Wooster, William Heath, Joseph Spencer, John Thomas, John Sullivan, and Nathaniel Green, were chosen brigadier-generals at the same time.

The success which had hitherto attended the Americans in all their measures, now emboldened them to think not only of defending themselves, but likewise of acting offensively against Great Britain. The conquest of Canada appeared an object within their reach, and one that would be attended with many advantages; and, as an invasion of that province was already facilitated by the taking of

Crown Point and Ticonderago, it was resolved if possible to penetrate that way into Canada, and reduce Quebec during the winter, before the fleets and armies, which they were well assured would sail thither from Britain, should arrive. By order of congress, therefore, 3000 men were put under the command of generals Montgomery and Schuyler, with orders to proceed to lake Champlain, from whence they were to be conveyed in flat-bottomed boats to the mouth of the river Sorel, a branch of the great river St. Lawrence, and on which is situated a fort of the same name with the river. On the other hand, they were opposed by general Carleton, governor of Canada; an officer of great activity and experience in war; who, with a very few troops, had hitherto been able to keep in awe the disaffected people of Canada, notwithstanding all the representations of the colonists. He had now augmented his army by a considerable number of Indians, and promised even in his present situation to make a formidable resistance.

As soon as general Montgomery arrived at Crown Point, he received information that several armed vessels were stationed at St. John's, a strong fort on the Sorel, with a view to prevent his crossing the lake; on which he took possession of an island that commands the mouth of the Sorel, and by which he could prevent them from entering the lake. In conjunction with general Schuyler, he next proceeded to St. John's: but, finding that place too strong, he landed on a part of the country considerably distant, and full of woods and swamps. From thence, however, they were driven by a party of Indians whom general Carleton had employed.

The provincial army was now obliged to retreat to the island of which they at first took possession; where general Schuyler being taken ill, Montgomery was left to command alone. His first step was to gain over the Indians whom general Carleton had employed, and this he in a great measure accomplished; after which he determined to lay siege to St. John's. In this he was facilitated by the reduction of Chamblee, a small fort in the neighbourhood, where he found a large supply of powder. An attempt was made by general Carleton to relieve the place; for which purpose he with great pains collected about 1000 Canadians, while Colonel Maclean proposed to raise a regiment of the Highlanders who had emigrated from their own country to America. But, while general Carleton was on his march with these new levies, he was attacked by a superior force of provincials, and utterly defeated; which being made known to another body of Canadians who had joined colonel Maclean, they abandoned him without striking a blow, and he was obliged to retreat to Quebec.

The defeat of general Carleton was a sufficient recompence to the Americans for that of colonel Ethan Allen, which had happened a little before. The success which had attended this gentleman against Crown Point and Ticonderago had emboldened him to make a similar attempt on Montreal; but, being attacked by the militia of the place, supported by a detachment of regulars, he was entirely defeated, and taken prisoner.

General Carleton's defeat, and the desertion of Maclean's forces, induced the garrison of St. John's to surrender themselves prisoners of war; and they were treated with great humanity. They were in number 500 regulars and 200 Canadians, among whom were many French nobles. General Montgomery next took measures to prevent the British shipping from passing down the river from Montreal to Quebec. This he accomplished so effectually, that the whole were taken. The town itself was obliged to surrender at discretion; and it was with the utmost difficulty that general Carleton escaped in an open boat by the favour of a dark night.

No obstacle now remained to prevent the Americans from making their way to the capital, except what arose from the nature of the country; and these were very considerable. Nothing, however, could damp the ardour of the provincials. Notwithstanding it was now the middle

of November, and the depth of winter was at hand, colonel Arnold formed a design of penetrating through woods, morasses, and the most frightful solitudes, from New England to Canada by a nearer way than that which Montgomery had chosen; and this he accomplished in spite of every difficulty, to the astonishment of all who saw or heard of the attempt. This desperate march, however, cannot be looked upon as conducive to any good purpose. A third part of his men under another colonel had abandoned him by the way, under pretence of want of provisions; the total want of artillery rendered his presence insignificant before a place strongly fortified; and the smallness of his army rendered it even doubtful whether he could have taken the town by surprise. The Canadians indeed were amazed at the exploit, and their inclination to revolt from Britain was somewhat augmented; but none of them as yet took up arms in behalf of America. The consternation into which the town of Quebec was thrown, proved detrimental rather than otherwise to the expedition; as it doubled the vigilance and activity of the inhabitants to prevent any surprise; and the appearance of common danger united all parties, who, before the arrival of Arnold, were contending most violently with one another. He was therefore obliged to content himself with blocking up the avenues to the town, in order to distress the garrison for want of provisions; and even this he was unable to do effectually, by reason of the small number of his men. The matter was not much mended by the arrival of general Montgomery. The force he had with him, even when united to that of Arnold, was too insignificant to attempt the reduction of a place so strongly fortified, especially with the assistance only of a few mortars and field-pieces. After the siege had continued through the month of December, general Montgomery, conscious that he could accomplish his end no other way than by surprise, resolved to make an attempt on the last day of the year 1775. The method he took at this time was perhaps the best that human wisdom could devise. He advanced by break of day, in the midst of an heavy fall of snow, which covered his men from the sight of the enemy. Two real attacks were made by himself and colonel Arnold, at the same time that two feigned attacks were made on two other places, thus to distract the garrison, and make them divide their forces. One of the real attacks was made by the people of New York, and the other by those of New England under Arnold. Their hopes of surprising the place, however, were defeated by the signal for the attack being through some mistake given too soon. General Montgomery himself had the most dangerous place, being obliged to pass between the river and some high rocks on which the Upper Town stands; so that he was forced to make what haste he could to close with the enemy. His fate, however, was now decided. Having forced the first barrier, a violent discharge of musquetry and grape-shot from the second killed him, his principal officers, and the most of the party he commanded; on which those who remained immediately retreated. Colonel Arnold in the mean time made a desperate attack on the Lower Town, and carried one of the barriers after an obstinate resistance for an hour; but in the action he himself received a wound, which obliged him to withdraw. The attack, however, was continued by the officers whom he had left, and another barrier forced: but the garrison, now perceiving that nothing was to be feared except from that quarter, collected their whole force against it; and, after a desperate engagement of three hours, overpowered the provincials, and obliged them to surrender.

In this action the valour of the provincial troops could not be exceeded. Yet such a terrible disaster left no hope remaining of the accomplishment of their purpose, as Arnold could now scarcely number 800 effective men under his command. He did not, however, abandon the province, or even remove to a greater distance than three miles from Quebec; and here he still found means to annoy the garrison very considerably by intercepting their provisions.

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The Canadians, notwithstanding the bad success of the American arms, still continued friendly; and thus he was enabled to sustain the hardships of a winter encampment in that most severe climate. The congress, far from passing any censure on him for his misfortune, created him a brigadier-general.

While hostilities were thus carried on with vigour in the north, the flame of contention was gradually extending itself in the south. Lord Dunmore, the governor of Virginia, was involved in disputes similar to those which had taken place in other colonies. These had proceeded so far, that the assembly was dissolved; which in this province was attended with a consequence unknown to the rest. As Virginia contained a great number of slaves, it was necessary that a militia should be constantly embodied to keep them in awe. During the dissolution of the assembly the militia-laws expired; and the people, after complaining of the danger they were in from the negroes, formed a convention, which enacted that each county should raise a quota for the defence of the province. Dunmore, on this, removed the powder from Williamsburg; which created such discontents, that an immediate quarrel would probably have ensued, had not the merchants of the town undertaken to obtain satisfaction for the injury supposed to be done to the community. This tranquillity, however, was soon interrupted; the people, alarmed by a report that an armed party were on their way from the man of war where the powder had been deposited, assembled in arms, and determined to oppose by force any farther removals. In some of the conferences which passed at this time, the governor let fall some unguarded expressions, such as threatening them with setting up the royal standard, proclaiming liberty to the negroes, destroying the town of Williamsburg, &c. which were afterwards made public, and exaggerated in such a manner as greatly to increase the public ferment.

In this state of confusion the governor thought it necessary to fortify his palace with artillery, and procure a party of marines to guard it. Lord North's conciliatory proposal arriving also about the same time, he used his utmost endeavours to cause the people to comply with it. The arguments he used were such as must do him honour; and, had not matters already gone to such a pitch of distraction, it is highly probable that some attention would have been paid to them. "The view (he said) in which the colonies ought to behold this conciliatory proposal, was no more than an earnest admonition from Great Britain to relieve her wants: that the utmost condescendence had been used in the mode of application; no determinate sum having been fixed, as it was thought most worthy of British generosity to take what they thought could be conveniently spared, and likewise to leave the mode of raising it to themselves, &c." But the clamour and dissatisfaction were now so universal, that nothing else could be attended to. The governor had called an assembly for the purpose of laying this conciliatory proposal before them; but it had been little attended to. The assembly began their session by enquiries into the state of the magazine. It had been broken into by some of the townsmen; for which reason spring-guns had been placed there by the governor, which discharged themselves upon the offenders at their entrance: these circumstances, with others of a similar kind, raised such a violent uproar, that, as soon as the preliminary business of the session was over, the governor retired on-board a man of war, informing the assembly that he durst no longer trust himself on shore. This produced a long course of disputation, which ended in a positive refusal of the governor to trust himself again in Williamsburg, even to give his assent to the bills, which could not be passed without it, and though the assembly offered to bind themselves for his personal safety. In his turn he requested them to meet him on-board the man of war where he then was; but this proposal was rejected, and all further correspondence containing the least appearance of friendship was discontinued.

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Lord

Lord Dunmore, thus deprived of his government, attempted to reduce by force those whom he could no longer govern. Some of the most strenuous adherents to the British cause, whom their zeal had rendered obnoxious at home, now repaired to him. He was also joined by numbers of black slaves. With these, and the assistance of the British shipping, he was for some time enabled to carry on a kind of predatory war, sufficient to hurt and exasperate, but not to subdue. After some inconsiderable attempts on land, proclaiming liberty to the slaves, and setting up the royal standard, he took up his residence at Norfolk, a maritime town of some consequence, where the people were better affected to Britain than in most other places. A considerable force, however, was collected against him; and the natural impetuosity of his temper prompting him to act against them with more courage than caution, he was entirely defeated, and obliged to retire to his shipping, which was now crowded by the number of those who had incurred the resentment of the provincials.

In the mean time a scheme of the utmost magnitude and importance was formed by one Mr. Conolly, a Pennsylvanian, of an intrepid and aspiring disposition, and attached to the cause of Britain. The first step of this plan was to enter into a league with the Ohio Indians. This he communicated to lord Dunmore, and it received his approbation: upon which Conolly set out, and actually succeeded in his design. On his return, he was dispatched to general Gage, from whom he received a colonel's commission, and set out in order to accomplish the remainder of his scheme. The plan in general was, that he should return to the Ohio, where, by the assistance of the British and Indians in these parts, he was to penetrate through the back settlements into Virginia, and join lord Dunmore at Alexandria: but, by an accident very naturally to be expected, he was discovered, taken prisoner, and thrown into a dungeon.

After the retreat of lord Dunmore from Norfolk, that place was taken possession of by the provincials, who treated the loyalists that had remained there with great cruelty; at the same time that they greatly distressed those on-board lord Dunmore's fleet, by refusing to supply them with any necessities. Nor was this all: the vicinity of the shipping was so great, as to afford the riflemen an opportunity of aiming at the people on-board, and exercising the cruel occupation of killing them, in which they did not fail every day to employ themselves. These proceedings at last drew a remonstrance from his lordship; in which he insisted, that the fleet should be furnished with necessities, and that the soldiers should desist from the cruel diversion above-mentioned; but, both these requests being denied, a resolution was taken to set fire to the town. After giving the inhabitants a proper warning, a party landed, under cover of a man of war, and set fire to that part which lay nearest the shore; but the flames were observed, at the same time, to break forth in every other quarter, and the whole town was reduced to ashes. This universal destruction, by which a loss of more than 300,000*l.* was incurred, is said to have been occasioned by order of the congress itself, that the loyalists might find no refuge there for the future.

In the southern colonies of Carolina, the governors were expelled, and obliged to take refuge on-board the men of war, as lord Dunmore had been: among others, Mr. Martin, governor of North Carolina, was expelled, on a charge of attempting to raise the back-settlers, consisting chiefly of Scots Highlanders, against the colony. Having secured themselves against any attempts from these enemies, they proceeded to regulate their internal concerns in the same manner as the rest of the colonies; and, by the end of the year 1775, Britain beheld the whole of America united against her in the most determined opposition. Her vast possessions of that tract of land, since known by the name of the *Thirteen United States*, were now reduced to the single town of Boston; in which her forces were besieged by an enemy with whom they were apparently

not able to cope, and by whom they must of course expect in a very short time to be expelled. The situation of the inhabitants of Boston, indeed, was peculiarly unhappy. After having failed in their attempts to leave the town, general Gage had consented to allow them to retire with their effects; but afterwards, for what reason does not well appear, he refused to fulfil his promise. When he resigned his place to general Howe, in October 1775, the latter, apprehensive that they might give intelligence of the situation of the British troops, strictly prohibited every person from leaving the place, under pain of military execution. Thus matters continued till the month of March, 1776, when the town was evacuated.

On the second of that month, general Washington opened a battery on the west side of the town, from whence it was bombarded with a heavy fire of cannon at the same time; and three days after, it was attacked by another battery from the eastern shore. This terrible attack continued for fourteen days without intermission; when general Howe, finding the place no longer tenable, determined if possible to drive the enemy from their works. Preparations were therefore made for a most vigorous attack on a hill called Dorchester Neck, which the Americans had fortified in such a manner as would in all probability have rendered the enterprise next to desperate. No difficulties, however, were sufficient to daunt the spirit of the general; and every thing was in readiness, when a sudden storm prevented this intended exertion of British valour. Next day, upon a more close inspection of the works they were to attack, it was thought advisable to desist from the enterprise altogether. The fortifications were very strong, and extremely well provided with artillery; and, besides other implements of destruction, upwards of 100 hogheads of stones were provided to roll down upon the enemy as they came up; which, as the ascent was extremely steep, must have done prodigious execution.

Nothing, therefore, now remained, but to think of a retreat; and even this was attended with the utmost difficulty and danger. The Americans, knowing that it was in the power of the British general to reduce the town to ashes, which could not have been repaired in many years, did not think proper to give the least molestation; and, for the space of a fortnight, the troops were employed in the evacuation of the place, from whence they carried along with them 2000 of the inhabitants, who durst not stay on account of their attachment to the British cause. From Boston they sailed to Halifax; but all their vigilance could not prevent a number of valuable ships from falling into the hands of the enemy. A considerable quantity of cannon and ammunition had also been left at Bunker's Hill and Boston Neck; and, in the town, an immense variety of goods, principally woollen and linen, of which the provincials stood very much in need. The estates of those who fled to Halifax were confiscated; as also those who were attached to government, and had remained in the town. As an attack was expected as soon as the British forces should arrive, every method was employed to render the fortifications, already very strong, impregnable. For this purpose some foreign engineers were employed, who had before arrived at Boston; and so eager were people of all ranks to accomplish this business, that every able-bodied man in the place, without distinction of rank, set apart two days in the week, to complete it the sooner.

The Americans, exasperated to the utmost by the proceedings of parliament, now formally renounced all connection with Britain, and declared themselves independent. This celebrated declaration was published on the fourth of July, 1776. Previous to this, a circular letter had been sent through each colony, stating the reasons for it; and such was the animosity now every where prevailing against Great Britain, that it met with universal approbation, except in the province of Maryland alone. It was not long, however, before the people of that colony, finding themselves left in a very dangerous minority, thought proper to accede to the measures of the rest. The manifesto it-

self was much in the usual style, stating a long list of grievances, for which redress had been often applied in vain; and, for these reasons, they determined on a final separation; to hold the people of Britain, as the rest of mankind, "enemies in war, in peace friends."

After thus publicly throwing off all allegiance and hope of reconciliation, the colonists soon found that an exertion of all their strength was required in order to support their pretensions. Their arms, indeed, had not, during this season, been attended with success in Canada. Reinforcements had been promised to general Arnold, who still continued the blockade of Quebec; but they did not arrive in time to second his operations. Being sensible, however, that he must either desist from the enterprise, or finish it successfully, he recommenced in form; attempting to burn the shipping, and even to storm the town itself. They were unsuccessful, however; by reason of the smallness of their number, though they succeeded so far as to burn a number of houses in the suburbs; and the garrison were obliged to pull down the remainder, in order to prevent the fire from spreading.

As the provincials, though unable to reduce the town, kept the garrison in continual alarms, and in a very disagreeable situation, some of the nobility collected themselves into a body, under the command of one Mr. Beaujeu, in order to relieve their capital; but they were met on their march by the provincials, and so entirely defeated, that they were never afterwards able to attempt any thing. The Americans, however, had but little reason to plume themselves on this success. Their want of artillery at last convinced them, that it was impracticable in their situation to reduce a place so strongly fortified; the small-pox at the same time made its appearance in their camp, and carried off great numbers; intimidating the rest to such a degree, that they deserted in crowds. To add to their misfortunes, the British reinforcements unexpectedly appeared, and the ships made their way through the ice with such celerity, that the one part of their army was separated from the other; and general Carleton, sailing out as soon as the reinforcement was landed, obliged them to fly with the utmost precipitation, leaving behind them all their cannon and military stores; at the same time that their shipping was entirely captured by vessels sent up the river for that purpose. General Carleton now gave a signal instance of his humanity: being well apprised that many of the provincials had not been able to accompany the rest in their retreat, and that they were concealed in woods, &c. in a very deplorable situation, he generously issued a proclamation, ordering proper persons to seek them out, and give them relief at the public expence; at the same time, lest, through fear of being made prisoners, they should refuse these offers of humanity, he promised, that, as soon as their situation enabled them, they should be at liberty to depart to their respective homes.

The British general, now freed from any danger of an attack, was soon enabled to act offensively against the provincials, by the arrival of the forces destined for that purpose from Britain. By these, he was put at the head of 12,000 regular troops, among whom were those of Brunswick. With this force he instantly set out to the Three Rivers, where he expected that Arnold would have made a stand; but he had fled to Sorel, a place 150 miles distant from Quebec, where he was at last met by the reinforcements ordered by congress. Here, though the preceding events were by no means calculated to inspire much military ardour, a very daring enterprise was undertaken; and this was, to surprise the British troops posted under generals Frazer and Nesbit; of whom the former commanded those on land, the latter such as were on-board the transports, and were but a little way distant. The enterprise was very hazardous, both on account of the strength of the parties against whom they were to act, and as the main body of the British forces were advanced within fifty miles of the place; besides that, a number of small vessels and transports with troops lay between them and the

Three Rivers. Two thousand chosen men, under general Thomson, engaged in this enterprise. Their success was by no means answerable to their spirit and valour. Though they passed the shipping without being observed, general Frazer had notice of their landing; and, thus being prepared to receive them, they were soon thrown into disorder, at the same time that general Nesbit, having landed his forces, prepared to attack them in the rear. On this occasion some field-pieces did prodigious execution, and a retreat was found to be unavoidable. General Nesbit had got between them and their boats; so that they were obliged to take a circuit through a deep swamp, while they were vigorously pursued by both parties at the same time, who marched for some miles on each side of the swamp, till at last the miserable provincials were sheltered from further danger by a wood at the end of the swamp. General Thomson was taken, with 200 of his men.

By this disaster the provincials lost all hopes of accomplishing any thing in Canada. They demolished their works, and carried off their artillery with the utmost expedition. They were pursued by general Burgoyne; against whom it was expected that they would have collected all their force, and made a resolute stand. But they were for the present too much dispirited by misfortunes to make any further exertions of valour. On the 18th of June the British general arrived at Fort St. John's, which he found abandoned and burnt. Chamblee had shared the same fate, as well as all the vessels that were not capable of being dragged up against the current of the river. It was thought they would have made some resistance at Nut Island, the entrance to Lake Champlain; but this also they had abandoned, and retreated across the lake to Crown Point, whither they could not be immediately followed. Thus was the province of Canada entirely evacuated by the Americans; whose loss in their retreat from Quebec was not calculated at less than 1000 men, of whom 400 fell at once into the hands of the enemy at a place called the Cedars, about fifty miles above Montreal. General Sullivan, however, who conducted this retreat after the affair of general Thomson, was acknowledged to have had great merit in what he did, and received the thanks of the congress accordingly.

This bad success in the north was somewhat compensated by what happened in the southern colonies. We have formerly taken notice that Mr. Martin, governor of North Carolina, had been obliged to leave his province and take refuge on-board of a man of war. Notwithstanding this, he did not despair of reducing it again to obedience. For this purpose he applied to the Regulators, a daring set of banditti, who lived in a kind of independent state; and, though considered by government as rebels, yet had never been molested, on account of their numbers and known skill in the use of fire-arms. To the chiefs of these people commissions were sent, in order to raise some regiments; and colonel Macdonald, a brave and enterprising officer, was appointed to command them. In the month of February he erected the king's standard, issued proclamations, &c. and collected some forces, expecting to be soon joined by a body of regular troops, who were known to be shipped from Great Britain to act against the southern colonies. The Americans, sensible of their danger, dispatched immediately what forces they had to act against the royalists, at the same time that they diligently exerted themselves to support these with suitable reinforcements. Their present force was commanded by general Moore, whose numbers were inferior to Macdonald; for which reason the latter summoned him to join the king's standard, under pain of being treated as a rebel. But Moore, being well provided with cannon, and conscious that nothing could be attempted against him, returned the compliment, by acquainting colonel Macdonald, that if he and his party would lay down their arms, and subscribe an oath of fidelity to congress, they should be treated as friends; but, if they persisted in an undertaking for which it was evident they had not sufficient strength, they could not but expect

the severest treatment. In a few days, general Moore found himself at the head of 8000 men, by reason of the continual supplies which daily arrived from all parts. The royal party amounted only to 2000, and they were destitute of artillery, which prevented them from attacking the enemy while they had the advantage of numbers. They were now, therefore, obliged to have recourse to a desperate exertion of personal valour; by dint of which, they effected a retreat for eighty miles, to Moore's Creek, within sixteen miles of Wilmington. Could they have gained this place, they expected to have been joined by governor Martin and general Clinton, who had lately arrived with a considerable reinforcement. But Moore, with his army, pursued them so close, that they were obliged to attempt the passage of the creek itself, though a considerable body of the enemy, under the command of colonel Coswell, in fortifications well planted with cannon, was posted on the other side. On attempting the creek, it was found not to be fordable. They were obliged, therefore, to cross over a wooden bridge, which the provincials had not time to destroy entirely. They had, however, by pulling up part of the planks, and greasing the remainder in order to render them slippery, made the passage so difficult, that the royalists could not attempt it. In this situation they were, on the 27th of February, attacked by Moore, with his superior army, and totally defeated; with the loss of their general, and most of their leaders, as well as the best and bravest of their men.

Thus was the power of the provincials established in North Carolina. Nor were they less successful in the province of Virginia; where lord Dunmore, having long continued an useless predatory war, was at last driven from every creek and road in the province. The people he had on-board were distressed to the highest degree, by confinement in small vessels. The heat of the season, and the numbers crowded together, produced a pestilential fever, which made a great havoc, especially among the blacks. At last, finding themselves in the utmost hazard of perishing by famine as well as disease, they set fire to the least valuable of their vessels, reserving only about fifty for themselves, in which they bade adieu to Virginia, some sailing to Florida, some to Bermuda, and the rest to the West Indies.

In South Carolina, the provincials had a more formidable enemy to deal with. A squadron, whose object was the reduction of Charlestown, had been fitted out in December, 1775; but, by reason of unfavourable weather, did not reach Cape Fear, in North Carolina, till the month of May, 1776; and here it met with further obstacles till the end of the month. Thus the Americans, always noted for their alertness in raising fortifications, had time to strengthen those of Charlestown in such a manner as rendered it extremely difficult to be attacked. The British squadron consisted of two 50-gun ships, four of 30 guns, two of 20, an armed schooner, and bomb-ketch, under the command of Sir Peter Parker. The land-forces were commanded by lord Cornwallis, with generals Clinton and Vaughan. As they had yet no intelligence of the evacuation of Boston, general Howe dispatched a vessel to Cape Fear with some instructions; but it was too late; and, in the beginning of June, the squadron anchored off Charlestown-bar. Here they met with some difficulty in crossing, being obliged to take out the guns from the two large ships, which were, notwithstanding, several times in danger of sticking fast. The next obstacle was a strong fort on Sullivan's island, six miles east from Charlestown; which, though not completely finished, was very strong. The British generals resolved, without hesitation, to attack it; but, though an attack was easy from the sea, it was very difficult to obtain a co-operation with the land-forces. This was attempted, by landing them on Long Island, adjacent to Sullivan's Island on the east, from which it is separated by a very narrow creek, said not to be above two feet deep at low water. Opposite to this ford, the provincials had posted a strong body of troops,

with cannon and intrenchments; while general Lee was posted on the main land, with a bridge of boats betwixt that and Sullivan's Island, so that he could at pleasure send reinforcements to the troops in the fort on Sullivan's Island. On the part of the British, so many delays occurred, that it was the 28th of June before they were in readiness to make an attack; and, by this time, the provincials had abundantly provided for their reception. On the morning of that day, the bomb-ketch began to throw shells into fort Sullivan; and, about mid-day, the two 50-gun ships and 30-gun frigates came up and began a severe fire. Three other frigates were ordered to take their station between Charlestown and the fort, in order to enfilade the batteries, and cut off the communication with the main land; but, through the ignorance of the pilots, they all stuck fast; and, though two of them were disentangled, they were found to be totally unfit for service: the third was burnt, that she might not fall into the hands of the enemy. The attack was therefore confined to the five armed ships and bomb-ketch, between whom and the fort a dreadful fire ensued. The Bristol suffered excessively. The springs on her cable being shot away, she was entirely exposed to the enemy's fire. As the enemy poured in great quantities of red-hot balls, she was twice in flames. The captain, (Mr. Morris,) after receiving five wounds, was obliged to go below, in order to have his arm amputated. After undergoing this operation, he bravely returned to his place, where he received another wound, but still refused to quit his station; at last he received a red-hot ball in his belly, which instantly put an end to his life. Of all the officers and seamen who stood on the quarter-deck of this vessel, not one escaped without a wound, excepting Sir Peter Parker alone; whose intrepidity and presence of mind on this occasion was very remarkable. The engagement lasted till darkness put an end to it. Little damage was done by the British, as the works of the enemy lay so low, that most of the shot flew over; and the fortifications, being composed of palm-trees mixed with earth, were extremely well calculated to resist the impression of cannon. During the height of the attack, the provincial batteries remained for some time silent, so that it was concluded that they had been abandoned; but this was found to proceed only from want of powder; for, as soon as a supply of this article was obtained, the firing was resumed as briskly as ever. During the whole of this desperate engagement, it was impossible for the land-forces to give the least assistance to the fleet. The enemy's works were found to be much stronger than they had been imagined, and the depth of water effectually prevented them from making any attempt. In this unsuccessful attack, the killed and wounded, on the part of the British, amounted to about 200. The Bristol and Experiment were so much damaged, that it was thought they could not have been got over the bar; however, this was at last accomplished, by a very great exertion of naval skill, to the surprise of the provincials, who had expected to make them both prizes. On the American side the loss was very considerable; as most of their guns were dismounted; and reinforcements had poured into the fort during the whole time of the action.

This year also, the Americans, having so frequently made trial of their valour by land, became desirous of trying it by sea, and of forming a navy that might in some measure be able to protect their trade, and do essential hurt to the enemy. In the beginning of March, commodore Hopkins was dispatched with five frigates to the Bahama Islands, where he made himself master of the ordnance and military stores; but the gunpowder, which had been the principal object, was removed. On his return he captured several vessels; but was foiled in his attempt on the Glasgow frigate, which found means to escape, notwithstanding the efforts of his whole squadron.

The time was now come, when the fortitude and patience of the Americans were to undergo a severe trial. Hitherto they had been, on the whole, successful in their operations.

operations: but now they were doomed to experience misfortune, misery, and disgrace; the enemy over-running their country, and their own armies not able to face them in the field. The province of New York, as being the most central colony, and most accessible by sea, was pitched upon for the object of the main attack. The force sent against it consisted of six ships of the line, thirty frigates, besides other armed vessels, and a vast number of transports. The fleet was commanded by lord Howe, and the land-forces by his brother, general Howe, who was now at Halifax. The latter, however, a considerable time before his brother arrived, had set sail from Halifax, and lay before New York, but without attempting to commence hostilities until he should be joined by his brother. The Americans had fortified New York, and the adjacent islands, in an extraordinary manner. General Howe landed his troops on Staten Island, where he was soon joined by a number of the inhabitants. About the middle of July, lord Howe arrived with the grand armament; and, being one of the commissioners appointed to receive the submission of the colonists, he published a circular letter to this purpose, to the several governors who had lately been expelled from their provinces, desiring them to make the extent of his commission, and the powers he was invested with by parliament, as public as possible. Here, however, congress saved him trouble, by ordering his letter and declaration to be published in all the newspapers, that every one, as they said, might see the insidiousness of the British ministry, and that they had nothing to trust to besides the exertion of their own valour.

Lord Howe next sent a letter to general Washington; but, as it was directed "To George Washington, Esq." the general refused to receive it, as not being directed in the style suitable to his station. To obviate this objection, adjutant-general Paterson was sent with another letter, directed "To George Washington, &c. &c." But, though a very polite reception was given to the bearer, general Washington utterly refused the letter; nor could any explanation of the adjutant induce him to open it. The only interesting part of the conversation, of which lord Howe was one. The adjutant told him, that these powers were very extensive; that the commissioners were determined to exert themselves to the utmost, in order to bring about a reconciliation; and that he hoped the general would consider this visit as a step towards it. General Washington replied, that it did not appear that these powers consisted in any thing else than granting pardons; and, as America had committed no offence, she asked no forgiveness, and was only defending her unquestionable rights.

The decision of every thing being now by consent of both parties left to the sword, no time was lost, but hostilities commenced as soon as the British troops could be collected. This, however, was not done before the month of August; when they landed on Long Island, opposite to the shore of Staten Island. General Putnam, with a large body of troops, lay encamped and strongly fortified on a peninsula on the opposite shore, with a range of hills between the armies, the principal pass of which was near a place called *Flat-bush*. Here the centre of the British army, consisting of Hessians, took post; the left wing, under general Grant, lying near the shore; and the right, consisting of the greater part of the British forces, lay under lords Percy, Cornwallis, and general Clinton. Putnam had ordered the passes to be secured by large detachments, which was executed as to those at hand; but one of the greatest importance, which lay at a distance, was entirely neglected. This gave an opportunity to a large body of troops under lord Percy and Clinton to pass the mountains and attack the Americans in the rear, while they were engaged with the Hessians in front. Through this piece of negligence their defeat became inevitable. Those who were engaged with the Hessians first perceived their mistake, and began a retreat towards their camp; but the passage was intercepted by the British troops, who

drove them back into the woods. Here they were met by the Hessians; and thus were they for many hours slaughtered between two fires, no way of escape remaining but by breaking through the British troops, and thus regaining their camp. In this attempt many perished; and the right wing, engaged with general Grant, shared the same fate. The victory was complete; and the Americans lost on this fatal day (August 27th) between three and four thousand men, of whom 2000 were killed in the battle. Among these a regiment, consisting of young gentlemen of fortune and family in Maryland, was almost entirely cut in pieces, and of the survivors not one escaped without a wound. The ardour of the British troops was so great, that they could scarcely be restrained from attacking the lines of the provincials; but for this there was now no occasion, as it was certain they could not be defended. Of the British only sixty-one were killed in this engagement, and 257 wounded. Eleven hundred of the enemy, among whom were three generals, were taken prisoners. As none of the American commanders thought it proper to risk another attack, it was resolved to abandon their camp as soon as possible. Accordingly, on the night of the 29th of August, the whole of the continental troops were ferried over with the utmost secrecy and silence; so that in the morning the British had nothing to do but take possession of the camp and artillery which they had abandoned.

This victory, though complete, was very far from being so decisive as the conquerors imagined. Lord Howe, supposing that it would be sufficient to intimidate the congress into some terms, sent general Sullivan, who had been taken prisoner in the late action, to congress, with a message, importing, that though he could not consistently treat with them as a legal assembly, yet he would be very glad to confer with any of the members in their private capacity; setting forth at the same time the nature and extent of his powers as commissioner. But the congress was not as yet sufficiently humbled to derogate in the least from the dignity of character they had assumed. They replied, that the congress of the free and independent states of America could not consistently send any of its members in another capacity than that which they had publicly assumed; but, as they were extremely desirous of restoring peace to their country upon equitable conditions, they would appoint a committee of their body to wait upon him, and learn what proposals he had to make.

This produced a new conference. The committee appointed by congress was composed of Dr. Franklin, Mr. Adams, and Mr. Rutledge. They were very politely received by his lordship; but the conference proved as fruitless as before independency had been declared, and the final answer of the deputies was, that they were extremely willing to enter into any treaty with Great Britain that conduce to the good of both nations, but that they would not treat in any other character than that of independent states. This positive declaration instantly put an end to all hopes of reconciliation; and it was resolved to prosecute the war with the utmost vigour. Lord Howe, after publishing a manifesto, in which he declared the refusal of congress, and that he himself was willing to confer with all well-disposed persons about the means of restoring public tranquillity, set about the most proper methods for reducing the city of New York. Here the provincial troops were posted, and from a great number of batteries kept continually annoying the British shipping. The East River lay between them, of about 1200 yards in breadth, which the British troops were extremely desirous of passing. At last the ships having, after an incessant cannonade of several days, silenced the most troublesome batteries, a body of troops was sent up the river to a bay, about three miles distant, where the fortifications were less strong than in other places. Here having driven off the provincials by the cannon of the fleet, they marched directly towards the city; but the enemy, finding that they should now be attacked on all sides, abandoned the city, and retired to the

north of the island, where their principal force was collected. In their passage thither they skirmished with the British, but carefully avoided a general engagement; and it was observed that they did not behave with that ardour and impetuous valour which had hitherto marked their character.

The British and provincial armies were not now above two miles distant from each other: the former lay encamped from shore to shore for an extent of two miles, being the breadth of the island, which though fifteen miles long, exceeds not two in any part in breadth. The provincials, who lay directly opposite, had strengthened their camp with many fortifications; at the same time, being masters of all the passes and defiles between the two camps, they were enabled to defend themselves against an army much more numerous than their own; and they had also strongly fortified a pass called *King's Bridge*, whence they could secure a passage to the continent in case of any misfortune. Here general Washington, in order to inure the provincials to actual service, and at the same time to annoy the enemy as much as possible, employed his troops in continual skirmishes; by which it was observed that they soon recovered their spirits, and behaved with their usual boldness.

As the situation of the two armies was now highly inconvenient for the British generals, it was resolved to make such movements as might oblige general Washington to relinquish his strong situation. The possession of New York had been less beneficial than was expected. It had been concerted among the provincials, that the city should be burnt at the time of evacuation; but, as they were forced to depart with precipitation, they were prevented from putting the scheme in execution. In a few days, however, it was attempted by some who had been left behind for that purpose. Taking advantage of a high wind and dry weather, the town was set on fire in several places at once, by means of combustibles placed for that purpose; and, notwithstanding the most active exertions of the soldiery and sailors, a fourth part of the city was consumed.

On this occasion the British were irritated to the highest degree; and many persons, said to be incendiaries, were without mercy thrown into the flames. It was determined to force the provincial army to a greater distance, that they might have it less in their power, by any emissaries, to engage others in a similar attempt. For this purpose, general Howe having left lord Percy with sufficient force to garrison New York, he embarked his army in flat-bottom boats, by which they were conveyed through the dangerous passage called *Hull Gate*, and landed near the town of West Chester, lying on the continent towards Connecticut. Here having received a supply of men and provisions, they moved to New Rochelle, situated on the sound which separates Long Island from the continent. After this, receiving still fresh reinforcements, they made such movements as threatened to distress the provincials very much, by cutting off their convoys of provisions from Connecticut, and thus force them to an engagement. This, general Washington determined at all events to avoid. He therefore extended his forces into a long line opposite to the way in which the enemy marched, keeping the *Bruna*, a river of considerable magnitude, between the two armies, with the North River on his rear. Here again the provincials continued for some time to annoy and skirmish with the Royal army, until at last, by some other manoeuvres, the British general found means to attack them advantageously at a place called the *White Plains*, and drove them from some of their posts. The victory on this occasion was much less complete than the former; however, it obliged the provincials once more to shift their ground, and to retreat further up the country. General Howe pursued for some time; but, at last, finding all his endeavours vain to bring the Americans to a pitched battle, he determined to give over such an useless chase, and employ himself in reducing the forts which the provincials still retained in the neighbourhood of New York. In this he

met with the most complete success. The Americans, on the approach of the king's forces, retreated from King's Bridge into Fort Mifflin; and this, as well as Fort Mifflin, which lay in the neighbourhood, was quickly reduced, though the garrison made their escape. Thus the Jerseys were laid entirely open to the incursions of the British troops; and so fully were these provinces taken possession of by the royal army, that its winter quarters extended from New Brunswick to the river Delaware. Had any number of boats been at hand, it is probable that Philadelphia would now have fallen into their hands. All these, however, had been carefully removed by the Americans. In lieu of this enterprise, Sir Henry Clinton undertook an expedition to Rhode Island, and became master of it without losing a man. His expedition was also attended with this further advantage, that the American fleet under commodore Hopkins was obliged to sail as far as possible up the river Providence, and thus remained entirely useless.

The same ill success attended the Americans in other parts. After their expulsion from Canada, they had crossed the lake-Champlain, and taken up their quarters at Crown Point, as already mentioned. Here they remained for some time in safety, as the British had no vessels on the lake, and consequently general Burgoyne could not pursue them. To remedy this deficiency, there was no possible method, but either to construct vessels on the spot, or take to pieces some vessels already constructed, and drag them up the river into the lake. This was effected in no longer a space than three months; and the British general, after incredible toil and difficulty, saw himself in possession of a great number of vessels, by which means he was enabled to pursue his enemies, and attack them in his turn. The labour undergone at this time by the sea and land forces, must indeed have been prodigious; since there were conveyed over land, and dragged up the rapids of St. Lawrence, no fewer than 30 large long-boats, 400 bateaux, besides a vast number of flat-bottomed boats, and a gondola of thirty tons. The intent of the expedition was to push forward before winter to Albany, where the army would take up its winter quarters, and next spring effect a junction with that under general Howe, when it was supposed that the united force and skill of these two commanders would speedily put a termination to the war.

By reason of the difficulties with which the equipment of this fleet had been attended, it was the beginning of October before the expedition could be undertaken. It was now, however, by every judge, allowed to be completely able to answer the purpose for which it was intended. It consisted of one large vessel with three masts, carrying 18 twelve-pounders; two schooners, the one carrying 14, the other 12, six-pounders; a large flat-bottomed radeau with 6 twenty-four and 6 twelve pounders; and a gondola with 8 nine-pounders. Besides these were twenty vessels of a smaller size, called *gun-boats*, carrying each a piece of brass ordnance from nine to twenty-four pounders, or howitzers. Several long-boats were fitted out in the same manner; and, besides all these, there was a vast number of boats and tenders of various sizes, to be used as transports for the troops and baggage. It was manned by a number of select seamen, and the guns were to be served by a detachment from the corps of artillery; the officers and soldiers for this expedition were also chosen out of the whole army.

To oppose this formidable armament the Americans had only an inconsiderable force, commanded by general Arnold, who, after engaging part of the British fleet for a whole day, took advantage of the darkness of the night to set sail without being perceived, and next morning was out of sight; but he was so closely pursued by the British, that on the second day after he was overtaken, and forced to a second engagement. In this he behaved with great gallantry; but, his force being very inferior to that of the enemy, he was obliged to run his ships ashore and set them on fire; but a few escaped to Lake George. The garrison of Crown Point, having destroyed or carried off every thing of value, retired to Ticonderoga.

Thus,

Thus the affairs of the Americans seemed every where going to wreck: even those who had been most sanguine in their cause began to waver. The time, also, for which the soldiers had enlisted themselves, was now expired; and the bad success of the preceding campaign had been so very discouraging, that no person was willing to engage himself during the continuance of a war, of which the event seemed to be so doubtful. In consequence of this, general Washington found his army daily decreasing in strength; so that from 30,000, of whom it consisted when general Howe landed on Staten Island, scarcely a tenth part could now be mustered. To assist the chief commander as much as possible, general Lee had collected a body of forces in the north; but on his way southward, having imprudently taken up his lodging at some distance from his troops, information was given to colonel Harcourt, who happened at that time to be in the neighbourhood, and Lee was made prisoner. The loss of this general was much regretted, the more especially as he was of superior quality to any prisoner in the possession of the colonists. Six field-officers were offered in exchange for him, but refused; and the congress was highly irritated at its being reported that he was to be treated as a deserter, having been a half-pay officer in the British service at the commencement of the war. In consequence of this they issued a proclamation, threatening to retaliate on the prisoners in their possession whatever punishment should be inflicted on any of those taken by the British; and especially, that their conduct should be regulated by the treatment of general Lee.

In the mean time, they proceeded with the most indefatigable diligence to recruit their army, and bound their soldiers to serve for a term of three years, or during the continuance of the war. The army designed for the ensuing campaign, was to consist of eighty-eight battalions; of which, each province was to contribute its quota; and twenty dollars were offered as a bounty to each soldier, besides an allotment of lands at the end of the war. In this allotment it was stipulated, that each soldier should have 100 acres; an ensign, 150; a lieutenant, 200; a captain, 300; a major, 400; a lieutenant-colonel, 450; and a colonel, 500. No lands were promised to those who enlisted only for three years. All officers or soldiers disabled through wounds received in the service, were to enjoy half-pay during life. To defray the expence, congress borrowed five millions of dollars at five per cent. for payment of which the United States became surety. At the same time, in order to animate the people to vigorous exertions, a declaration was published, in which they set forth the necessity there was for taking proper methods to ensure success in their cause: they endeavoured to palliate, as much as possible, the misfortunes which had already happened; and represented the true cause of the present distress to be the short term of enlistment.

This declaration, together with the imminent danger of Philadelphia, determined the Americans to exert themselves to the utmost, in order to reinforce general Washington's army; and they soon received farther encouragement, by an exploit of that general against the Hessians. As the royal army extended in different cantonments for a considerable length, general Washington, perceiving the imminent danger to which Philadelphia was exposed, resolved to make some attempt on those divisions of the enemy which lay nearest that city. These happened to be the Hessians, who lay in three divisions. On the 25th of December, he set out with an intent to surprise that body of the enemy which lay at Trenton. His army was divided into three battalions, one of which he ordered to cross the Delaware at Trenton Ferry, a little below the town; the second at a distance below, at a place called Borden-town, where the second division of Hessians was placed; while he himself with the third, directing his course to a ferry some miles above Trenton, intended to have passed it at midnight, and attack the Hessians at break of day. But, by reason of various impediments, it was eight in the

morning before he could reach the place of his destination. The enemy did not perceive his approach till they were suddenly attacked. Colonel Ralle, who commanded them, did all that could be expected from a brave and experienced officer; but every thing was in such confusion, that no efforts of valour or skill could now avail them. The colonel himself was mortally wounded, his troops were entirely broken, their artillery seized, and about 1000 taken prisoners.

This action, though seemingly of no very decisive nature, was sufficient, at that time, to turn the fortune of war in favour of America. It tended greatly to lessen the fear which the provincials had of the Hessians, at the same time that it equally abated the confidence which the British had till now put in them. Reinforcements came in to general Washington's army from all quarters; so that he was soon in a condition to leave Philadelphia, and take up his quarters at Trenton. Emboldened by his success, he determined to make an attempt on a division of the British forces stationed at Maidenhead, a town situated half-way between Trenton and Prince-town. This consisted of three regiments, under the command of colonel Mawhood, an officer of great merit. The troops were surprised on their march; but, though they were separately surrounded and attacked by a force vastly superior, they charged the enemy so resolutely with their bayonets, that they effected a retreat. These attempts of the Americans, however, with the hostile disposition of the people, shewed the impossibility of maintaining posts so far advanced in the enemy's country; so that it was resolved to retreat towards Brunswick, in order to prevent it, with the troops and magazines it contained, from falling into the hands of the provincials. General Washington omitted no opportunity of recovering what had been lost; and, by dividing his army into small parties, which could be reunited on a few hours warning, he in a manner entirely covered the face of the country, and repossessed himself of all the important places.

Thus ended the campaign of 1776, with scarce any real advantage other than the acquisition of the city of New York, and of a few fortresses in its neighbourhood; where the troops were constrained to act with as much circumspection as if they had been besieged by a victorious army, instead of being themselves the conquerors.

The army at New York began, in 1777, to exercise a kind of predatory war, by sending out parties to destroy magazines, make incursions, and take or destroy such forts as lay on the banks of rivers, to which their great command of shipping gave them access. In this they were generally successful; the provincial magazines at Peek's Hill, a place about fifty miles distant from New York, were destroyed, the town of Dunbury, in Connecticut, burnt, and that of Ridgefield, in the same province, was taken possession of. In returning from the last expedition, the British were greatly harried by the enemy under generals Arnold, Wooster, and Sullivan; but they made good their retreat in spite of all opposition, with the loss of only 170 killed and wounded. On the American side the loss was much greater, general Wooster was killed, and Arnold in the most imminent danger. On the other hand, the Americans destroyed the stores at Sag Harbor, in Long Island, and made prisoners of all who defended the place. As this method of making war could answer but little purpose, and favoured more of the barbarous incursions of savages than of a war carried on by a civilized people, it was resolved to make an attempt on Philadelphia. At first it was thought that this could be done through the Jerseys; but general Washington had received such large reinforcements, and posted himself so strongly, that it was found to be impracticable. Many stratagems were used to draw him from this strong situation, but without success; so that it was found necessary to make the attempt on Philadelphia by sea. While the preparations for this expedition were going forward, the Americans found means to make amends for the capture of general Lee by that of general

general Prescott, who was seized in his quarters with his *aid-de-camp*, in much the same manner as general Lee had been. This was exceedingly mortifying to the general himself, as he had not long before set a price upon general Arnold, by offering a sum of money to any one that apprehended him; which the latter answered, by setting a lower price upon general Prescott.

The month of July was far advanced before the preparations for the expedition against Philadelphia were completed; and it was the 23^d before the fleet was able to sail from Sandy Hook. The force employed in this expedition consisted of thirty-six battalions of British and Hessians, a regiment of light horse, and a body of loyalists raised at New York. The remainder of these, with seventeen battalions, and another body of light horse, were stationed at New York, under Sir Henry Clinton. Seven battalions were stationed at Rhode Island. After a week's sailing, they arrived at the mouth of the Delaware; when they received certain intelligence, that the navigation of the river was so effectually obstructed, that no possibility of forcing a passage remained. Upon this, it was resolved to proceed farther southward, to Chesapeake Bay, in Maryland, from whence the distance to Philadelphia was not very great, and where the provincial army would find less advantage, from the nature of the country, than in the Jerseys. On the news of their arrival in Chesapeake, general Washington left the Jerseys, and hastened to the relief of Philadelphia; and, in the beginning of September, met the royal army at Brandy-wine Creek, about mid-day, between the head of the Elk and Philadelphia. Here he adhered to his former method of skirmishing and harassing the royal army on its march; but, as this proved insufficient to stop its progress, he retired to that side of the creek next to Philadelphia, with an intent to dispute the passage. This brought on a general engagement, on the 11th of September, in which the Americans were defeated; and it was only through the approach of night that they were saved from being entirely destroyed. On this occasion, the provincials lost about 1000 in killed and wounded, besides 400 taken prisoners.

The loss of this battle proved also the loss of Philadelphia. General Washington retired towards Lancaster, an inland town at a considerable distance. Here the British general took such measures as must have forced the provincials to a second engagement, but a violent rain, which lasted a day and a night, prevented his design. General Washington, though he could not prevent the loss of Philadelphia, still adhered to his original plan of distressing the royal party, by laying ambushes, and cutting off detached parties: but in this he was less successful than formerly; and one of his own detachments, which lay in ambush in a wood, were themselves surprised and entirely defeated, with the loss of 300 killed and wounded, besides a great number taken, and all their arms and baggage.

General Howe, now perceiving that the Americans would not risk another battle, even for the sake of their capital, took peaceable possession of it on the 26th of September. His first care was then to cut off, by means of strong batteries, the communication between the upper and lower parts of the river: which was executed, notwithstanding the opposition of some American armed vessels; one of which, carrying 36 guns, was taken. His next task was to open a communication with it by sea; and this was a work of no small difficulty. A vast number of batteries and forts had been erected, and immense machines, formed like *chevaux de frize*, from whence they took their name, sunk in the river to prevent its navigation. As the fleet was sent round to the mouth of the river, in order to co-operate with the army, this work, however difficult, was accomplished; nor did the provincials give much opposition, well knowing that all places of this kind were now untenable. General Washington, however, took the advantage of the royal army being divided, to attack the camp of the principal division of it, that lay at German-town, in the neighbourhood of Phila-

delphia. In this he met with very little success; for, though he reached the place of destination by three o'clock in the morning, the patrols had time to call the troops to arms. The Americans made a very resolute attack; but they were received with such bravery, that they were compelled to abandon the attempt, and retreat in great disorder; with the advantage, however, of carrying off their cannon, though pursued for a considerable way, after having 300 killed, 600 wounded, and upwards of 400 taken prisoners, among whom were fifty-four officers. On the British side, the loss amounted to 430 wounded and prisoners, and 70 killed; among which were general Agnew and colonel Bird, with some other excellent officers.

There still remained two strong forts on the Delaware to be reduced. These were Mud Island and Red Bank. The various obstructions which the Americans had thrown in the way rendered it necessary to bring up the *Augusta*, a ship of the line, and the *Merlin* frigate, to the attack of Mud Island; but, during the heat of the action, both were grounded. Upon this, the Americans sent down four fire-ships, and directed the whole fire from their galleys against them. The former were rendered ineffectual by the courage and skill of the British seamen; but, during the engagement, both the *Augusta* and *Merlin* took fire, and were burnt to ashes, and the other ships obliged to withdraw. The enemy, encouraged by this unsuccessful attempt, proceeded to throw new obstructions in the way; but the British general having found means to convey a number of cannon, and to erect batteries within a gun-shot of the fort, by land, and bringing up three ships of the line which mounted heavy cannon, the garrison, after making a vigorous defence for one day, perceiving that preparations were making for a general assault on the next, abandoned the place in the night. Those who defended Red Bank followed their example, and abandoned it on the approach of lord Cornwallis. A great number of the American shipping, finding themselves entirely destitute of any protection, sailed up the river in the night-time. Seventeen remained, whose retreat was intercepted by a frigate and some armed vessels; on which the Americans ran them ashore and burnt them, to prevent their falling into the enemy's hands.

Thus the campaign of 1777, in Pennsylvania, concluded successfully on the part of the British. In the north, however, matters wore a different aspect. The expedition in that quarter had been projected by the British ministry, as the most effectual method that could be taken to crush the colonies at once. The four provinces of New England had originally begun the confederacy against Britain, and they were still considered as the most active in the continuation of it; and it was thought, that any impression made upon them would contribute in an effectual manner to the reduction of the rest. For this purpose, an army of 4000 chosen British troops, and 3000 Germans, were put under the command of general Burgoyne: general Carleton was directed to use his interest with the Indians to persuade them to assist in this expedition; and the province of Quebec was to furnish large parties to join in the same. The officers who commanded under general Burgoyne were, general Philips of the artillery, generals Fraser, Powell, and Hamilton; with the German officers, generals Reidesel and Specht. To aid the principal expedition, another was projected on the Mohawk river, under colonel St. Leger, who was to be assisted by Sir John Johnson, son to the famous Sir William Johnson, who had so greatly distinguished himself in the war of 1755.

On the 21st of June, 1777, the army encamped on the western side of the Lake Champlain; where, being joined by a considerable body of Indians, general Burgoyne made a speech, in which he exhorted these new allies to lay aside their ferocious and barbarous manner of making war; to kill only such as opposed them in arms; and to spare prisoners, with such women and children as should fall into their hands. After issuing a proclamation, in which the force of Britain, and that which he commanded, was set forth

forth in very ostentatious terms, the campaign opened with the siege of Ticonderoga. The place was very strong, and garrisoned by 6000 men, under general Sinclair; nevertheless, the works were so extensive, that even this number was scarce sufficient to defend them. They had, therefore, omitted to fortify a rugged eminence, called Sugar Hill, the top of which overlooked and effectually commanded the whole works; vainly imagining, that the difficulty of the ascent would be sufficient to prevent the enemy from taking possession of it. On the approach of the first division of the army, the provincials abandoned and set fire to their outworks; and so expeditious were the British troops, that by the 5th of July every post was secured which was judged necessary for investing it completely. A road was soon after made to the very summit of that eminence, which the Americans had with such confidence supposed could not be ascended; and so much were they now disheartened, that they instantly abandoned the fort entirely, taking the road to Skenesborough, a place to the south of Lake George; while their baggage, with what artillery and military stores they could carry off, were sent to the same place by water. But the British generals were determined not to let them pass so easily. Both were pursued, and both overtaken. Their armed vessels consisted only of five galleys; two of which were taken, and three blown up; on which they set fire to their boats and fortifications at Skenesborough. On this occasion, the provincials lost 200 boats, 130 pieces of cannon, with all their provisions and baggage. Their land-forces under colonel Francis made a brave defence against general Frazer: and, being greatly superior in number, had almost overpowered him, when general Reidefel, with a large body of Germans, came to his assistance. The enemy were now overpowered in their turn; and, their commander being killed, they fled on all sides with great precipitation. In this action 200 Americans were killed, as many taken prisoners, and above 600 wounded, many of whom perished in the woods for want of assistance.

During the engagement, general Sinclair was at Castleton, about six miles from the place; but, instead of going forward to Fort Anne, the next place of strength, he repaired to the woods which lie between that fortress and New England. General Burgoyne detached colonel Hill, with the ninth regiment, to intercept such as should attempt to retreat towards Fort Anne. On his way he met with a body of the enemy, said to be six times as numerous as his own; who, after an engagement of three hours, were obliged to retire with great loss. After so many disasters, despairing of being able to make any stand at Fort Anne, they set fire to it, and retired to Fort Edward. In all these engagements, the loss of killed and wounded in the royal army did not exceed two hundred men.

General Burgoyne was now obliged to suspend his operations for some time, and wait at Skenesborough for the arrival of his tents, provisions, &c. He therefore employed this interval in making roads through the country about St. Anne, and in clearing a passage for his troops to proceed against the enemy. This was attended with incredible toil; but all obstacles were surmounted with equal patience and resolution by the army. In short, after undergoing the utmost difficulties that could be undergone, and making every exertion that man could make, he arrived with his army before Fort Edward about the end of July. Here general Schuyler had been for some time endeavouring to recruit the shattered American forces, and had been joined by general Sinclair with the remains of his army; the garrison of Fort George also, situated on the lake of that name, had evacuated the place, and retired to Fort Edward. However, on the approach of the royal army, they retired thence also, and formed their head-quarters at Saratoga. Notwithstanding the great successes of the British general, the Americans shewed not the least disposition to submit, but seemed only to consider how they might make the most effectual resistance. For this purpose, the militia were every where raised and draughted to join the

army at Saratoga; and such numbers of volunteers were daily added, that they soon began to recover from the terror into which they had been thrown. That they might have a commander whose abilities could be relied on, general Arnold was appointed, who repaired to Saratoga with a considerable train of artillery; but, receiving intelligence that colonel St. Leger was proceeding with great rapidity in his expedition on the Mohawk River, he removed to Stillwater, a place about half-way between Saratoga and the junction of the Mohawk and Hudson's River. The colonel, in the mean time, had advanced as far as Fort Stanwix; the siege of which he pressed with great vigour. On the 6th of August, understanding that a supply of provisions, escorted by eight or nine hundred men, was on the way to the fort, he dispatched Sir John Johnson with a strong detachment to intercept it. This he did so effectually, that, besides intercepting the provisions, 400 of its guard were slain, 200 taken, and the rest escaped with great difficulty. The garrison, however, were not to be intimidated by this disaster, nor by the threats or representations of St. Leger: on the contrary, they made several successful sallies, under colonel Willet, the second in command; and this gentleman, in company with another, even ventured out of the fort; and, eluding the vigilance of the enemy, passed through them, in order to hasten the march of general Arnold to their assistance.

Thus the affairs of colonel St. Leger seemed to be in no very favourable situation, notwithstanding his late success, and they were soon totally ruined by the desertion of the Indians. They had been alarmed by the report of general Arnold's advancing with 2000 men to the relief of the fort; and, while the colonel was attempting to give them encouragement, another report was spread, that general Burgoyne had been defeated with great slaughter, and was now flying before the provincials. On this, he was obliged to retreat, with the loss of the tents, and some of the artillery and military stores.

General Burgoyne, in the mean time, notwithstanding the difficulties he had already sustained, found that he must still encounter more. The roads he had made with so much labour and pains, were destroyed, either by the wetness of the season, or by the enemy; so that the provisions he brought from Fort George could not arrive at his camp without prodigious toil. On hearing of the siege of Fort Stanwix by colonel St. Leger, he determined to move forward, in hopes of inclosing the enemy betwixt his own army and that of St. Leger, or of obtaining the command of all the country between Fort Stanwix and Albany; or, at any rate, a junction with colonel St. Leger would be effected, which could not but be attended with the most happy consequences. The only difficulty was, the want of provisions; and this it was proposed to remedy by reducing the provincial magazines at Bennington. For this purpose, colonel Baume, a German officer of great bravery, was chosen, with a body of 500 men. The place was about twenty miles from Hudson's River; and, to support colonel Baume's party, the whole army marched up the river's bank, and encamped almost opposite to Saratoga, with the river betwixt it and that place. An advanced party was posted at Batten Kill, between the camp and Bennington, in order to support colonel Baume. In their way, the British seized a large supply of cattle and provisions, which were immediately sent to the camp; but the badness of the roads retarded their march so much, that intelligence of their design was sent to Bennington. Understanding now that the American force was greatly superior to his own, the colonel acquainted the general, who immediately dispatched colonel Breyman with a party to his assistance; but, through the same causes that had retarded the march of colonel Baume, this assistance came too late. General Starke, in the mean time, who commanded at Bennington, determined to attack the two parties separately; and, for this purpose, advanced against colonel Baume, whom he surrounded on all sides, and attacked with the utmost violence. The troops defended themselves

themselves with great valour, but were to a man either killed or taken. Colonel Breyman, after a desperate engagement, had the good luck to effect a retreat through the darkness of the night, which otherwise he could not have done, as his men had expended all their ammunition.

General Burgoyne, disappointed in his attempt on Bennington, applied himself with indefatigable diligence to procure provisions from Fort George; and, having amassed a sufficient quantity to last for a month, he threw a bridge of boats over the river Hudson, which he crossed about the middle of September, encamping on the hills and plains near Saratoga. As soon as he approached the provincial army, encamped at Stillwater under general Gates, he determined to make an attack; for which purpose he put himself at the head of the central division of his army, having general Frazer and colonel Breyman on the right, with generals Reidesel and Philips on the left. In this position he advanced towards the enemy on the 19th of September. But the Americans did not now wait to be attacked: on the contrary, they attacked the central division with the greatest ardour; and it was not until general Philips with the artillery came up, that they could be repulsed. On this occasion, though the British troops lost only 330 in killed and wounded, and the enemy no less than 1500, the former were very much alarmed at the obstinate resolution shewn by the Americans. This did not, however, prevent the British from advancing towards the enemy, and posting themselves the next day within cannon-shot of their lines. But their allies the Indians began to desert in great numbers; and at the same time the general was in the highest degree mortified by having no intelligence of any assistance from Sir Henry Clinton, as had been stipulated. He now received a letter from him, by which he was informed that Sir Henry intended to make a diversion on the North River in his favour. This afforded but little comfort: however, he returned an answer by several trusty persons whom he dispatched different ways, stating his present distressed situation, and mentioning that the provisions and other necessities he had would only enable him to hold out till the 12th of October.

In the mean time the Americans, in order to cut off the retreat of the British army, undertook an expedition against Ticonderoga; but were obliged to abandon the enterprise after having surprised all the out-posts, and taken a great number of boats with some armed vessels, and a number of prisoners. The army under general Burgoyne now laboured under the greatest distresses; so that in the beginning of October he was obliged to diminish the soldiers' allowance. On the 7th of that month he determined to move towards the enemy. For this purpose he sent a body of 1500 men to reconnoitre their left wing; intending, if possible, to break through it in order to effect a retreat. This detachment had not proceeded far, when a dreadful attack was made upon the left wing of the British army, which was with great difficulty preserved by a reinforcement brought up by general Frazer, who was killed in the action. After the troops had with great difficulty regained their camp, it was furiously assaulted by general Arnold; who, notwithstanding all opposition, would have forced the entrenchments, had he not received a dangerous wound, which obliged him to retire. Thus the attack failed on the left, but on the right the camp of the German reserve was forced, colonel Breyman killed, and his countrymen defeated, with the loss of all their artillery and baggage.

This was by far the heaviest loss the British army had sustained since the action at Bunker's Hill. The list of killed and wounded amounted to near 1200, exclusive of the Germans; but the greatest misfortune was, that the enemy had now an opening on the right and rear of the British forces, so that the army was threatened with entire destruction. This obliged general Burgoyne once more to shift his position, that the enemy might also be obliged to alter theirs. This was accomplished on the night of the 7th, without any loss, and all the next day he continued to

offer the enemy battle; but they were now too well assured of obtaining a complete victory, by cutting off all supplies from the British, to risk another engagement. Wherefore they advanced on the right side, in order to inclose him entirely; which obliged the general to direct a retreat towards Saratoga. But the enemy had stationed a great force on the ford at Hudson's River, so that the only possibility of retreat was by securing a passage to lake George; and, to effect this, a body of workmen were detached, with a strong guard, to repair the roads and bridges that led to Fort Edward. As soon as they were gone, the enemy seemed to menace an attack; which rendered it necessary to recal the guard, and the workmen, being of course left exposed, could not proceed. The boats, which conveyed provisions down Hudson's River, were now exposed to the continual fire of the American marksmen, who also took many of them; so that it became necessary to convey the provisions over land. In this extreme danger it was resolved to march by night to Fort Edward, forcing the passages at the fords either above or below the place; and, in order to effect this the more easily, it was resolved that the soldiers should carry their provisions on their backs, leaving behind their baggage and every other incumbrance. But, before this could be executed, intelligence was received that the enemy had raised strong entrenchments opposite to these fords, well provided with cannon, and that they had likewise taken possession of the rising ground between Fort George and Fort Edward, which in like manner was provided with cannon.

All this time the American army was increasing by the continual arrival of militia and volunteers from all parts. Their parties extended all along the opposite bank of Hudson's River, and some had even passed it in order to watch the least movement of the British army. The whole force under general Gates was computed at upwards of 16,000 men, while the army under general Burgoyne did not amount to 6000; and every part of the camp was penetrated by the grape and rifle shot of the enemy, besides discharges from their artillery, which were almost incessant. In this state of extreme distress and danger, the army continued with the greatest constancy and perseverance till the evening of the 13th of October, when, an inventory of provisions being taken, it was found that no more remained than what were sufficient to serve for three days; and, a council of war being called, it was unanimously determined that there was no method now remaining but to treat with the enemy. In consequence of this, a negotiation was opened the next day, which speedily terminated in a capitulation of the whole British army; the principal article of which was, that the troops were to have a free passage to Britain, on condition of not serving against America during the war. On this occasion, general Gates ordered his army to keep within their camp, while the British soldiers went to a place appointed for them to lay down their arms, that the latter might not have the additional mortification of being made spectacles of, so melancholy an event. The number of those who surrendered at Saratoga amounted to 5750, according to the American accounts; the list of sick and wounded left in the camp when the army retreated to Saratoga, to 528; and the number of those lost by other accidents since the taking of Ticonderoga, to near 3000. But in the evidence afterwards adduced before the house of commons by general Burgoyne, it appeared that the number of effective men in the British army at the time it surrendered, amounted only to 3499; whilst the number of the American army, according to general Gates's return, was 18,624. Thirty-five brass field-pieces, 7000 stand of arms, clothing for an equal number of soldiers, with the tents, military-chest, &c. likewise fell into the hands of the Americans.

Sir Henry Clinton, in the mean time, had failed up the North River, and destroyed the two forts called Montgomery and Clinton, with Fort Constitution, and another place called Continental Village, where were barracks for 2000 men. Seventy large cannon were carried away, be-

sides

sides a number of smaller artillery, and a great quantity of stores and ammunition; a large boom and chain reaching across the river from Fort Montgomery to a point of land called St. Anthony's Nose, which cost no less than 70,000*l.* sterling, were partly destroyed and partly carried away, as was also another boom of little less value at Fort Constitution. Another attack was made by Sir James Wallace, with some frigates, and a body of land-forces under general Vaughan. The place which now suffered was named Esopus: the fortifications were destroyed, and the town itself reduced to ashes, as that called Continental Village had been before. But these successes, of whatever importance they might be, were now disregarded by both parties. They served only to irritate the Americans, flushed with their success; and they were utterly insufficient to raise the spirits of the British, who were now thrown into the utmost dismay.

On the 16th of March, 1778, lord North acquainted the house of commons, that a paper had been laid before the king by the French ambassador, intimating the conclusion of an alliance between the court of France and the United States of America. The preliminaries of this treaty had been concluded in the end of the year 1777, and a copy of them sent to congress, in order to counteract any proposals that might be made in the mean time by the British ministry. On February 6, 1778, the articles were signed, to the great satisfaction of the French nation.

The notification of such a treaty as this could not but be looked upon as a declaration of war. On its being announced to the house, every one agreed in an address to his majesty, promising to stand by him to the utmost in the present emergency; but it was warmly contended by the members in opposition, that the present ministry ought to be removed on account of their numberless blunders and miscarriages in every instance. Many were of opinion, that the only way to extricate the nation from its trouble was to acknowledge the independency of America at once, and thus we might still do with a good grace what must inevitably be done at last, after expending much more blood and treasure than had yet been lavished in this unhappy contest. The ministerial party, however, entertained different ideas. Instigated by zeal for the national honour, it was determined at once to resent the arrogance of France, and prosecute hostilities against America with more vigour than ever, should the terms now offered them be rejected.

The Americans, in the mean time, assiduously employed their agents at the courts of Spain, Vienna, Prussia, and Tuscany, in order, if possible, to conclude alliances with them, or at least to procure an acknowledgment of their independency. As it had been reported that Britain intended to apply for assistance to Russia, the American commissioners were enjoined to use their utmost influence with the German princes to prevent such auxiliaries from marching through their territories, and to endeavour to procure the recall of the German troops already sent to America. To France they offered a cession of such West-India islands as should be taken by the united strength of France and America; and, should Britain by their joint endeavours be dispossessed of Newfoundland, Cape Breton, and Nova Scotia, these territories should be divided betwixt the two nations, and Great Britain be totally excluded from the fishery. The proposals to the Spanish court were, that, in case they should think proper to espouse their quarrel, the American States should assist in reducing Pensacola under the dominion of Spain, provided their subjects were allowed the free navigation of the river Mississippi, and the use of the harbour of Pensacola; and they further offered, that, if agreeable to Spain, they would declare war against Portugal, should that power expel the American ships from its ports.

In the mean time, the troops under general Burgoyne were preparing to embark for Britain, according to the convention at Saratoga; but, to their utter surprise, congress positively refused to allow them to depart, under pretence that some sinister designs were harboured on the

part of Britain, and that they only wanted an opportunity to join the other troops at Philadelphia or New York.

The season for action was now approaching; and congress was indefatigable in its preparations for a new campaign, which it was confidently said would be the last. Among other methods taken for this purpose, it was recommended to all the young gentlemen of the colonies to form themselves into bodies of cavalry to serve at their own expence during the war. General Washington, at the same time, in order to remove all incumbrances from his army, lightened the baggage as much as possible, by substituting sacks and portmanteaus in place of chests and boxes, and using pack-horses instead of waggons. On the other hand, the British army, expecting to be speedily reinforced by 20,000 men, thought of nothing but concluding the war according to their wishes before the end of the campaign. It was with the utmost concern, as well as indignation, therefore, that they received the news of lord North's conciliatory bill. It was universally looked upon as a national disgrace; and some even tore the cockades from their hats, and trampled them under their feet as a token of their indignation. By the colonists it was received with indifference. The British commissioners endeavoured to make it as public as possible; and the congress, as formerly, ordered it to be printed in all the newspapers. On this occasion governor Tryon inclosed several copies of the bill to general Washington in a letter, entreating that he would allow them to be circulated; to which that general returned for answer a copy of a newspaper in which the bill was printed, together with the resolutions of congress upon it. These were, That whoever presumed to make a separate agreement with Britain should be deemed a public enemy; that the United States could not with any propriety keep correspondence with the commissioners until their independence was acknowledged, and the British fleets and armies removed from America. At the same time, the colonies were warned not to suffer themselves to be deceived into security by any offers that might be made; but to use their utmost endeavours to send their quotas with all diligence into the field. The individuals with whom the commissioners conversed on the subject of the conciliatory bill, generally returned for answer, that the day of reconciliation was past; and that the haughtiness of Britain had extinguished all filial regard in the breasts of the Americans.

About this time also Mr. Silas Deane arrived from France with two copies of the treaty of commerce and alliance to be signed by congress. Advances of the most agreeable nature were also received from various parts, representing in the most favourable light the dispositions of the European powers; all of whom, it was said, wished to see the independence of America settled upon the most firm and permanent basis. Considering the situation of matters with the colonists at this time, therefore, it is no wonder that the commissioners found themselves unable to accomplish the errand on which they came. Their proposals were utterly rejected, themselves treated as spies, and all intercourse with them interdicted.

But, before any final answer could be obtained from congress, Sir Henry Clinton had taken the resolution of evacuating Philadelphia. Accordingly, on the 10th of June, after having made all necessary preparations, the army marched out of the city, and crossed the Delaware before noon with all its baggage and other incumbrances. General Washington, apprised of this design, had dispatched expresses into the Jerseys with orders to collect all the forces that could be assembled, to obstruct the march of the enemy. After various movements on both sides, Sir Henry Clinton, with the royal army, arrived on the 27th of June at a place called Freehold; where, judging that the enemy would attack him, he encamped in a very strong situation. Here general Washington determined to make an attack as soon as the army had again begun its march. The night was spent in making the necessary preparations, and general Lee with his division was ordered to be ready by day-break. But Sir Henry Clinton, justly apprehending that

that the chief object of the enemy was the baggage, committed it to the care of general Knyphausen, whom he ordered to set out early in the morning, while he followed with the rest of the army. The attack was accordingly made; but the British general had taken such care to arrange his troops properly, and so effectually supported his forces when engaged with the Americans, that the latter not only made no impression, but were with difficulty preserved from a total defeat, by the arrival of general Washington with the whole army. The British troops effected their retreat with the loss of 300 men, of whom many died through fatigue. In this action general Lee was charged by general Washington with disobedience and misconduct in retreating before the British army. He was tried by a court-martial, and sentenced to a temporary suspension from his command. After they had arrived at Sandy Hook, a bridge of boats was by lord Howe's directions thrown over the channel which separated the island from the main land, and the troops were conveyed on-board the fleet; after which they failed to New York. After sending some light detachments to watch the enemy's motions, general Washington marched towards the North River, where a great force had been collected to join him, and where it was now expected that some capital operations would take place.

In the mean time, France had set about her preparations for the assistance of the Americans. On the 14th of April count D'Estaing sailed from Toulon with a strong squadron of ships of the line and frigates, and arrived on the coast of Virginia in the beginning of July, while the British fleet was employed in conveying the forces from Sandy Hook to New York. It consisted of one ship of 90 guns, one of 80, six of 74, and four of 64, besides several large frigates; and, exclusive of its complement of sailors, had 6000 marines and soldiers on-board. To oppose this the British had only six ships of 64 guns, three of 50, and two of 40, with some frigates and sloops. Notwithstanding this inferiority, however, the British admiral posted himself to advantageously, and shewed such superior courage and skill, that D'Estaing did not think proper to attack him. He therefore remained at anchor four miles off Sandy Hook till the 22d of July, without effecting any thing more than the capture of some vessels, which, through ignorance of his arrival, fell into his hands.

The next attempt of the French admiral was, in conjunction with the Americans, on Rhode Island. It was proposed that D'Estaing, with the 6000 troops he brought with him, should make a descent on the southern part of the island, while a body of the Americans should take possession of the north; at the same time the French squadron was to enter the harbour of Newport, and take or destroy all the British shipping. On the 8th of August the French admiral entered the harbour as was proposed, but found himself unable to effect any thing material. Lord Howe instantly set sail for Rhode Island; and D'Estaing, confiding in his superiority, came out of the harbour to meet him. A violent storm parted the two fleets, and did so much damage that they were both rendered unfit for action. The French suffered most; and several of their ships, being afterwards attacked singly by the British, very narrowly escaped being taken. On the 20th of August D'Estaing returned to Newport in a very shattered condition; and, not thinking himself safe there, failed two days after for Boston. General Sullivan had landed in the mean time on the northern part of Rhode Island with 10,000 men. On the 17th of August they began their operations by erecting batteries, and making their approaches to the British lines. But general Pigot, who commanded in Newport, had taken such effectual care to secure himself on the land-side, that without the assistance of a marine force it was altogether impossible to attack him with any probability of success. The conduct of D'Estaing, therefore, who had abandoned them when master of the harbour, gave the greatest disgust to the people of New England, and Sullivan began to think of a retreat. On perceiving his intentions, the garrison sallied out upon him with so

much vigour, that it was not without difficulty that he effected his retreat. He had not been long gone when Sir Henry Clinton arrived with a body of 4000 men; which, had it arrived sooner, would have enabled the British commander to have gained a decisive advantage over him, as well as to have destroyed the town of Providence, which, by its vicinity to Rhode Island, and the enterprises which were continually projected and carried on in that place, kept the inhabitants of Rhode Island in continual alarm.

The first British expedition was to Buzzard's Bay, in the neighbourhood of Rhode Island. Here they destroyed a great number of privateers and merchantmen, magazines, with storehouses, &c. whence proceeding to a fertile and populous island called Martha's Vineyard, they carried off 10,000 sheep and 300 black cattle. Another expedition took place up the North River, under lord Cornwallis and general Knyphausen; the principal event of which was the destruction of a regiment of American cavalry, known by the name of Washington's light-horse. A third expedition was directed to Little Egg Harbour, in New Jersey, a place noted for privateers, the destruction of which was its principal intention. It was conducted by captains Ferguson and Collins, and ended in the destruction of the enemy's vessels, as well as of the place itself. At the same time part of another body of American troops, called Pulaski's legion, was surprised, and a great number of them put to the sword.

The Americans had in the beginning of the year projected the conquest of West Florida; and captain Willing, with a party of resolute men, had made a successful incursion into the country. This awakened the attention of the British to the southern colonies, and an expedition against them was resolved on. Georgia was the place of destination; and the more effectually to ensure success, colonel Campbell, with a sufficient force, under convoy of some ships of war, commanded by commodore Hyde Parker, embarked at New York, while general Prevost, who commanded in East Florida, was directed to set out with all the forces he could collect. The armament from New York arrived off the coast of Georgia in December; and, though the enemy were strongly posted in an advantageous situation near the shore, the British troops made good their landing, and advanced towards Savannah the capital of the province. That same day they defeated the provincials who opposed them; and took possession of the town with such celerity, that the Americans had not time to execute a resolution they had taken of setting it on fire. In ten days the whole province of Georgia was reduced, Sunbury alone excepted; and this was also brought under subjection by general Prevost in his march northward. Every proper method was taken to secure the tranquillity of the country; and rewards were offered for apprehending committee and assembly men, or such as they judged most inimical to the British interest. On the arrival of general Prevost, the command of the troops devolved on him as the senior officer; and the conquest of Carolina was next projected. That country contained a great number of friends to government, who now eagerly embraced the opportunity of declaring themselves; many of the inhabitants of Georgia had joined the royal standard; and there was not in the province any provincial forces capable of opposing the efforts of the regular and well-disciplined troops. On the news of general Prevost's approach, the loyalists assembled, imagining themselves able to stand their ground until their allies should arrive; but in this they were disappointed. The Americans attacked and defeated them, with the loss of half their number. The remainder retreated into Georgia; and, after undergoing many hardships, at last effected a junction with the British forces.

In the mean time, general Lincoln, with a considerable reinforcement of American troops, had encamped within twenty miles of the town of Savannah; and another strong party had posted themselves at a place called Briar's Creek, farther up the river of the same name. Thus the extent of the British government was likely to be circumscribed within

within very narrow bounds. General Prevost therefore determined to dislodge the party at Briar's Creek: and the latter, trusting to their strong situation, and being remiss in their guard, suffered themselves to be surprised on the 30th of March, 1779; when they were utterly routed, with the loss of 400 killed and taken, besides a great number drowned in the river or the swamps. The whole artillery, stores, baggage, and almost all the arms, of this unfortunate party were taken, so that they could no more make any stand; and thus a communication was opened with those places in Carolina where the royalists chiefly resided.

The victory at Briar's Creek proved of considerable service to the British cause. Great numbers of the loyalists joined the army, and considerably increased its force. Hence general Prevost was enabled to stretch his posts farther up the river, and to guard all the principal passes: so that general Lincoln was reduced to a state of inaction; and at last moved off towards Augusta, in order to protect the provincial assembly, which was obliged to sit in that place, the capital being in the hands of the British. Lincoln had no sooner quitted his post, than it was judged proper by the British general to put in execution the grand scheme which had been meditated against Carolina. Many difficulties indeed lay in his way. The river Savannah was so swelled by excessive rains, that it seemed impassable; the opposite shore was so full of swamps and marshes, that no army could march over it without the greatest difficulty; and, to render the passage still more difficult, general Moultrie was left with a considerable body of troops to oppose the enemy's attempts. Yet, in spite of every opposition, the constancy and perseverance of the British forces prevailed. General Moultrie was defeated, and obliged to retire towards Charlestown; and the victorious army, after having waded through the marshes for some time, arrived in an open country, through which they pursued their march with great rapidity towards the capital; while general Lincoln remained in a state of security at Augusta, vainly imagining that the obstacles he had left in the way could not be surmounted.

Intelligence of the danger to which Charlestown was exposed, roused the American general from his lethargy. A chosen body of infantry, mounted on horseback for the greater expedition, was dispatched before him; while Lincoln himself followed with all the forces he could collect. General Moultrie too, with the troops he had brought from the Savannah, and some others he had collected since his retreat from thence, had taken possession of all the avenues leading to Charlestown, and prepared for a vigorous defence. But all opposition proved ineffectual. The Americans were defeated in every encounter; and, retreating continually, allowed the British army to come within cannon-shot of Charlestown on the 12th of May. The town was now summoned to surrender; and the inhabitants would gladly have agreed to observe a neutrality during the rest of the war, and would also have engaged for the rest of the province. But, these terms not being accepted, they made preparations for a vigorous defence. It was not in the power of the British commander at this time to make an attack with any prospect of success. His artillery was not of sufficient weight; there were no ships to support him by sea; and general Lincoln, advancing rapidly with a superior army, threatened to inclose him between his own forces and the town; so that, should he fail in his first attempt, certain destruction would be the consequence. For these reasons he withdrew his army from before the town, and took possession of two islands called St. James's and St. John's, lying to the southward; where, having waited some time, he was reinforced by the arrival of two frigates. With these he determined to make himself master of Port Royal, an island possessed of an excellent harbour and many other natural advantages, from its situation also commanding the sea-coast from Charlestown to Savannah River. The American general, however, did not allow this to be accomplished without opposition. Perceiving that his oppo-

nent had occupied an advantageous post on St. John's island, preparatory to his enterprise against Port Royal, he attempted, on the 20th of June, to dislodge him from it; but, after an obstinate attack, the provincials were, as usual, obliged to retire with considerable loss. On this occasion the success of the British was in a great measure owing to an armed float; which galled the right flank of the enemy so effectually, that they could direct their efforts only against the strongest part of the lines, which proved impregnable. This disappointment was instantly followed by the loss of Port Royal, which general Prevost took possession of, and put his troops into proper stations, waiting for the arrival of such further reinforcements as were necessary for the intended attack on Charlestown.

In the mean time, count D'Estaing, who put into Boston harbour to refit, had used his utmost efforts to ingratiate himself with the inhabitants of that city. Zealous also in the cause of his master, he had published a proclamation to be dispersed through Canada, inviting the people to return to their original friendship with France, and declaring that all who renounced their allegiance to Great Britain should certainly find a protector in the French king. All his endeavours, however, proved insufficient to produce any revolution, or even to form a party of any consequence among the Canadians.

As soon as the French admiral had refitted his fleet, he took the opportunity, while that of admiral Byron had been shattered by a storm, of sailing to the West Indies. During his operations there, the Americans having represented his conduct as totally unserviceable to them, he received orders from Europe to assist the colonies with all possible speed. He therefore directed his course towards Georgia, with a design to recover that province, and to put it, as well as South Carolina, in such a posture of defence as would effectually secure them from any future attack. This seemed to be an easy matter, from the little force with which he knew he should be opposed; and the next object in contemplation was the destruction of the British fleet and army at New York. Full of these hopes, the French commander arrived off the coast of Georgia with a fleet of twenty-two sail of the line and ten frigates. His arrival was so little expected, that several vessels laden with provisions and military stores fell into his hands: the Experiment also, a vessel of 50 guns, commanded by Sir James Wallace, was taken after a stout resistance. On the continent, the British troops were divided. General Prevost, with one part, remained at Savannah; but the main force was under colonel Maitland at Port Royal. On the first appearance of the French fleet, an express was dispatched to colonel Maitland: but it was intercepted by the enemy; so that, before he could set out to join the commander in chief, the Americans had secured most of the passes by land, while the French fleet effectually blocked up the passage by sea. Yet by taking advantage of creeks and inlets, and marching over land, he arrived just in time to relieve Savannah.

D'Estaing allowed general Prevost twenty-four hours to deliberate whether he would capitulate or not. This time the general employed in making the best preparations he could for a defence; and at this critical juncture colonel Maitland arrived. D'Estaing's summons was now rejected; and, as the superiority of the enemy was by no means so much out of proportion, there was every probability of success on the part of the British. The garrison consisted of 3000 men, of approved valour and experience; and, having the advantage of a strong fortification and excellent engineers, the fire of the allies made so little impression, that D'Estaing resolved to bombard the town, and a battery of nine mortars was erected for the purpose. This produced a request from general Prevost, that the women and children might be allowed to retire to a place of safety. But the allied commanders had the inhumanity to refuse compliance; and resolved upon a general assault. This was accordingly attempted on the 9th of October: but the assailants were every where repulsed with such slaugh-

ter, that 1200 were killed and wounded; among the former was count Polaski, and among the latter D'Estaing himself. This disaster entirely overthrew the sanguine hopes of the Americans and French; mutual reproaches and animosities took place, and, after waiting eight days, both parties prepared to retreat; the French to their shipping, and the Americans into Carolina.

While the allies were thus unsuccessfully employed in the southern colonies, their antagonists were no less assiduous in distressing them in the northern parts. Sir George Collier was sent with a fleet, carrying general Matthews, with a body of land-forces, into the province of Virginia. Their first attempt was on the town of Portsmouth; where, though the enemy had destroyed some ships of great value, the British troops arrived in time to save a great number of others. On this occasion about 120 vessels of different sizes were burnt, and twenty carried off; and an immense quantity of provisions designed for the use of general Washington's army was either taken or destroyed, together with a great variety of naval and military stores.

The success with which this expedition was attended, soon gave encouragement to another. The Americans had for some time been employed in erecting two strong forts on the river; the one at Verplanks Neck on the east, and the other at Stoney Point on the west side. These when completed would have been of the utmost service to the Americans, by commanding the principal pass, called the King's Ferry, between the northern and southern colonies. At present, however, they were not in a condition to make any effectual defence; and it was determined to attack them before the works should be completed. The force employed on this occasion was divided into two battalions; one of which directed its course against Verplanks, and the other against Stoney Point. The former was commanded by general Vaughan, the latter by general Patton, while the shipping was under the direction of Sir George Collier. General Vaughan met with no resistance, the enemy abandoning their works, and setting fire to every thing they could not carry off. At Stoney Point, however, a vigorous defence was made, though the garrison was at last obliged to capitulate. To secure the possession of this last, which was the more important of the two, general Clinton removed from his former situation, and encamped in such a manner that Washington could not give any assistance. The Americans, in turn, revenged themselves by distressing, with their numerous privateers, the trade to New York.

This occasioned an expedition to Connecticut, where these privateers were chiefly built and harboured. The command was given to governor Tryon and general Garth. Under convoy of a considerable number of armed vessels they landed at Newhaven, where they demolished the batteries that had been erected to oppose them, and destroyed the shipping and naval stores; but they spared the town itself, as the inhabitants had abstained from firing out of their houses upon the troops. From Newhaven they marched to Fairfield, where they proceeded as before, and reduced the town to ashes. Norwalk was next attacked, which in like manner was burnt; as was also Greenfield, a small sea-port in the neighbourhood. These successes proved very alarming as well as detrimental to the Americans; so that general Washington determined at all events to drive the enemy from Stoney Point. For this purpose he sent general Wayne with a detachment of chosen men, directing them to attempt the recovery of it by surprise. On this occasion the Americans shewed a spirit and resolution exceeding any thing they had performed during the course of the war. Though the fortifications of this place were very strong, they attacked the British with bayonets, after passing through a heavy fire of musquetry and grape-shot; and, in spite of all opposition, obliged the surviving part of the garrison, amounting to 500 men, to surrender prisoners of war. Though the Americans did not retain Stoney Point, the success they had met with emboldened them to make a similar attempt on Paulus Hook, a fortified

post on the Jersey side, opposite to New York; but they were obliged to retreat, after they had made themselves masters of one or two posts.

An expedition of greater importance was now projected on the part of the Americans. This was against a post on the river Penobscot, on the borders of Nova Scotia, of which the British had lately taken possession, and where they had begun to erect a fort, which threatened great inconvenience to the colonists. The armament destined against it was so soon got in readiness, that colonel MacLane, the commanding officer at Penobscot, found himself obliged to drop the execution of part of his scheme; and, instead of a regular fort, to content himself with putting the works already constructed in as good a posture of defence as possible. The Americans could not effect a landing without much difficulty; and, as soon as this was done, they erected several batteries, and kept up a brisk fire for the space of a fortnight. They now proposed to carry the fort by a general assault; but before this could be effected, they perceived Sir George Collier, with a British fleet, coming to its relief. On this, they instantly re-embarked their artillery and military stores, and sailed up the river, as far as possible, in order to avoid him. They were so closely pursued, however, that not a single vessel could escape; so that the whole fleet, consisting of nineteen armed vessels and twenty-four transports, was destroyed. The soldiers and sailors were obliged to wander through immense deserts, where they suffered much for want of provisions; and, to add to their calamities, a quarrel arose between the soldiers and seamen concerning the cause of their disaster, which ended in a violent fray, wherein a great number were killed.

Thus, the arms of America and France being almost every where unsuccessful, the independency of the former seemed yet to be in danger, notwithstanding the assistance of so powerful an ally, when further encouragement was given by the accession of Spain to the confederacy against Britain, in the month of June, 1779. The first effect of this appeared in the invasion of West Florida by the Spaniards, in September following. As the country was in no state of defence, the enemy easily made themselves masters of it, almost without opposition. Their next enterprise was against the Bay of Honduras, where the British logwood-cutters were settled. These, finding themselves too weak to resist, applied to the governor of Jamaica for relief; who sent them a supply of men, ammunition, and military stores, under captain Dalrymple. Before the arrival of this detachment, the principal settlement in those parts, called St. George's Key, had been taken by the Spaniards, and retaken by the British. In his way, captain Dalrymple fell in with a squadron from admiral Parker, in search of some register ships richly laden; but which, retreating into the harbour of Omoa, were too strongly protected by the fort to be attacked with safety. A project was then formed, in conjunction with the people of Honduras, to reduce this fort. The design was to surprise it; but, the Spaniards having discovered them, they were obliged to fight. Victory quickly declared for the British; but the fortifications were so strong, that the artillery made no impression. It was then determined to try the success of an escalade; and this was executed with so much spirit, that the Spaniards stood astonished, without making any resistance, and, in spite of all the efforts of the officers, threw down their arms and surrendered. The spoil was immense, being valued at three millions of dollars. The Spaniards chiefly lamented the loss of 250 quintals of quicksilver; a commodity indispensably necessary in the working of their gold and silver mines, so that they offered to ransom it at any price; but this was refused, as well as the ransom of the fort, though the governor offered 300,000 dollars for it. A small garrison was left for the defence of the place; but it was soon after attacked by a superior force, and retaken.

We must now take a view of the transactions in the southern colonies; to which the war, in the year 1780, was

was so effectually transferred, that the operations there became at last decisive. The success of general Prevost, in advancing to the very capital of South Carolina, has been already stated, together with the obstacles which prevented him from becoming master of it at that time. Towards the end of 1779, Sir Henry Clinton set sail from New York with a considerable body of troops, intended for the attack of Charlestown, in a fleet of ships of war and transports, under the command of vice-admiral Arbuthnot. They had a very tedious voyage; the weather was uncommonly bad; several of the transports were lost; and an ordnance-ship foundered at sea. Having arrived at Savannah, where they endeavoured to repair the damages, they proceeded, on the 10th of February, 1780, to North Edisto, the place of debarkation which had been previously appointed. They had a favourable passage thither; and, though it required time to have the bar explored and the channel marked, the transports all entered the harbour the next day; and the army took possession of John's Island without opposition. Preparations were then made for passing the Squadron over Charlestown-bar, where the high-water spring-tides were only nineteen feet deep; but no opportunity offered of going into the harbour till the 20th of March, when it was effected without any accident, though the American galleys continually attempted to prevent the English boats from founding the channel. The British troops had previously removed from John's to James's Island; and, on the 29th of the same month, they effected their landing on Charlestown Neck. On the 1st of April they broke ground within 800 yards of the American works; and, by the 8th, the besiegers guns were mounted for action.

As soon as the army began to open their batteries against the town, admiral Arbuthnot embraced the first opportunity of passing Sullivan's Island, upon which there was a strong fort, the chief defence of the harbour. He weighed on the 9th, with the Roebuck, Richmond, and Romulus, Blonde, Virginia, Raleigh, and Sandwich armed ship, the Renown bringing up the rear; and, passing through a severe fire, anchored in about two hours under James's Island, with the loss of twenty-seven seamen killed and wounded. The Richmond's fore-top-mast was shot away, and the ships in general sustained damage in their masts and rigging, though not materially in their hulls. But the *Acetus* transport, having on-board some naval stores, grounded within gun-shot of Sullivan's Island, and received so much damage, that she was obliged to be abandoned and burnt.

On the 10th, Sir Henry Clinton and admiral Arbuthnot summoned the town to surrender; but major-general Lincoln, who commanded in Charlestown, returned them an answer, declaring it to be his intention to defend the place. The batteries were now opened against the town; and from their effect the fire of the American advanced works considerably abated. It appears, that the number of troops under the command of Lincoln, were by far too few for defending works of such extent as those of Charlestown; and, that many of these were men little accustomed to military service, and very ill provided with clothes and other necessaries. Lincoln had been for some time expecting reinforcements and supplies from Virginia, and other places; but they came in very slowly. Earl Cornwallis and lieutenant-colonel Tarleton were extremely active in intercepting these reinforcements. They totally defeated a considerable body of cavalry and militia, which was proceeding to the relief of the town; and made themselves masters of some posts, which gave them the command of the country, by which means great supplies of provisions fell into their hands. Such was the state of things, and Fort Sullivan had also been taken by the king's troops, when general Clinton again summoned the town to surrender; an offer being made, that the lives and property of the inhabitants should be preserved to them. Articles of capitulation were then agreed upon, and the town surrendered on the 4th of May, 1780. A large quantity of ordnance,

arms, and ammunition, was found in Charlestown; and, according to Sir Henry Clinton's account, the number of prisoners amounted to 5618 men, exclusively of near a thousand sailors in arms; but, according to general Lincoln's account, transmitted to the congress, the whole number of continental troops taken prisoners amounted to no more than 2487. The remainder, therefore, included in general Clinton's account, must have consisted of militia and inhabitants of the town. Several American frigates were also taken or destroyed in the harbour.

While Sir Henry Clinton was employed in his voyage to Charlestown, and in the siege of that place, the garrison at New York were not free from apprehensions for their own safety. An intense frost, accompanied with great falls of snow, began about the middle of December, 1779, and shut up the navigation of the port of New York from the sea, within a few days after the departure of admiral Arbuthnot and general Clinton. The severity of the weather increased to so great a degree, that towards the middle of January all communications with New York by water were entirely cut off; and as many new ones opened by the ice. The inhabitants could scarcely be said to be in an insular state. Horses with heavy carriages could go over the ice into the Jerseys, from one island to another. The passage in the North River, even in the widest part, from New York to Paulus Hook, which was 2000 yards, was, about the 19th of January, passable for the heaviest cannon: an event which had been unknown in the memory of man. Provisions were soon after transported upon sledges, and a detachment of cavalry marched upon the ice from New York to Staten Island, which was a distance of eleven miles.

The city of New York being thus circumstanced, was much exposed to the continental troops; and it was strongly reported, that general Washington was meditating an attack upon it with his whole force. Some time before this, major-general Pattison, commandant at New York, having received an address from many of the inhabitants, offering to put themselves in military array, he thought the present a favourable opportunity of trying the sincerity of their professions. Accordingly, he issued a proclamation, calling upon all the male inhabitants from sixteen to sixty to take up arms. The requisition was so readily complied with, that, in a few days, forty companies from the six wards of the city were enrolled, officered, and under arms, to the number of 2600. Other volunteer companies were also formed; and the city was put into a strong posture of defence. No attack, however, was made upon New York, whatever design might originally have been meditated: but an attempt was made upon Staten Island, where there were about 1800 men, under the command of brigadier-general Sterling. General Washington, whose army was halted at Morris-town, sent a detachment of 2700 men, with six pieces of cannon, two mortars, and some horses, commanded by lord Sterling, who arrived at Staten Island early in the morning of the 15th of January. The advanced posts of the British troops retired upon the approach of the Americans, who formed the line, and made some movements in the course of the day; but they withdrew in the night, and carried off with them about 200 head of cattle. Immediately on the arrival of the Americans on Staten Island, lieutenant-general Knyphausen had embarked 600 men to attempt a passage, and to support general Sterling; but the floating ice compelled them to return. After Charlestown had surrendered, general Clinton issued two proclamations, and circulated a hand-bill amongst the inhabitants of South Carolina, to induce them to return to their allegiance, and to be ready to join the king's troops. These proclamations appear to have produced some effect, though they probably operated chiefly upon those who were before not much inclined to the cause of American independence. Two hundred and ten of the inhabitants of Charlestown signed an address to general Clinton and admiral Arbuthnot, soliciting to be re-admitted to the character and condition of British subjects; declaring their disapprobation of the doctrine of American inde.

independence, and expressing their regret, that, after the repeal of those statutes which gave rise to the troubles in America, the overtures of his majesty's commissioners had not been regarded by the congress.

At this time the people of America were involved in great difficulties by the depreciation of their paper-currency. At the time when the colonies engaged in war with Great Britain, they had no regular civil government established among them of sufficient energy to enforce the collection of taxes, or to provide funds for the redemption of such bills of credit as their necessities obliged them to issue. In consequence of this, their bills increased in quantity far beyond the sum necessary for the purpose of a circulating medium: and, as they wanted at the same time specific funds to rest on for their redemption, they saw their paper-currency daily sink in value. The depreciation continued, by a kind of gradual progression, from the year 1777 to the year 1780; so that, at the latter period, the continental dollars were passed, by common consent, in most parts of America, at the rate of at least thirty-nine fortieths below their nominal value. The impossibility of keeping up the credit of the currency to any fixed standard, occasioned great and almost insurmountable embarrassments in ascertaining the value of property, or carrying on trade with any sufficient certainty. Those who sold, and those who bought, were left without a rule whereon to form a judgment of their profit or their loss: and every species of commerce or exchange, whether foreign or domestic, was exposed to numberless and increasing difficulties. The consequences of the depreciation of the paper-currency, were also felt with peculiar severity by such of the Americans as were engaged in their military services, and greatly augmented by their other hardships. The requisitions made by the congress to the several colonies for supplies, were also far from always being complied with: and their troops were not unfrequently in want of the most common necessities; which naturally occasioned complaints and discontent among them. Some of these difficulties, resulting from their circumstances and situation, perhaps no wisdom could have prevented: but they seem to have arisen in part from the congress not being sufficiently acquainted with the principles of finance, and from a defect of system in the departments of their government. The cause of the Americans appears also to have suffered by their depending too much on temporary enlistments. But the congress endeavoured, towards the close of the year 1780, to put their army upon a more permanent footing, and to give all the satisfaction to their officers and soldiers which their circumstances would permit. They appointed a committee for arranging their finances, and made some new regulations respecting their war-office and treasury-board, and other public departments.

Notwithstanding the disadvantages under which they laboured, the Americans seemed to entertain no doubts but that they should be able to maintain their independency. The 4th of July was celebrated this year at Philadelphia, as the anniversary of American independence. A commencement for conferring degrees in the arts was held the same day, in the hall of the university there; at which the president and members of the congress attended, and other persons in public offices. The chevalier de la Lucerne, minister plenipotentiary from the French king to the United States, was also present on the occasion. A charge was publicly addressed by the provost of the university to the students; in which he said, that he could not but congratulate them "on that auspicious day, which, amidst the confusions and desolations of war, beheld learning beginning to revive; and animated them with the pleasing prospect of seeing the sacred lamp of science burning with a still brighter flame, and scattering its invigorating rays over the unexplored deserts of that extensive continent; until the whole world should be involved in the united blaze of knowledge, liberty, and religion. When he stretched his views forward," he said, "and surveyed the

rising glories of America, the enriching consequences of their determined struggle for liberty, the extensive fields of intellectual improvement and useful invention, in science and arts, in agriculture and commerce, in religion and government, through which the unfettered mind would range, with increasing delight, in quest of the undiscovered treasure which yet lay concealed in the animal, vegetable, and mineral, kingdoms of that new world; or in the other fertile sources of knowledge with which it abounded. His heart swelled with the pleasing prospect, that the sons of that institution would distinguish themselves, in the different walks of life, by their literary contributions to the embellishment and increase of human happiness.

On the 10th of July, M. Ternay, with a fleet consisting of seven ships of the line, besides frigates, and a large body of French troops, commanded by the count de Rochambeau, arrived at Rhode Island; and the following day 6000 men were landed. A committee from the general assembly of Rhode Island was appointed to congratulate the French general upon his arrival: whereupon he returned an answer, in which he informed them, that the king his master had sent him to the assistance of his good and faithful allies the United States of America. At present, he said, he only brought over the vanguard of a much greater force destined for their aid; and the king had ordered him to assure them, that his whole power should be exerted for their support. He added, that the French troops were under the strictest discipline; and, acting under the orders of general Washington, would live with the Americans as their brethren.

A scheme was soon after formed, of making a combined attack with English ships and troops, under the command of Sir Henry Clinton and admiral Arbuthnot, against the French fleet and troops at Rhode Island. Accordingly a considerable part of the troops at New York were embarked for that purpose. General Washington, having received information of this, passed the North River by a very rapid movement, and, with an army increased to 12,000 men, proceeded with celerity towards King's Bridge, in order to attack New York; but, learning that the British general had changed his intentions, and disembarked his troops on the 31st of the month, general Washington recrossed the river, and returned to his former station. Sir Henry Clinton and the admiral had agreed to relinquish their design of attacking the French and Americans at Rhode Island as impracticable.

An unsuccessful attempt was also made about this time in the Jerseys by general Knyphausen, with 7000 British troops under his command, to surprise the advanced posts of general Washington's army. They proceeded rapidly towards Springfield, meeting little opposition till they came to the bridge there, which was very gallantly defended by 170 of the continental troops, for fifteen minutes, against the British army: but they were at length obliged to give up so unequal a contest, with the loss of thirty-seven men. After securing this pass, the British troops marched into the place, and set fire to most of the houses. They also committed some other depredations in the Jerseys; but were obliged to return about the beginning of July, without effecting any thing material.

In South Carolina the royal arms were attended with more success. Earl Cornwallis, who commanded the British troops, obtained a very signal victory over general Gates, on the 16th of August. The action began at break of day, in a situation very advantageous for the British troops, but very unfavourable to the Americans. The latter were much more numerous; but the ground on which both armies stood was narrowed by swamps on the right and left, so that the Americans could not avail themselves of their superior numbers. There seems to have been a want of generalship in Gates, in suffering himself to be surprised in so disadvantageous a position: but this circumstance was partly the effect of accident; for both armies set out with a design of attacking each other precisely at the same time, at ten the preceding evening, and met

met together before day-light at the place where the action happened. The attack was made by the British troops with great vigour, and in a few minutes the action was general along the whole line. It was at this time a dead calm, with a little haziness in the air, which prevented the smoke from rising, and occasioned so thick a darkness, that it was difficult to see the effect of a very heavy and well-supported fire on both sides. The British troops either kept up a constant fire, or made use of bayonets, as opportunities offered: and, after an obstinate resistance during three quarters of an hour, threw the Americans into total confusion, and forced them to give way in all quarters. The continental troops appear to have behaved well, but the militia were soon broken, and left the regulars to oppose the whole force of the British troops. General Gates did all in his power to rally the militia, but without effect: the continentals retreated in some order; but the rout of the militia was so great, that the British cavalry are said to have continued the pursuit of them to the distance of twenty-two miles from the place where the action happened. The loss of the Americans was very considerable: about 1000 prisoners were taken, and more said to have been killed and wounded, but the number is not very accurately ascertained. Seven pieces of brass cannon, a number of colours, and all the ammunition-waggons of the Americans, were taken. Of the British troops, the killed and wounded amounted to 213. Among the prisoners was major-general baron de Kalb, a Prussian officer in the American service, who was mortally wounded, having exhibited great gallantry in the action, and received eleven wounds. The British troops by which this great victory was achieved did not much exceed 2000, while the American army is said to have amounted to 6000; of which, however, the greatest part was militia.

Lieutenant-colonel Tarleton, who had greatly distinguished himself in this action, was detached the following day, with some cavalry and light infantry, amounting to about 350 men, to attack a corps of Americans under general Sumpter. He executed this service with great activity and military address. He procured good information of Sumpter's movements; and by force and concealed marches came up with and surprised him in the middle of the day on the 18th, near the Catawba fords. He totally destroyed or dispersed his detachment, which consisted of 700 men, killing 150 on the spot, and taking two pieces of brass cannon, 300 prisoners, and forty-four waggons.

Not long after these events, major-general Arnold, who had engaged so ardently in the cause of America, and who had exhibited so much bravery in the support of it, became an apostate. Major André, adjutant-general to the British army, was a principal agent in this transaction: or, if the overture of joining the king's troops came first from Arnold, this gentleman was the person employed to concert the affair with him. More must have been originally comprehended in the scheme than the mere desertion of the American cause by Arnold: but, whatever designs had been formed for promoting the views of the British government, they were frustrated by the apprehending of major André. He was taken in disguise, after having assumed a false name, on the 23d of September, by three American soldiers; to whom he offered considerable rewards if they would have suffered him to escape, but without effect. Several papers written by Arnold were found upon him; and, when Arnold had learned that major André was seized, he found means to get on-board a barge, and to escape to one of the king's ships. General Washington referred the case of major André to the examination and decision of a board of general officers, consisting of major-general Green, major-general lord Sterling, major-general the marquis de la Fayette, major-general the baron de Stenben, two other major-generals, and eight brigadier-generals. Major André was examined before them, and the particulars of his case enquired into; and they reported to the American commander in chief, that Mr. André came on shore from the *Vulture*

floop of war in the night, on an interview with general Arnold, in a private and secret manner; that he changed his dress within the American lines; and, under a feigned name, and in a disguised habit, passed the American works at Stoney Point and Verplanks Point on the evening of the 22d of September; that he was taken on the morning of the 23d at Tarry-town, being then on his way for New York: and that, when taken, he had in his possession several papers which contained intelligence for the enemy. They therefore determined, that he ought to be considered as a spy from the enemy; and that, agreeable to the law and usage of nations, he ought to suffer death. Sir Henry Clinton, lieutenant-general Robertson, and the late American general Arnold, all wrote pressing letters to general Washington on the occasion, to prevent the decision of the board of general officers from being put in force; but their applications were ineffectual. Major André was hanged at Tappan, in the province of New York, on the 2d of October. He met his fate with great firmness; but appeared somewhat hurt that he was not allowed a more military death, for which he had solicited. He was a gentleman of very amiable qualities, had a taste for literature and the fine arts, and possessed many accomplishments. His death, therefore, was regretted even by his enemies; and the severity of the determination concerning him was much exclaimed against in Great Britain. It was, however, generally acknowledged by impartial persons, that there was nothing in the execution of this unfortunate gentleman but what was perfectly consonant to the rules of war.

Arnold was now made a brigadier-general in the king's service, and published an address to the inhabitants of America, dated from New York, October 7, in which he endeavoured to justify his desertion of their cause. He said, that, when he first engaged in it, he conceived the rights of his country to be in danger, and that duty and honour called him to her defence. A redress of grievances was his only aim and object; and therefore he acquiesced unwillingly in the declaration of independence, because he thought it precipitate. But what now induced him to desert their cause was the disgust he had conceived at the French alliance, and at the refusal of congress to comply with the last terms offered by Great Britain, which he thought equal to all their expectations and their wants.

After the defeat of general Gates by earl Cornwallis, that nobleman exerted himself to the utmost in extending the progress of the British arms, and with considerable effect. But one enterprise, which was conducted by major Ferguson, proved unsuccessful. That officer had taken abundant pains to discipline some of the Tory militia, as they were termed; and with a party of these, and some British troops, amounting in the whole to about 1400 men, made incursions into the country. But on the 7th of October he was attacked by a superior number of Americans, at a place called King's Mountain, and totally defeated. One hundred and fifty were killed in the action, and 810 made prisoners, of which 150 were wounded. Fifteen hundred stand of arms also fell into the hands of the Americans, whose loss was inconsiderable.

On the 3d of September, the *Mercury*, a congress packet, was taken by the *Vestal*, captain Keppel, near Newfoundland. On board this packet was Mr. Laurens, late president of the congress, who was bound on an embassy to Holland. He had thrown his papers overboard, but great part of them were recovered without having received much damage. He was brought to London, and examined before the privy-council; in consequence of which he was committed close prisoner to the Tower on the 6th of October, on a charge of high treason. His papers were delivered to the ministry, and contributed to facilitate a rupture with Holland, as among them was found the sketch of a treaty of amity and commerce between the republic of Holland and the United States of America.

At the beginning of the year 1781, an affair happened in America, from which expectations were formed by Sir

Henry Clinton, that some considerable advantage might be derived to the royal cause. The long continuance of the war, and the difficulties under which the congress laboured, had prevented their troops from being properly supplied with necessaries and conveniences. In consequence of this, on January the 1st, the American troops that were huddled at Morris-town, and who formed what was called the *Pennsylvania line*, turned out, being in number about 1300, and declared, that they would serve no longer, unless their grievances were redressed, as they had not received their pay, or been furnished with the necessary clothing or provisions. It is said that they were somewhat inflamed with liquor, in consequence of rum having been distributed to them more liberally than usual, New-year's Day being considered as a kind of festival. A riot ensued, in which an officer was killed, and four wounded; five or six of the insurgents were also wounded. They then collected the artillery, stores, provisions, and waggons, and marched out of the camp. They passed by the quarters of general Wayne, who sent a message to them, requesting them to desist, or the consequences would prove fatal. They refused, and proceeded on their march till the evening, when they took post on an advantageous piece of ground, and elected officers from among themselves. On the second, they marched to Middlebrook, and on the third to Prince-town, where they fixed their quarters. On that day a flag of truce was sent to them from the officers of the American camp, with a message, desiring to know what were their intentions. Some of them answered, that they had already served longer than the time for which they were enlisted, and would serve no longer; and others, that they would not return, unless their grievances were redressed. But at the same time they repeatedly, and in the strongest terms, denied being influenced by the least diffidence to the American cause, or having any intentions of deserting to the enemy.

Intelligence of this transaction was soon conveyed to New York. A large body of British troops were immediately ordered to hold themselves in readiness to move on the shortest notice, it being hoped that the American volunteers might be induced to join the royal army. Messengers were also sent to them from general Clinton, acquainting them that they should directly be taken under the protection of the British government; that they should have a free pardon for all former offences; and that the pay due to them from the congress should be faithfully paid them, without any expectation of military service, unless it should be voluntary, upon condition of their laying down their arms and returning to their allegiance. It was also recommended to them to move beyond the South River; and they were assured, that a body of British troops should be ready to protect them whenever they desired it. These propositions were rejected with disdain; and they even delivered up two of Sir Henry Clinton's messengers to the congress. Joseph Reed, Esq. president of the state of Pennsylvania, afterwards repaired to them at Prince-town, and an accommodation took place: such of them as had served out their full term were permitted to return to their homes, and others again joined the American army, upon receiving satisfactory assurances that their grievances should be redressed.

Earl Cornwallis now made vigorous preparations to penetrate into North Carolina. On the 11th of January his lordship's army was in motion; but was somewhat delayed by an attempt made by the Americans, under general Morgan, to make themselves masters of the valuable district of Ninety-six. To prevent this, lord Cornwallis detached lieutenant-colonel Tarleton, with 300 cavalry, 300 light infantry, the 7th regiment, the first battalion of the 71st regiment, and two 3-pounders, to oppose the progress of Morgan, not doubting but that he would be able to perform this service effectually. The British troops came up with the Americans on the 17th of January. They were drawn up in an open wood, and, having been lately joined by some militia, were more numerous than the British;

but the latter were so much better disciplined, that they had the utmost confidence of obtaining a speedy victory. The attack was begun by the first line of infantry, consisting of the 7th regiment and a corps of light infantry, with a troop of cavalry placed on each flank. The first battalion of the 71st and the remainder of the cavalry formed the reserve. The American line soon gave way, and their militia quitted the field; upon which the royal troops, supposing the victory already gained, engaged with ardour in the pursuit, and were thereby thrown into some disorder. General Morgan's corps, who were supposed to have been routed, immediately faced about, and began a heavy fire upon the king's troops, which occasioned the utmost confusion amongst them; and they were at length totally defeated by the Americans. Four hundred of the British infantry were either killed, wounded, or taken prisoners: the loss of the cavalry was much less considerable; but the two 3-pounders fell into the hands of the Americans, together with the colours of the 7th regiment. Lieutenant-colonel Tarleton gallantly made another effort; having assembled about fifty of his cavalry, with which he charged and repulsed colonel Washington's horse, retook his baggage, and killed the Americans who were appointed to guard it. He then retreated to Hamilton's Ford, near the mouth of Bullock's Creek, carrying with him part of baggage, and destroying the remainder.

This defeat was a severe stroke to lord Cornwallis, as the loss of his light infantry was a great disadvantage to him. The day after that event, he employed in collecting the remains of Tarleton's corps, and in endeavouring to form a junction with general Leslie, who had been ordered to march towards him with some British troops from Wynneshorough. Considerable exertions were then made by part of the army, without baggage, to retake the prisoners in the hands of the Americans, and to intercept general Morgan's corps on its retreat to the Catawba. But that officer had made forced marches up the country, and crossed the Catawba the evening before a great rain, which swelled the river to such a degree, as to prevent the royal army from crossing for several days; by which time the British prisoners were got quite out of reach.

On the first of February, the king's troops crossed the Catawba at M'Cowan's Ford, where general Davidson, with a party of the American militia, was ordered to oppose their passage; but, that officer being killed by the first discharge, the royal troops made good their landing, and the militia retreated. When lord Cornwallis arrived at Hillsborough, he erected the king's standard, and invited, by proclamation, all loyal subjects to repair to it, and to stand forth and take an active part in assisting his lordship to restore order and government. He had been taught to believe that the king's friends were numerous in that part of the country: but the event did not confirm the truth of the representations that had been made. The royalists were but few in number, and some of them too timid to join the king's standard. There were, indeed, about 200 who were proceeding to Hillsborough, under colonel Pyle, in order to avow their attachment to the royal cause; but they were met accidentally, and surrounded, by a detachment from the American army, by whom a number of them are said to have been killed when they were begging for quarter, without making the least resistance. Meanwhile general Greene was marching with great expedition to form a junction with another corps of American troops, in order to put a stop to the progress of lord Cornwallis.

In other places considerable advantages were obtained by the royal arms. On the 4th of January, some ships of war with a number of transports, on-board which was a large body of troops under the command of general Arnold, arrived at Westover, about 140 miles from the Capes of Virginia, where the troops immediately landed and marched to Richmond; which they reached without opposition, the provincials having retreated on their approach. Lieutenant-colonel Simcoe marched from hence with a detachment of the British troops to Westham, where he destroyed

destroyed one of the finest foundries for cannon in America, and a large quantity of stores and ammunition. General Arnold, on his arrival at Richmond, found large quantities of salt, rum, sail-cloth, tobacco, and other merchandise; and that part which was public property he destroyed. The British troops afterwards attacked and dispersed some small parties of the Americans, took some stores, and a few pieces of cannon; and, on the 20th of the same month, marched into Portsmouth. On the 23th, captain Barclay, with several ships of war, and a body of troops under the command of major Craig, arrived in Cape Fear river. The troops landed about nine miles from Wilmington, and, on the 28th, entered that town. It was understood, that their having possession of that town, and being masters of Cape Fear river, would be productive of very beneficial effects to lord Cornwallis's army.

General Greene, having effected a junction, about the 10th of March, with a continental regiment, and two large bodies of militia, resolved to attack the British troops under lord Cornwallis. The American army marched from the High Rock Ford on the 12th of the month, and on the 14th arrived at Guildford. Lord Cornwallis, from the information he had received of the motions of the American general, concluded what were his designs. As they approached more nearly to each other, a few skirmishes ensued between some advanced parties, in which the king's troops had the advantage. On the morning of the 15th, lord Cornwallis marched at day-break to meet the Americans, or to attack them in their camp. About four miles from Guildford, the advanced guard of the British army, commanded by lieutenant-colonel Tarleton, fell in with a corps of the Americans, consisting of lieutenant-colonel Lee's legion, which he defeated.

The greater part of the country in which the action happened is a wilderness, with a few cleared fields interspersed. The American army, which was superior to the British in point of numbers, was posted on a rising ground. It was drawn up in three lines: the front line was composed of the North Carolina militia, under the command of generals Butler and Eaton; the second line was of Virginian militia, commanded by generals Stephens and Lawton, forming two brigades; the third line, consisting of two brigades, one of Virginia and one of Maryland continental troops, was commanded by general Huger and colonel Williams. Lieutenant-colonel Washington, with the dragoons of the first and third regiments, a detachment of light infantry, composed of continental troops, and a regiment of riflemen, under colonel Lynch, formed a corps of observation for the security of their right flank. Lieutenant-colonel Lee, with his legion, a detachment of light infantry, and a corps of riflemen under colonel Campbell, formed a corps of observation for the security of their left flank. The attack was made by lord Cornwallis, in the following order: on the right, the regiment of Bose and the 71st regiment, led by major-general Leslie, and supported by the first battalion of guards; on the left, the 23d and 33d regiments, led by lieutenant-colonel Webster, and supported by the grenadiers and second battalion of guards, commanded by general O'Hara; the Yagers and light infantry of the guards remained in a wood, on the left of the guns, and the cavalry in the road, ready to act as circumstances might require.

About half an hour after one in the afternoon, the action commenced by a cannonade, which lasted about twenty minutes; when the British troops advanced in three columns and attacked the North Carolina brigade with great vigour, and soon obliged part of these troops, who behaved very ill, to quit the field: but the Virginia militia kept up a heavy fire for a long time, till, being beaten back, the action became general every where. The American corps, under colonels Washington and Lee, did considerable execution. Lieutenant-colonel Tarleton had directions to keep his cavalry compact, and not to charge without positive orders, excepting to protect any of the corps from the most evident danger of being defeated.

The excessive thickness of the woods rendered the British bayonets of little use, and enabled the broken corps of Americans to make frequent stands with an irregular fire. The second battalion of the guards first gained the clear ground near Guildford court-house, and found a corps of continental infantry, superior in number, formed in an open field on the left of the road. Desirous of signalizing themselves, they immediately attacked and soon defeated them, taking two six-pounders; but, as they pursued the Americans into the wood with too much ardour, they were thrown into confusion, and instantly charged and driven back into the field by lieutenant-colonel Washington's dragoons, with the loss of the six-pounders they had taken. But the American cavalry were in turn repulsed, and the two six-pounders again fell into the hands of the British troops. The spirited exertions of general O'Hara and lieutenant-colonel Tarleton, contributed to bring the action to a termination. The British troops having at length broken the second Maryland regiment, and turned the left flank of the Americans, got into the rear of the Virginia brigade, and appeared to be gaining their right, which would have encircled the whole of the continental troops, when general Greene thought it prudent to retreat. Many of the American militia dispersed in the woods; but the continental troops fell back in good order to the Reedy Fork River, and crossed at the ford, about three miles from the field of action. When they had collected their stragglers, they retreated to the iron-works, ten miles distant from Guildford, where they encamped. They lost their artillery, and two waggons laden with ammunition. It was a hard-fought battle, and lasted an hour and an half. Of the British troops, the loss, as stated by lord Cornwallis, was 532 killed, wounded, and missing. General Greene, in his account of the action transmitted to the congress, stated the loss of the continental troops to be 329 killed, wounded, and missing; but he made no estimate of the loss of the militia. Lieutenant-colonel Stuart was killed in the action; and lieutenant-colonel Webster, and captains Schutz, Maynard, and Goodriche, died of their wounds. General O'Hara, general Howard, and lieutenant-colonel Tarleton, were also wounded. Of the Americans, the principal officer killed was major Anderson, of the Maryland line; and generals Stephens and Huger were wounded.

The British troops underwent great hardships in the course of this campaign; and in a letter from lord Cornwallis to lord George Germaine, dated March 17th, he observed, that "the soldiers had been two days without bread." His lordship quitted Guildford three days after the battle; and, on the 7th of April, arrived at Wilmington. General Greene, notwithstanding his late defeat, endeavoured to make some fresh attempts against the king's forces in South Carolina. Lord Rawdon had been appointed to defend the post of Camden, with about 800 British; and, on the 19th of April, general Greene appeared before that place with a large body of continentals and militia. He found it impossible to storm the town with any prospect of success; and therefore endeavoured to take such a position as should induce the British troops to sally forth from their works. He posted the Americans about a mile from the town, on an eminence which was covered with woods, and flanked on the left by an impassable swamp. On the morning of the 25th, lord Rawdon marched out of Camden, and with great gallantry attacked general Greene in his camp. The Americans made a vigorous resistance, but were at last compelled to give way, and the pursuit is said to have been continued three miles. The loss of the English was about 100 killed and wounded. Upwards of 100 of the Americans were taken prisoners; and, according to the account published by general Greene, they had 126 killed and wounded.

Notwithstanding the advantage which lord Rawdon had obtained, he soon found it necessary to quit his post; and the Americans made themselves masters of several other posts that were occupied by the king's troops, and the garisons were made prisoners of war. These were afterwards

wards exchanged under a cartel which took place between lord Cornwallis and general Greene, for the release of all prisoners in the southern district. After this, general Greene laid siege to Ninety-six, which was the most commanding and important of all the posts in the back-settlements; and, on the 19th of June, he attempted to storm the garrison, but was repulsed by the British troops, with the loss of 75 killed and 150 wounded. General Greene then raised the siege, and retired behind the Saluda, to a strong situation within sixteen miles of Ninety-six.

On the 18th of April, a large body of British troops, under the command of general Philips and general Arnold, embarked at Portsmouth, in Virginia, on an expedition for the purpose of destroying some of the American stores. A party of light-infantry were sent ten miles up the Chickahomany; where they destroyed several armed ships, sundry warehouses, and the American ship-yards. At Peterburgh, they destroyed 4000 hogheads of tobacco, one ship, and a number of small vessels on the stocks and in the river. At Chesterfield, they burnt a range of barracks for 2000 men, and 300 barrels of flour. At a place called Osborn's, they made themselves masters of several vessels loaded with cordage and flour, and destroyed 2000 hogheads of tobacco, and sundry vessels were sunk and burnt. At Warwick, they burnt 500 barrels of flour, some mills belonging to colonel Carey, a large range of public rope-walks and store-houses, tan and bark houses full of hides and bark, and great quantities of tobacco. A like destruction of stores and goods was made in other parts of Virginia.

Lord Cornwallis, after his victory over general Greene, at Guildford, proceeded, as we have seen, to Wilmington; and, on the 20th of May, his lordship arrived at Peterburgh, in Virginia, where he joined the British troops that had been under the command of general Philips and general Arnold. Before this junction, he had encountered considerable inconveniences from the difficulty of procuring provisions and forage; so that, in a letter to Sir Henry Clinton, he informed him, that his cavalry wanted every thing; and his infantry every thing but shoes. He added, that he had experienced the distresses of marching hundreds of miles in a country chiefly hostile, without one active or useful friend, without intelligence, and without communication with any part of the country.

On the 26th of June, about six miles from Williamsburgh, lieutenant-colonel Simcoe, and 350 of the queen's rangers, with eighty mounted yagers, were attacked by a much superior body of the Americans; but whom they repulsed with great gallantry and with equal success, making four officers and twenty private men prisoners. The loss of the Americans in this action is said to have been upwards of 120, and that of the British troops not more than forty. On the 6th of July, another action happened near the Green Springs, in Virginia, between a reconnoitring party of the Americans, under general Wayne, amounting to about 800, and a large part of the British army, under lord Cornwallis; in which, the Americans had 127 killed and wounded; and the loss of the royal troops is supposed to have been considerably greater. It was an action in which no small degree of military skill and courage was exhibited by the Americans. In a variety of skirmishes, the marquis la Fayette very much distinguished himself, and displayed the utmost ardour in the American cause.

Notwithstanding the signal advantages lord Cornwallis had obtained, his situation in Virginia began to be very critical; and the rather, because he did not receive those reinforcements from Sir Henry Clinton which he conceived to be necessary for the success of his operations. Indeed, the commander in chief was prevented from sending those reinforcements, by his fears respecting New York, against which he entertained apprehensions that general Washington intended to make a formidable attack. In fact, the American general appears to have taken much pains, and to have employed great finesse, to lead Sir

Henry Clinton into this imagination. Letters, expressive of this intention, fell into the hands of Sir Henry, which were manifestly written to be intercepted, with a view to amuse and deceive the British general. The project was successful; and, by a variety of manoeuvres, in which he completely out-generalled the British commander, he increased his apprehensions about New York, and prevented him from sending proper assistance to lord Cornwallis. Having thus kept Sir Henry Clinton in perpetual alarm, general Washington suddenly quitted his camp at White Plains, crossed the Delaware, and marched towards Virginia, with a design to attack lord Cornwallis. Sir Henry Clinton now received information, that the count de Grasse, with a large French fleet, was expected every moment in the Chesapeak, to co-operate with general Washington. He therefore endeavoured to communicate this information to lord Cornwallis; and also sent him assurances, that he would either reinforce him by every possible means, or make the best diversion he could in his favour. In the mean time, lord Cornwallis had taken possession of the posts of York-town and Gloucester, in Virginia, where he fortified himself in the best manner he could.

On the 28th of August, Sir Samuel Hood, with a squadron from the West Indies, joined the fleet under admiral Graves, before New York. It was then necessary, on account of the situation of lord Cornwallis, that they should immediately proceed to the Chesapeak; but much time appears to have been lost, though admiral Hood was extremely anxious that no delay might be made. They arrived in the Chesapeak on the 5th of September, with nineteen ships of the line; where they found the count de Grasse, who had come to an anchor, on the 30th of August, with twenty-four ships of the line. The French admiral had previously landed a large body of troops, which had marched to join the American army under general Washington. The British and French fleets came to an action on the same day in which the former arrived in the Chesapeak. On-board the British fleet, ninety were killed and 246 wounded; some of the ships were greatly damaged in the engagement, and the Terrible, a 74-gun ship, was so much shattered, that it was afterwards found necessary to set her on fire. That this action was not favourable to the English, was manifest from the event: the fleets continued in sight of each other for five days successively, and sometimes were very near; but at length, the French all anchored within the Cape, so as to block up the passage. Admiral Graves then called a council of war, in which it was resolved, that the fleet should return to New York, that the ships might be put into the best state for the service: and thus were the French left masters of the Chesapeak.

Before the news of this engagement had reached New York, a council of war had been held, in which it was resolved, that 5000 men should be embarked on-board the king's ships, in order to proceed to the assistance of lord Cornwallis. But, when it was known that the French were absolute masters of the navigation of the Chesapeak, it was thought inexpedient to send off that reinforcement. In another council of war, it was resolved, that as lord Cornwallis had provisions to last him to the end of October, it was advisable to wait for more favourable accounts from admiral Graves, or for the arrival of admiral Digby, who was expected with three ships of the line.

In the mean time, the most effectual measures were taken by general Washington, for surrounding the army under lord Cornwallis. A large body of French troops, under the command of the count de Rochambeau, with a considerable train of artillery, assisted in the enterprise. The Americans amounted to near 8000 continentals, and 5000 militia. General Washington was commander in chief of the combined forces of America and France. On the 29th of September, the investment of York-town was complete, and the British army were quite blocked up. The day following, Sir Henry Clinton wrote a letter to lord Cornwallis, containing assurances that he would do every thing

thing in his power to relieve him. A duplicate of this letter was sent to his lordship by major Cochran, on the 3d of October. That gentleman, who was a very gallant officer, went in a vessel to the Capes, and made his way to lord Cornwallis, undiscovered, through the whole French fleet, in an open boat. He got to York-town on the 10th of the month; and, soon after his arrival, had his head carried off by a cannon-ball.

After the return of admiral Graves to New York, a council of war was held, in which it was resolved, that a large body of troops should be embarked on-board the king's ships, as soon as they were refitted; and, that the exertions of both fleet and army should be made, in order to form a junction with lord Cornwallis. Sir Henry Clinton himself embarked on-board the fleet, with upwards of 7000 troops, on the 18th; they arrived off Cape Charles, at the entrance of the Chesapeake, on the 24th, where they received the mortifying intelligence, that lord Cornwallis had been obliged to capitulate five days before.

It was on the 19th of October, that lord Cornwallis surrendered himself and his whole army prisoners of war, to the combined armies of America and France. He made a defence suitable to the character he had before acquired for courage and military skill; but was compelled to submit to untoward circumstances and superior numbers. It was agreed by the articles of capitulation, that the British troops were to be prisoners to the United States of America, and the seamen to the French king, to whose officers also the British vessels found at York-town and Gloucester were to be delivered up. The British prisoners amounted to more than 6000; but many of them, at the time of surrender, were incapable of duty. A considerable number of cannon, and a large quantity of military stores, fell into the hands of the Americans on this occasion.

As no rational expectation now remained of a subjugation of the colonies, the military operations that succeeded in America were of little consequence. On the 5th of May, 1782, Sir Guy Carleton arrived at New York, being appointed to the command of the British troops in America, in the room of Sir Henry Clinton. Two days after his arrival, he wrote to general Washington, acquainting him, that admiral Digby was joined with himself in a commission to treat of peace with the people of America; transmitting to him, at the same time, some papers, tending to manifest the pacific disposition of the government and people of Britain towards those of America. He also desired a passport for Mr. Morgan, who was appointed to transmit a similar letter of compliment to the congress. General Washington declined signing any passport till he had taken the opinion of congress upon that measure; and by them he was directed to refuse any passport for such a purpose. However, another letter was sent to general Washington, dated the 2d of August, and signed by Sir Guy Carleton and rear-admiral Digby, in which they informed him, that they were acquainted by authority, that negotiations for a general peace had already commenced at Paris; that Mr. Grenville was invested with full powers to treat with all the parties at war, and was then at Paris in the execution of his commission. They farther informed him, that his majesty, in order to remove all obstacles to that peace which he so ardently wished to restore, had commanded his ministers to acknowledge the independency of the thirteen provinces the first instance, instead of making it the condition of a general treaty. But some jealousies were still entertained, that it was the design of the British court either to disunite them, or to bring them to treat of a peace separately from their ally the king of France: they therefore resolved, that any man, or body of men, who should presume to make any separate or partial convention or agreement with the king of Great Britain, or with any commissioner or commissioners under the crown of Great Britain, ought to be considered and treated as open and avowed enemies of the United States of America; and also that those States could not with propriety hold any conference or treaty with any com-

missioners on the part of Great Britain, unless they should, as a preliminary, thereto, either withdraw their fleets and armies; or else, in positive or express terms, acknowledge the independency of the said States. They likewise resolved, that any propositions which might be made by the court of Great Britain, in any manner tending to violate the treaty subsisting between them and the king of France, ought to be treated with every mark of indignity and contempt.

The most satisfactory assurances, however, on the part of the British chiefs, having been laid before congress, an immediate cessation of hostilities took place; and, on the 30th of November following, the provisional articles of peace and reconciliation between England and America was signed at Paris, by which Great Britain solemnly acknowledged the independency and sovereignty of the United States. These articles were ratified by a definitive treaty, September 3, 1783. This peace was negotiated on the part of Great Britain by Mr. Oswald, and the definitive treaty was signed by Mr. Hartley; and on the part of the United States by John Adams, and John Jay, Esqrs. and Dr. Benjamin Franklin. Holland acknowledged the independency of the United States of America on the 19th day of April, 1782; Sweden, February 5, 1783; Denmark, the 25th of February; Spain in March, and Russia in July, 1783.

Thus ended that long and arduous conflict, in which Great Britain expended near an hundred millions of money, with an hundred thousand lives, and won nothing; and in which America patiently endured every distress; lost an infinite number of lives, and much treasure; but eventually delivered herself from a foreign dominion, and gained a name among the nations of the earth.

ESTABLISHMENT of the UNITED STATES.

By the definitive treaty of peace between the king of Great Britain and the United States of America, the boundaries of these states are fixed to extend on the north from Nova Scotia, across the four great lakes Ontario, Erie, Huron, and Superior, assigning to the states the southern half of each, and in the latter the islands Royal and Phillippeaux; lake Michigan they possess entire: though these lakes have ever been considered as making a part of Canada, and no new regulation of limits has excluded them. This boundary is farther extended through the centre of the Lake of the Woods to its most western point. It may be supposed that a want of acquaintance with the geography of the country has caused it to be added "from thence on a due west course to the river Mississippi," for, if the boundary is carried due west, it will reach the Pacific Ocean, about one degree of latitude south of Nootka Sound. The line, in order to touch the Mississippi, should have been carried from the western side of the Lake of the Woods due south. In consequence of this inaccuracy, no boundary is settled throughout a space of near three degrees of latitude; it being resumed along the middle of the river Mississippi to thirty-one degrees north latitude, where that river begins to divide West Florida from Louisiana. The American States are bounded on the south by the two Floridas. They possess all the eastern coast from the mouth of the river St. Croix, in the bay of Fundy, to St. Mary's River, which divides Georgia from East Florida, and all islands within twenty leagues of any part of the shores.

The states with whom the king of Great Britain concluded this treaty were, New Hampshire, Massachusetts Bay, Rhode Island with Providence Plantation, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, and Georgia.

These states, in their fullest extent, comprise eighteen degrees of latitude, and thirty-three degrees of longitude; they are described as being 1250 miles in length, and 1000 in breadth: reaching from thirty-one degrees to forty-nine degrees north latitude, and from fifty-one degrees to

eighty-four degrees west longitude from Greenwich; but, as the Americans have fixed their meridian at the city of Philadelphia, the extent in longitude from that city is, from nine degrees east to twenty-four degrees west.

Although the longitudinal extent is laid down to be nearly double to the latitudinal, yet the limits are so intersected on the northward, that toward the north-west coast it lies in forty-five degrees, except a small district of land, which reaches to almost forty-seven degrees; but, in the interior country, on lake Erie, the boundary is on forty-two degrees: its greatest extent is on the coast, toward the north-east, where only it is forty-nine degrees. Its longitudinal extent, from New England on the east, to a little below Nootka Sound on the west, comprehends the whole continental breadth, from the Atlantic to the Pacific Ocean; and it is only in that part that its breadth is 1040 miles.

Mr. Hutchins, late geographer to the United States, computed that the surface contained within the boundaries so described, is one million of square miles, which comprehends 640 millions of acres; and he computes that of these, fifty-one millions are water, or about $\frac{2}{5}$ parts of the whole: so that the land within the United States amounts to 589 millions of acres; about three-fifths of which is comprised within the States which now compose the union; the remaining 220 millions of acres, which lie west of the northern and middle States, and north-west of of the river Ohio, and extend to the river Mississippi, together with an extensive territory south of the Ohio, originally ceded to the United States, by North Carolina, South Carolina, and Georgia, forms what is usually denominated "the western territory."

The face of the country belonging to the United States, is happily variegated with plains and mountains, hills and vallies. Some parts are rocky, particularly New England, the north parts of New York, and New Jersey, and a broad space, including the several ridges of the long range of mountains which run fourth-westward through Pennsylvania, Virginia, North Carolina, and part of Georgia, dividing the waters which flow into the Atlantic from those which fall into the Mississippi.

In this extent of country are to be found every species of soil that the earth affords; and in one part or other are produced all the various kinds of fruits, grain, pulse, and hortulane plants and roots, which are found in Europe, and have been thence transplanted to America; and besides these, a great variety of native vegetable productions.

The American States are composed of almost all nations, languages, characters, and religions, which Europe can furnish; the greater part, however, are descended from the English; and all may, perhaps with propriety, be denominated Federal Americans.

The English language is universally spoken in the States, and in it business is transacted, and the records are kept. It is spoken with great purity, and pronounced with propriety, in New England, by persons of education; and, excepting some few corruptions in pronunciation, by all ranks of people. In the middle and southern States, where they have had a great influx of foreigners, the language, in many instances, is corrupted in pronunciation. Attempts are making, however, to introduce an uniformity of pronunciation, throughout the provinces; which, for political, as well as other, reasons, it is hoped will completely succeed. Intermingled with the Americans, are the Dutch, Scotch, Irish, French, Germans, Swedes, and Jews; all these, except the Scotch and Irish, retain in a greater or less degree their native language, in which they perform their public worship, converse, or transact their business with each other.

The origin of the present system of government in America, had its rise from a general congress, which, as we have seen, was first held at Philadelphia, in September, 1774, and was composed of delegates chosen by the houses of representatives of each of the twelve old colonies, Georgia alone being unrepresented in that assembly; but it afterward acceded, and the number of members then

amounted to fifty-four, and a president; two years after, the number was reduced to forty-eight. In this assembly each colony had no more than a single voice, whether its deputation was more or less numerous; so that a contrariety of opinion among the deputies from any particular colony, if the majority were in favour of the measure, did not occasion a dissenting voice in the congress; the sense of any colony could not be taken if its deputies were equally divided in their opinions; which was likely frequently to occur, as seven of the colonies sent either two or four deputies; the other five were represented by three, five, seven, or nine.

In the year 1776 congress, by a solemn act, renounced allegiance to the king of Great Britain, and declared the American colonies to be Independent States. In March, 1781, articles of confederation were ratified; and the style of the confederation was settled to be, "United States of America." The particular articles agreed upon by this compact need not here be spoken of, as in a convention of all the states, which was held at New York, where general Washington presided, a new constitution was agreed upon, from which the delegates from Rhode Island alone dissented. It consisted of seven articles, which were transmitted to congress for their approbation, which having received, in the year 1789, general Washington was chosen president of the congress thus formed.

This new system of republican government retains much of the spirit of the English constitution; and those two essential securities to individuals in their persons and their property, the habeas corpus act and trial by jury, are retained. It unites the American States in a much closer confederation than the Helvetic union brought the Swiss Cantons, or even than the compact entered into by the Seven United Provinces of the Netherlands placed the Dutch. Indeed, in many important points, it is such a form of government as the world had not before seen. The most effectual measures seem to have been taken to remove what was formerly a fruitful source of animosity and dissension among the colonies, the undefined bounds of their respective territories, as every state has now renounced all right of deciding upon their claims, and has agreed that they shall be laid before congress, and decided upon by that assembly as a court of judicature. In this new form of government the several independent states may be said to have delegated to congress all the functions of government, except retaining their interior constitution, but deprived of the power of levying duties on merchandize, of equipping ships of war, of making foreign alliances, or waging war; for, as the preamble to the new constitution expresses it, in the federal government of these states, "it is impossible to secure all right of independent sovereignty to each, and yet provide for the interest and safety of all."

The president of the congress, the senate, and representatives, form a legislative body somewhat similar to the king, lords, and commons, of Great Britain, in that every act of congress must have a majority of votes in the two houses, and receive the assent of the president, before it can pass into a law; but the American constitution differs in many particulars: the president of the congress has not a power absolutely to negative any bill; he can only refuse his assent, and at the same time is required to assign the reasons on which he founds his refusal; the business is then to undergo a fresh discussion in both houses, and the bill must be passed by two-thirds of the members of each house, which then constitutes it a law without the concurrence of the president.

No specific portion of property, whether real or personal, is required to be possessed as a qualification either for a representative, a senator, the vice-president, or the president. Nor is any one excluded on account of the religious principles which he professes, whatever they may be; so that Jews or Roman Catholics are as eligible as any other citizens. The house of representatives are chosen every two years, by the people of the several states. The only legal requisites in a candidate are his having attained

to twenty-five years of age; having been seven years a citizen of the United States; and, at the time of his election, an inhabitant of the state by which he is chosen; the holding of any place of honour, trust, or emolument, is an absolute disqualification. In this representation there is no distinction of knights, citizens, and burgeses; it not being made out of counties, cities, and borough-towns; for the exclusive rights and peculiar privileges of corporations are entirely unknown here. The design of the new constitution is, that the number of representatives in congress shall not exceed one representative for every 30,000, but that each state shall have at least one representative. An enumeration or census of inhabitants was made soon after the first meeting of the new congress, and a fresh enumeration is to be taken within every subsequent term of ten years.

In the year 1790, a census was made of all the inhabitants; when they were classed as follows:

Free white males, from sixteen years of age and upward	- - -	807,094
Free white males under sixteen	- - -	794,900
Free white females, without discrimination of age	- - -	1,541,263
All other free persons, of either sex, and all ages	- - -	59,150
Slaves	- - -	694,280
		<u>3,896,687</u>

The south-west territory was found to contain inhabitants, in the whole, to the amount of

35,691
3,732,378

To the honour of the state of Mayne and Massachusetts, there was not a slave found there. Virginia had 292,627, and Pennsylvania 3,737.

The present state of representation is, arranging the several states according to the time when each acceded to the general confederacy,

Delaware	- - - - -	1
Pennsylvania	- - - - -	13
New Jersey	- - - - -	5
Georgia	- - - - -	2
Connecticut	- - - - -	7
{ Mayne	- - - - -	2
{ Massachusetts	- - - - -	12
Maryland	- - - - -	8
South Carolina	- - - - -	6
New Hampshire	- - - - -	4
Virginia	- - - - -	19
New York	- - - - -	10
North Carolina	- - - - -	10

The above twelve states acceded to the new constitution in the year 1789.

Rhode Island, acceded May 29, 1790	- - -	2
Vermont, January 10, 1791	- - -	2
Kentucky, June 1, 1792	- - -	2
		<u>105</u>

The salaries paid to the great officers who conduct the affairs of government are,—The president of the congress, and commander in chief of the military and naval forces, 25,000 dollars, (5,300l. sterling.) Vice-president, and president of the senate, 5,000 dollars, (1,060l.) The speaker of the house of representatives, twelve dollars per diem during his attendance, (2l. 11s.) The members of the senate and house of representatives, six dollars (1l. 5s. 6d.) for every day's attendance; as well as for every twenty miles travelling to and from the seat of government. The secretary of the senate and clerk of the house of representatives, each 1,500 dollars, (320l.) The chief justice of the supreme court, 4000 dollars, (850l.) The four associated justices, 3,500 dollars each.

The estimated amount of foreign debt, on the 4th of August, 1790, when an act was passed to make provision for the debts incurred by the war, appeared to be 11,710,378 dollars, or 2,488,455l. sterling; the estimated amount of the domestic debt, with the arrears of interest to the 31st

of December, 1790, as reported to the house of representatives by their secretary, was,

Liquidated,	- - -	40,414,085
Unliquidated,	- - -	2,000,000
Dollars,	- - -	<u>42,414,085</u>

Or 9,012,992l. sterling. To discharge which, a subscription was opened for a loan, on the 30th of September, 1793, and nearly a sufficient sum was subscribed; the amount being 39,635,248 dollars.

The American States in their house of commons are not represented by above one-third of the number by which the people of Great Britain are represented in their house, calculating upon the supposed population of each country. The senate of the United States, which may be considered as the upper house of parliament, is composed of two senators from each state, chosen, not from the people at large, but from the legislature thereof. No one can be chosen a senator who has not attained to thirty years of age, who has not been nine years a citizen, and is not a resident in the state where he is chosen: he cannot hold any place of honour, trust, or profit. These senators, when assembled, are divided into three classes; those in the first class vacate their seats at the expiration of the second year; those of the second class, at the end of the fourth year; and of the third class, at the expiration of the sixth year.

The president of the United States, in whom is vested the executive power, and who must not be under thirty-five years of age, is chosen by the nomination of each state, who for this purpose names two, and the person upon whom the largest number of suffrages falls obtains this distinguished rank, which is held for four years. In like manner the vice-president is to be elected, and for the same term. The latter is president of the senate. The president, vice-president, senate, and representatives, are paid for their services at a rate settled by law, and out of the treasury of the United States.

As the first regulation, by which each State had only one vote in congress, is abolished, and the majority of voices among the representatives now carry a question, the weight of interest which the largest colonies possess in that house may be considered as greatly predominating over the smaller states, who send only one or two representatives each; but, as the senate is composed of two delegates from every state, and no bill can pass into a law without the concurrence of that house, the interest of each state is equally maintained there. The executive powers of the president are likewise subject to the advice and controul of the senate, by which participation of power each state has an equal opportunity of being informed of the secret measures which are pursuing by government, and an equal power of enforcing or checking them.

That both the legislative and executive branches of government, over more than three millions of people, should be placed, when first formed, in the hands of only ninety-three persons, might be considered as dangerous to the pure principles of a republican constitution, by tending to cause it to degenerate into an aristocracy; but the most effectual precautions seem to have been taken to repress the spirit of ambition, and the views of aggrandisement inherent in human nature, by every individual being chosen for a short term, from his being inhibited from enjoying any kind of post, or receiving, without permission, any kind of present.

The president, by virtue of his office, is commander in chief of the army and navy, and of the militia of the several states, when called into the actual service of the union. He has power to grant reprieves and pardons for offences against the United States, except in cases of impeachment. With the advice and consent of the senate, he has the power to make treaties, but the concurrence of two-thirds of the senators present is necessary to render such an act valid. He nominates, and, with the advice and consent of the senate, appoints, ambassadors, consuls, judges of the supreme court, and all other officers of the United States, not otherwise appointed by the constitution.

He

He may, on extraordinary occasions, convene both houses, or either of them; and, in case of disagreement between them with respect to the time of adjournment, he may adjourn them to such time as he shall think proper. He receives ambassadors; and other public ministers, and is empowered to take care that the laws be faithfully executed.

The congress has the power to impose and collect taxes, duties, imposts, and excises, to pay the debts, and provide for the common defence and general welfare, of the community; but all duties, imposts, and excises, are to be uniform throughout the United States. To borrow money on the public credit. To regulate commerce with foreign nations, also among the several states, and with the Indian tribes. To coin money, to regulate the value thereof, and of foreign coin; and to fix the standard of weights and measures. To constitute tribunals inferior to the supreme court. To declare war, grant letters of mark and reprisal. To raise and support armies; but no appropriation of money to that use can be for a longer term than two years. To provide and maintain a navy. To provide for, call forth, arm, and discipline, the militia: each state to appoint the officers of their militia, and to possess the authority of training them, according to the discipline prescribed by congress. All bills for raising a revenue to originate in the house of representatives. The privilege of the writ of *habeas corpus* shall not be suspended, unless when, in cases of rebellion or invasion, the public safety may require it. No money shall be drawn from the treasury but in consequence of appropriations made by law, and a regular statement and account of the receipts and expenditure of all public money shall be published from time to time. No title of nobility shall be granted by the United States; and no person holding any office of profit or trust under them shall, without the consent of the congress, accept of any present, emolument, office, or title, of any kind whatever, from any king, prince, or foreign state. Each particular state is, by this confederation, debarred from entering into any treaty, alliance, or confederation, coin money, emit bills of credit, make any thing but gold and silver coin a tender in payment of debts, or grant any title of nobility. No state shall, without the consent of the congress, lay any imposts or duties on imports or exports, except what may be absolutely necessary for executing its inspection-laws; whilst the nett produce of such duties shall be for the use of the general treasury, and subject to the revision and controul of congress.

On surveying the nature of the government thus established in the United States, it will appear, that the genuine spirit of the British constitution has been much diffused through that of America. The code of laws which this new state will adopt, is likely to partake no less of the principles of the principles of British jurisprudence, but it is to be hoped that it will be as much simplified, and divested of legal chicane and circuitry, as is consistent with the judicial preservation of freedom. It is highly gratifying to an Englishman, when viewing these interesting events, to reflect, that not only the constitution and laws of his country will be thus perpetuated over a continent, which in future ages must be immensely populous, but that his language will be preserved there so long as the world shall endure. In the late war, whilst the French officers served in America, many of them were solicitous to become acquainted with the language spoken in the country, and it was at that time no small mortification to the Americans to consider it as the language of their invaders: it became therefore common among them to call the English language "the American," and to say to such foreigners as spoke it, "you speak American well." The marquis de Chastellux says, that they carried their aversion to the language so far as seriously to propose introducing another language, which should be taught in schools, and made use of in all public acts; but these resentful feelings have happily subsided.

The third congress was assembled in December 1793, when the illustrious George Washington was re-chosen

president; nor was there another man in any degree qualified like him to fill that dignified and important station; yet it is much to be apprehended that such a re-election at the commencement of the constitution, may furnish a precedent which, in future times, will prove very injurious to its original purity, as well as essential principle. Experience has fully proved, that elective offices, if not carefully guarded, are liable to be converted into tenures for life, and it may be deemed a discussion of much nicety, as well as importance, whether it had not been more advisable for the states to have lost the ostensible services of that great man for the four succeeding years, rather than by reinstating him to lay a foundation for a destructive innovation in future times; and such a sacrifice of present advantage to futurity, would have utterly frustrated all attempts of ambitious men hereafter to gain the presidency for life.

The three national objects of the government in the United States, are the encouragement of agriculture, commerce, and manufactures. The richness of the soil, which amply rewards the industrious husbandman; the temperature of the climate, which admits of steady labour; the cheapness of land, which tempts the foreigner from his native home; renders agriculture the great leading interest of America. This furnishes outward cargoes, not only for all their own ships, but for those also which foreign nations send to their ports; or, in other words, it pays for all their importations; it supplies a great part of the clothing of the inhabitants, and food for them and their cattle. What is consumed at home, including the materials for manufacturing, is four or five times the value of what is exported.

The number of people employed in agriculture, is at least three parts in four of the inhabitants of the United States; some say more. It follows of course that they form the body of the militia, who are the bulwark of the nation. The value of their property occupied by agriculture, is many times greater than the property employed in every other way. The settlement of waste lands, the sub-division of farms, and the numerous improvements in husbandry, annually increase the pre-eminence of the agricultural interest. The resources they derive from it, are at all times certain and indispensably necessary: besides, the rural life promotes health, by its active nature; and morality, by keeping the people from the luxuries and vices of populous towns. In short, agriculture is the spring of their commerce, and the parent of manufactures.

Yet the vast extent of sea-coast, which spreads before the confederated states; the number of excellent harbours and sea-port towns they possess; the numerous creeks and immense bays, which indent the coast; and the rivers, lakes, and canals, which peninsulate the whole country; give the United States superior advantages for trade. Their commerce, including their exports, imports, shipping, manufactures, and fisheries, may properly be considered as forming one interest. This has been considered as the great object, and the most important interest, of the New England States.

The consumption of fish, oil, whale-bone, and other articles obtained through the fisheries, in the towns and counties that are convenient for navigation, has become much greater than is generally supposed. It is computed that no less than 3000 barrels of mackarel, salmon, and pickled cod-fish, are vended annually in the city of Philadelphia; add to them the dried fish, oil, spermaceti candles, whale-bone, &c. and it will be found that a fleet of sloops and schooners are employed in the business.

The quantity of furs, deer and elk skins, annually imported from the northern parts of America to England, is prodigious. In 1784, the amount of sales for furs was more than 245,000*l*. It has not equalled this sum every year since, but has seldom varied more than from ten to twenty thousand pounds, and this often on the favourable side. When we consider the number of animals destroyed to furnish such extensive products, the mind feels itself

lost in contemplating the vast tract of country that could afford an habitation for them.

Manufactures, in the United States, are as yet in their infancy; the country abounds, however, with the raw materials for almost every purpose useful to mankind. Iron is found in various parts of the continent, in great abundance, and of almost every quality; and manufactures of edged tools, implements of husbandry, fire-arms and military weapons, spikes, nails, &c. are carried on to a considerable extent. The latter articles are manufactured chiefly by water-mills, the finishing of which employs a great number of boys, whose early habits of industry are of importance to the community, to the present support of their families, and to their own future comfort. It is no less curious than true, that in certain parts of the United States, the making of nails is an occasional family manufacture.

Coppersmiths and brass-founders, particularly the former, are numerous in the United States. The material is a natural production of the country. In many parts of the States mines of copper have been actually wrought. Lead also abounds in great plenty, and requires little to unfold it to an extent more than sufficient for every domestic occasion. A prolific mine of it has long been open in the south-western parts of Virginia; and, under a public administration, during the late war, yielded a considerable supply for military use. This is now in the hands of individuals, who not only carry it on with spirit, but have established extensive works at Richmond, in the same state.

As an important instrument of manufactures, fossil coal may, without impropriety, be mentioned among the subjects of the present remarks. There are several coal-mines in Virginia now worked; and appearances of their existence are familiar in several of the other states. As an article of household fuel it is an interesting production; and its importance to navigation, as a boundless source of traffic coastwise, is signally exemplified in Great Britain.

There is scarcely any manufacture of greater importance to the United States, than that of skins. The direct and very happy influence it has upon agriculture, by promoting the raising and growth of cattle of different kinds, is a very material consideration. Tanneries are now carried on as a regular business in many of the states, and they constitute in some places a valuable item of incidental family manufacture. Cabinet wares, and household furniture, likewise constitute an extensive branch of their domestic trade.

Manufactures of the several species of grain have made considerable progress in the United States; and are entitled to peculiar attention, not only because they are most of them so intimately connected with the subsistence of the people, but because they enlarge the demand for the most precious products of the soil. Breweries are now carried on very successfully; and, in order to discourage the use of spirituous liquors, a low duty has been imposed upon them; which, however, has been the means of introducing the excise-laws into America.

Manufactures of flax, hemp, and cotton, have already made considerable progress in the United States. Cotton works, not long since established at Beverly, in Massachusetts; at Providence, in the state of Rhode Island; and at New York; seem to have overcome the first obstacles to success: producing corduroys, velvets, fustians, jeans, and other similar articles, of a quality which will bear a comparison with the like articles from Manchester. Some essays are also making in the printing and staining of cotton goods; and there are several small establishments of this kind lately set on foot, that bid fair to grow into the first importance. A promising essay towards the fabrication of cloths, kerseymeres, and other woollen goods, is likewise going on at Hertford, in Connecticut. Specimens of the different kinds which we have seen, evince that these fabrics have already attained a considerable degree

of perfection. Household manufactures of woollen articles are carried on, in different parts of the United States, to a very interesting extent; and many thousands of families spin and make up their own clothing. Hats of wool, and of wool mixed with fur, are made in large quantities; and constitute a very productive manufacture, rapidly extending over the whole North American continent.

The production of silk is attended with great facility in most parts of the United States; but flourishes most in Connecticut, where silk stockings, handkerchiefs, ribbons, buttons, &c. are now made in tolerable quantities. A manufactory of lace has also been established at Ipswich, in the state of Massachusetts, which bids fair to answer every purpose of the proprietor.

Different manufactures of glass are now on foot in the United States. The sands and stones called *targa*, which include flinty and crystalline substances, and the salts of various plants, particularly kali or kelp, constitute the essential ingredients, and are every where to be found in North America. An extraordinary abundance of fuel, which is always at hand, gives great advantage to the undertaking. Considerable progress has been likewise made in the manufacture of gunpowder; and the encouragement given to it by the government, bids fair to make it an extensive article of commerce.

Manufactures of paper are among those which are arrived at the greatest maturity in America, and are most adequate to a national supply. That of paper hanging is also a branch in which respectable progress has been made. Refined sugars and chocolate are among the number of extensive and prosperous domestic manufactures; and that of maple sugar particularly, has of late become an interesting object of national attention. It is made from the sap or juice of the *ACER*, or maple-tree, which grows spontaneously in North America; and yields, by an easy process, great quantities of sugar, in every respect equal to that which is imported from the West-India islands. The manufacture of wines is also growing into respectability among the United States. Successful experiments have been made by some French settlers on the river Ohio, which evince the practicability of producing home-made wines of excellent quality; and, as grapes are the spontaneous production of the country, and, by culture, might be raised in any quantity, in great perfection, this manufacture bids fair to diminish, and in time, perhaps, wholly to preclude, foreign importation. It is further a pleasure to remark, that public improvements of every kind, in the United States of America, appear to go hand in hand with the extension of their commerce, and the growth of their manufactures. In the space only of three years, from the end of 1790 to the end of 1793, more public funds and private capitals have been applied to the improvement of roads and rivers, and the cutting of canals, than have been expended from the first settlement of the colonies up to that time.

The naval and military establishments of the United States are wisely kept upon a narrow footing. To aim at such a navy as the principal maritime powers of Europe possess, would be a useless waste of their revenue. As they have no possessions to protect abroad, nor any ambitious view of extending their dominions, it is deemed sufficient that ships enough be kept to repel any hostile attempt of those nations of Europe that are weak on the sea; because circumstances exist, which render even the stronger ones weak as to them. Providence has placed the richest and most defenceless European possessions at their door, and obliged its most valuable commerce to pass by their shores. To protect either of these, a small part only of any European navy would ever be detached across the Atlantic; and the dangers to which the elements expose them there, have been too often fatally experienced by the principal potentates of Europe. Hence a small naval force will at all times be sufficient to cope with such detachments, as well as to protect the American territory, and annoy the commerce of their enemies. Their mili-

tary strength lies chiefly in a well-disciplined militia. Five thousand regular troops were, however, in 1794, enlisted for the term of three years; and, on account of the present posture of affairs, it was proposed to encrease the number to 15,000; but, after mature deliberation, the house of representatives refused to comply, rather chusing, in case of a war, to trust to the energy and exertions of their militia, than risk the introduction of a standing army.

With respect to religion, we find a vast number of different sects dispersed over the United States; yet the spirit of toleration prevails among them to the fullest extent. In the New England provinces, the presbyterians and independents are most numerous; but, in Connecticut, the form of worship and ecclesiastical government of the church of England prevail. More to the southward the Quakers are extremely numerous, and the Moravians are increasing and flourishing greatly. Methodism likewise spreads very wide; but it has been said by an extensive observer of the present prevailing manners in these States, that the prevalent religion of the principal inhabitants of America, and particularly to the southward, is pure *deism*; called by the name of *philosophy* in Europe. A spirit which has contributed in no small degree to the revolution, and produced their unfettered constitutions of freedom and toleration.

When the independence of the American States was acknowledged by the British government, it became necessary that the clergy who adhered to the discipline of the church of England should obtain ordination, and that all ecclesiastical affairs should be transacted without crossing the Atlantic, and applying to an English bishop. At length an act of parliament was passed in Great Britain, authorising the metropolitan to consecrate American bishops. These now ordain priests and deacons for the service of the church of England there, but have no revenues annexed to their sees, and are no otherwise distinguished from the body of the clergy, than by pre-eminence of rank. In short, religion, in the United States, is placed on its proper basis. Without the feeble and unwarranted aid of the civil power, it is left to be supported by its own internal evidence, by the lives and manners of its professors, and by the almighty care of its Divine Author.

AMERICAN NIGHT-SHADE, *f.* in botany. See PHYTOLOACCA.

AMERICAN EARTH-NUT, *f.* in botany. See ARACHIS.

AMERICUS VESPUTIUS, a Florentine gentleman, from whom America improperly derived its name. The merchants of Seville, having obtained permission to attempt discoveries as private adventurers, sent out four ships in 1499, under the command of Alonzo de Ojeda (who had accompanied Columbus in his second voyage), assisted by Americus Vesputius, who was known to be deeply skilled in the science of navigation. This fleet touched on that part of the western continent already discovered by Columbus, whose track Ojeda followed; and Americus, who was a man of much address, as well as possessed of considerable literary talents, by publishing the first voyages on the subject, and other artful means, gave his name to the New World, in prejudice to the illustrious Genoese. The imposture, though long detected, has been sanctified by time; and hence the fourth division of the globe, so long unknown to the inhabitants of Europe, Asia, and Africa, continues to be distinguished by the name of AMERICA.

AMERIM'NUM, *f.* [*αμνημονον*, Gr. any thing void of care, or in a state of security; from the careless flow of the branches.] In botany, a genus of the diadelphica decandria class, ranking in the natural order of papilionaceæ or leguminosæ. The generic characters are—Calyx: perianthium one-leaved, tube bell-shaped, five-toothed; teeth sharp. Corolla: papilionaceous; standard with an oblong claw, roundish, heart-shaped, expanding, convex; wings lanceolate, shorter than the standard; keel short. Stamina: filaments ten, conjoined; antheræ roundish. Pistillum: germ pedicelled, oblong, compressed-leafy, varicose, with lateral veins, within woody, not gaping; cells

disposed longitudinally within. Seeds: solitary, kidney-shaped, thicker at the base, appendicled at the tip.—*Essential Character.* Calyx two-lipped; legume compressed-leafy, two-valved, gaping; seeds few, solitary.

Species. 1. *Amerimum Brownei*: unarmed; leaves petioled, alternate, subcordate-ovate; racemes compound, axillary and lateral. This shrub rises commonly to the height of about ten feet, and supports itself upon other shrubs. It divides into long round branches, covered with a blackish bark, and sub-dividing into a great number of alternate twigs. Leaves quite entire, sharp, shining, two or three inches in length. The common peduncles sustain about ten flowers; which are small, white, and have a very sweet scent: they come out in great abundance after the rainy season. The standard of the corolla after fecundation becomes erect, whereas before it spread out wide. Native of Carthage, Jamaica, and Domingo.

2. *Amerimum ebenus*, or prickly amerimum or Jamaica ebony: spiny; leaves subsessile aggregate obovate-oblong, peduncles two-flowered. The second sort is very common in Jamaica, and several other places in the West Indies, where the wood is cut, and sent to England under the title of ebony, though it is not the true ebony, which is a native of the eastern country, and is a plant of a very different genus. The wood of this American ebony being of a fine greenish brown colour, and polishing very well, is much coveted by the instrument-makers; and is of a very hard durable nature. Dr. Browne adds, that the small dimensions of this shrubby tree render it fit only for few purposes, the trunk seldom exceeding three or four inches in diameter: but that the slender branches, being very tough and flexible, are frequently used for riding switches, and generally kept at all the wharfs about Kingston, to scourge the refractory slaves. This tree has a pretty thick stem which rises twelve or fourteen feet high, covered with a rugged brown bark, and divides into many spreading branches, which grow almost horizontal, and are armed with short brown crooked spines. The leaves are small, stiff, and wedge-shaped, coming out in clusters, and sit close to the branches. The flowers come out upon slender foot-stalks from the side of the branches singly; they are of a bright yellow colour, and are succeeded by compressed moon-shaped pods, which inclose one kidney-shaped seed.

Propagation and Culture. The second sort is propagated by seeds, which must be procured from the countries of its natural growth, for the plants do not produce seeds in this climate. These seeds should be sown in pots filled with light fresh earth early in the spring, and plunged into a good hot-bed of tanner's bark, or placed in tan under pots, as their covers are very hard. In about six weeks the plants will appear, when they must be carefully treated, being very tender while young; they must have fresh air admitted to them every day when the weather is warm, and should be frequently refreshed with water when the earth in the pots appears dry. In about five or six weeks after the plants appear they will be fit to transplant, when they should be carefully shaken out of the pots and separated, planting each into a small pot filled with light rich earth, and then plunged into the hot-bed again, being careful to shade them from the sun every day until they have taken root; after which time they must be treated in the same manner as other very tender exotic plants, by giving them air every day in warm weather, and watering them once in two or three days gently, and, when the nights are cold, to cover the glasses. In this hot-bed the plants may remain till autumn, when they must be removed into the stove, and plunged into the bark-bed. Those of them whose roots have filled the pots, should be carefully shifted into pots one size larger before they are plunged; but, as these plants are not of quick growth while young, they do not require to be often shifted out of the pots. During the winter season these plants must be kept warm, especially the first year, and must have but little water, and in cold weather it must be given to them in small

small quantities; and, if their leaves should contract filth, they must be washed with a sponge to clean them, otherwise the plants will not thrive. As these plants are very tender when young, they will not live in the open air in this country, even in the warmest part of the year; therefore they must be constantly kept in the stove, and should be kept plugged in the bark-bed, observing in the summer season, when the weather is warm, to admit a large share of fresh air to the plants; but, when they have obtained strength, they may be exposed for three months in a warm situation in the summer.

AM'ERSFORT, a considerable town of the Netherlands, in the province of Utrecht. It carries on a manufacture of dimity and bombazines, and is seated in a fertile country, on the river Ems, twelve miles east of Utrecht. Lat. 52. 14. N. lon. 5. 22. E.

AM'ERSHAM, [*Agmundesham*, from *ac* in oak, *mund* a fence or mound, and *ham*, Sax. a village, q. d. a village fenced from the violence of the winds with a row of oaks; or from *Agmundas*, the builder of it.] A borough-town in Buckinghamshire, twenty-six miles from London. It has a market on Tuesday, and a fair on Whit-Monday for cattle, as also a statute-fair on the 19th of September. The chief manufactures are lace, which is considerably large, chiefly black lace; the facking manufacture, which is but small; and a manufactory for white cotton goods, by a machinery of the newest construction. This town lies in a vale between woody hills, near the river Colne, and has a free-school, founded in the reign of queen Elizabeth, and four alms-houses. Amersham consists of a long street, in the road from Uxbridge to Buckingham, divided about the middle by a shorter cross-street; in the intersection of which stands the church. The living is said to be the best in England. The town sends two members to parliament, and its town-hall, or market-house, is the handsomest in the county. Lat. 51. 47. N. lon. 0. 15. W.

A'MERY, or A'MERICK, [*earice*, Sax. always rich.] A proper name of men.

A'MES (William), a learned divine, famous for his controversial writings, was born in 1576, and educated at Christ's college, in Cambridge. In the reign of James I. he left the kingdom, on account of his being unwilling to conform to the rules of the church; and retired to the Hague, where he was invited to accept of the divinity-chair in the university of Franeker, in Friesland, which he filled with admirable abilities for above twelve years; during which his fame was so great, that many came from remote nations to be educated under him. His controversial writings, which compose the greatest part of his works, are chiefly against Bellarmine and the Arminians. He also wrote, *A fresh Suit against the Ceremonies; Lectures on Psalmos Davidis; Medulla Theologiæ*; and several pieces relative to the sciences. He died of an asthma at Rotterdam, in November 1633.

AMES ACE, *f.* [a corruption of the word *ambs ace*, which appears, from very old authorities, to have been early softened by omitting the *b.*] Two aces on two dice:

But then my study was to cog the dice,
And dext'rously to throw the lucky sice:
To shun *ames ace*, that swept my stakes away;
And watch the box, for fear they should convey
False bones, and put upon me in the play. *Dryden.*

AMESS', *f.* [corrupted from *amice*.] A priest's vestment.

AMESTRA'TA, a town of Sicily; now *Mistretta*, in the Val di Demona, on the river Halesus. It was a very strong fort of the Carthaginians, besieged in vain by the Romans for seven months with considerable loss; at length, after another siege, taken and raised.

AMETHO'DICAL, *adj.* [from *a* and *method*.] Out of method; without method; irregular.

A'METHYST, *f.* [*αμεθυστος*, Gr. of *α* priv. and *μεθυσω*, to make drunk.] A transparent gem of a purple colour, which seems composed of a strong blue and a deep red; and, according as either of these prevails, affording diffe-

rent tinges of purple, sometimes approaching to violet, and sometimes even fading to a pale rose-colour. Though the amethyst is generally of a purple colour, it is nevertheless sometimes found naturally colourless, and may at any time be easily made so by putting it into the fire; in which pellucid or colourless state, it so resembles the diamond, that its want of hardness seems the only way of distinguishing it. Some derive the name *amethyst* from its colour, which resembles wine mixed with water; whilst others, with more probability, think it got its name from its supposèd virtue of preventing drunkenness; an opinion which, however imaginary, prevailed to that degree among the ancients, that it was usual for great drinkers to wear it about their necks. Be this as it will, the amethyst is scarcely inferior to any of the gems in the beauty of its colour; and in its purest state is of the same hardness, and at least of equal value, with the ruby and sapphire. It is found of various sizes, from the bigness of a small vetch to an inch and a half in diameter, and often much more than that in length. Its shape is extremely various, sometimes roundish, sometimes oblong, and at others flattened, at least on one side; but its most common appearance is in crystalliform figure, consisting of a thick column, composed of four plants, and terminated by a flat and short pyramid, of the same number of sides; or else, of a thinner and longer hexangular column; and sometimes of a long pyramid, without any column. It makes the gayest figure in the last of these states, but is hardest and most valuable in the roundish and pebble-like form. The amethyst is found in Persia, Arabia, Armenia, and the East and West Indies, and in several parts of Europe.

Counterfeit or factitious AMETHYSTS. Spars and crystals tinged red and yellow, &c. are sold for amethysts. The false ones come from Germany, are tinged by vapours in the mines, and contain some lead. Amethysts may likewise be counterfeited by glass, to which the proper colour or stain is given. There were fine ones made in France about the year 1690, which may even impose on connoisseurs, unless the stone be taken out of the collet. The method of giving this colour to glass is directed as follows: Take crystal frit, made with the most perfect and fine tarso; then prepare a mixture of manganese in powder, one pound; and zaffar prepared, one ounce and a half. Mix these powders well together; and add to every pound of the frit an ounce of this powder. Let it be put into the pots with the frit, not into the already-made metal. When the whole has stood long enough in fusion to be perfectly pure, work it into vessels, and they will resemble the colour of the amethyst.

AMETHYST, in heraldry, a term for the purple colour in the coat of a nobleman, in use with those who blazon with precious stones, instead of metals and colours. This, in a gentleman's escutcheon, is called *purple*; and in those of sovereign princes, *mercury*.

AMETHYSTEA, *f.* [from the *amethystine* colour of the flowers.] In botany, a genus of the diandria monogynia class, in the natural order of verticillatæ. The generic characters are—Calyx: perianthium one-leaved, tube bell-shaped, angular, semiquinquefid, subequal, acuminate, permanent. Corolla: one-petalled, ringent, little longer than the calyx; border five-parted, subequal; upper lip erect, rounded, concave, two-parted, gaping; lower three-parted, the sides rounded, erect, shorter; the middle quite entire, concave, the length of the upper lip. Stamina: filaments filiform, approximating, under the upper lip, and longer than it; antheræ simple, roundish. Pistillum: germ quadrifid; style size of the stamens; stigmas two, acute. Pericarpium: none, but the calyx becomes more bell-shaped and spreading. Seeds: four, shorter than the calyx, obtuse, angular within.—*Essential Character.* Corolla quinquefid; the lower division more spreading. Stamina approximated. Calyx subcampanulate. Seeds four, gibbous.

There is only one species, called *amethystea cærulea*. It is an annual plant with an upright stalk, which rises

about a foot high; toward the top it puts out two or three small lateral branches, with small trifid leaves, fawed on their edges, of a very dark green colour; at the extremity of the branches the flowers are produced in small umbels; they are of a fine blue colour, as are also the upper part of the branches, and the leaves immediately under the umbel; so that, although the flowers are small, yet from their colour, with that of the upper part of the stalks, the plants make a pretty appearance, during their continuance in flower. If the seeds of this plant are sown in the autumn, or are permitted to scatter, the plants will come up early the following spring, and these will flower the beginning of June; but those which are sown in the spring will not flower till July; and, in dry seasons, the seeds will remain in the ground a whole year, so that the best time for sowing them is in the autumn. This plant is a native of the mountains of Siberia, from whence the seeds were sent to the imperial gardens at Petersburg, where the plants flourished and perfected their seeds, part of which were sent to Mr. Miller by Dr. Ammann, which grew in 1759 in the Chelsea garden, where the plants annually produce seeds.

When the plants come up, they will require no other care but to keep them clean from weeds, and, where they are too close, to thin them; for they do not thrive when transplanted, therefore the seeds should be sown where they are to remain.

AMETHYSTINE, *adj.* Resembling an amethyst in colour.

AMHAR, or **AMHARA**, a province of Abyssinia, said to extend forty leagues from east to west. It is considered as the most noble in the whole empire, both on account of its being the usual residence of the Abyssinian monarchs, and having a particular dialect different from all the rest, which, by reason of the emperors being brought up in this province, is become the language of the court and of the politer people. Here is the famed rock Ambageshen, where the young monarchs were formerly confined.

AMHERST (Lord). This gentleman, who has spent a long and active life in the service of his country, was major-general and commander of the land-forces in the expedition against Louisbourg in the year 1758. The land-forces amounted to about 14,000 men, including some light troops, fitted out for the peculiar service of the country. The fleet arrived at Halifax, in Nova Scotia, on the 9th day of May, failed from thence on the 28th of the same month, and, on the 2d day of June, appeared before Louisbourg. For six days they remained on the coast without being able to effect a landing, owing to the prodigious surf which swelled all along the shore, so that no boat could possibly live near it. The French, not trusting to this obstacle, had drawn intrenchments in every part where it might be possible to land, supported them with batteries in convenient places, and lined them with a numerous infantry. At length the surf, though violent at first, was observed to be somewhat abated, and the admiral and general did not lose a moment to avail themselves of this first opportunity of landing: they made all their dispositions for it with the highest judgment. The frigates were ordered to rake the enemy on the right and left, whilst the troops were disposed for landing in three divisions. That on the left was destined to the real attack. The divisions in the centre and to the right were meant only as feints, to draw the enemy's attention to all parts, and to distract their defence. The landing being effected, the centre division of the army moved forward, and was followed by the third division on the right; so that, in the course of that day, the whole British army made good their landing with inconsiderable loss. The interval of calm weather, which had befriended the operation thus far, was of very short continuance; it was succeeded by tempests, which continued several days, and caused a prodigious surf, which rendered it impossible to land the artillery and ammunition necessary to begin the siege. But the excellent conduct of general Amherst, by degrees,

overcame all the difficulties of the weather, which was extremely unfavourable, as well as those of the ground, which was rugged in some places, and boggy in others. At the same time the garrison defended the place with great resolution. Nor were the French destitute of means of defence, for in the harbour they had five sail of the line, each of which could bring a broadside to bear on the English troops as they advanced. It was therefore necessary to secure a point, called the light-house battery, which in some measure commanded the harbour. The possession of this spot greatly accelerated the reduction of the place; for, on the 25th day of June the island battery, which had been a great annoyance to the besiegers, was effectually silenced. Still, however, the advances were very gradual, for the ships in the harbour yet continued to fire with considerable effect. Fortunately, on the 21st day of July, one of the ships blew up, and spread its flames to the two next adjoining, whereby they were presently consumed to the water's edge. This was a decisive advantage gained. The approaches were now brought near the covered way, and it was expected that a lodgement would soon be made in it; the fire from the besieged grew less. By this time the fortifications had suffered great injury, and a considerable part of the town was reduced to ashes; so that the garrison soon after became prisoners of war, and amounted, with the irregulars and seamen, to 5637 men.

According to the plan laid down in England, for the reduction of Quebec and Montreal, we find general Amherst in motion, with some of his troops, as early as the first of May, 1759. He arrived at Albany on the 12th, and set out for Fort Edward on the 3d of June; the regular regiments being posted on the road to bring up the provisions in the batteaux; and all precautions were used to prevent a surprise. But, not to mention the difficulty of bringing up the batteaux, &c. for transporting the army, such was the behaviour of some individuals in that part of the world, without whose concurrence nothing could be done effectually, that general Amherst's progress was greatly obstructed: the impediments he met with protracted the time till the summer was far advanced before he could get his forces across Lake George. They landed on the 21st of July, and reached the field where their countrymen had fallen with so great a slaughter, and were obliged to retreat, before Ticonderoga, in the preceding year; but which hitherto-impregnable post, the enemy judging from the precaution and wise dispositions, and bold advances into their lines, with bayonets fixed, made by the approaching besiegers, that it would be impossible for them to maintain their post; and that their retreat from place to place, within the centre of operations, to cover Quebec, would do effectual service, and be much more eligible than to risk the hazard of being made prisoners of war; they did all that time would permit to dismantle their fortifications, and then retreated to Crown Point.

This acquisition, without a blow, put general Amherst into possession of a post, that effectually covered the frontiers of New York, and afforded him a safe retreat in case of necessity. For which reason he ordered the fortifications to be immediately restored, and allotted a strong garrison to protect it after his departure. During his stay at Ticonderoga, he levelled the trenches and batteries, and filled up the road he had made from lake Champlain to the Saw-mill river, for carrying on the siege, repaired the works of the fort, sent 500 men to Fort George for provisions, &c. and not only ordered brig-boats, built by his direction, to be finished with all expedition; but the French boats, which they sunk before they retreated, to be fished up, that he might have a superior force of sloops to the enemy on the lake. He forwarded every thing as fast as possible, that he might get possession of Crown Point without loss of time. While the general was thus necessarily employed, he continually detached scouting parties to reconnoitre, and to look from the mountains into Crown Point itself, and to watch the motions of a corps of the enemy.

enemy, which encamped on the eastern part of the lake. Whether diffident of their own strength, or directed to withdraw from their strong holds, by order of M. Montcalm, which, in case of a siege, he was in no condition to relieve; and his present circumstances required all his collective strength in the field; the scouts, on the 1st of August, brought an account, that the enemy had abandoned Crown Point also. The weather was so bad that made it impracticable to move with his whole army until the 4th. But he dispatched 200 rangers through the woods, to seize the possession of so easy a conquest. On the 4th, weather permitting, and the boats being brought over the carrying-place, the troops began to embark at two in the morning, and were all got over the lake, landed, and posted, before night; some being encamped, and others laid on their arms. Next day the general, considering the importance of this situation, which entirely secured all his majesty's dominions behind it, from the inroads of the enemy, and from the seeping parties that had infested the whole country, and that it would give peace and quiet to all the settlers from thence to New York to have a respectable fort built on that spot; he immediately ordered the ground to be traced out, and the fort to be begun with all possible expedition. Here general Amherst received intelligence, that the flying enemy had retired to the Isle Aux Noix, standing at the other end of lake Champlain, at about five leagues from St. John's: that their numbers were augmented, by other parties called in, to 3500 effective men, regulars, marines, and Canadians, encamped under the command of M. de Burlemaque, and provided with a numerous and well-regulated artillery; and that the enemy had got a squadron of four large vessels on the lake, mounted with cannon, and manned with piquets from different regiments, under the command of experienced naval officers. A strength, which, if to be encountered and defeated by general Amherst, was sufficient to retard his advancing to the assistance of the besiegers of Quebec, before the approach of the winter would oblige him to fall back, to prevent his army's suffering by the inclemency of the weather. But such was his zeal for the service of his country, that, regardless of any thing but to fulfil his instructions, he ordered a sloop to carry sixteen guns, and a radeau (of eighty-four feet long and twenty broad) to carry six 24-pounders, to be built with the utmost expedition; and with these, and with a brigantine and a sloop, which arrived on the 11th of October, the general embarked to attack Burlemaque on the Island Aux Noix; but a storm soon after compelled him to give up all further thoughts of forcing a way to the river St. Lawrence in quest of the British fleet, and to seek shelter once more in the bay, from whence he had sailed just before: where he debarked, and marched with his army back to Crown Point; without being able to get any certain intelligence of the situation and operations of the fleet and army before Quebec. He arrived at Crown Point on the 21st of October, where he completed his intended fortresses, and three small out-forts; opened communications between Ticonderoga and the governments of New Hampshire and Massachusetts; and disposed his troops in winter quarters, after such a manner, as to prevent any inroads by the enemy.

General Amherst resumed his operations as soon as the season in 1760 would permit. But before he could reach Oswego (on the 9th of July) two French vessels had crossed the lake, and appeared off that fort. Being informed of this, the general ordered the *Mondega*, carrying four 9-pounders, fourteen 6-pounders, and 100 seamen; and the *Mohawk*, carrying sixteen 6-pounders and ninety seamen; to sail in quest of them, and if possible to cut them off from their harbour. General Amherst, during his stay at this fort, employed his time in every useful expedient to improve the troops and to forward his intended operations against the enemy. For it was the 9th of August before Schuyler's regiment arrived. The whole army was ordered to embark at day-break next morning;

but, the batteaux being not quite completed, the general embarked with the regulars; and left general Gage to bring up the provincials and the rear; who failed next morning, and joined general Amherst on the 14th. This navigation was attended with several difficulties, from its own nature and the want of sufficient pilots; which greatly retarded the armed vessels. On the 16th the general had intelligence of the enemy's two vessels, which had escaped the vigilance of those sent in quest of them on the 14th of July. An Oswegatchie Indian informed him that one of the French vessels was a-ground at the fort, and so much damaged that he could not get off; and that the other lay off Galette. At this juncture the armed vessels could not be found, having got out of the right channel: wherefore the general fitted his row-galleys to attack the vessel. This account also hastened his attack of the enemy's post at Isle Royale. As this post was deprived of any assistance from their ships, he resolved to proceed, without halting, down the river Swegatchie for that purpose; and reached the Point de Baril with the advanced guard very late in the day of the 16th. They could see the French vessel a-ground; but, as it was a calm, there was no reaching of her that night: but she was taken the next day; on which day also, the general took possession of Swegatchie, and encamped there, while he detached two engineers, with parties, to view the coasts and situation of the islands near l'Isle Royale; whose report, next day, being favourable, general Amherst, though the weather was excessive bad, was determined to seize the first moment to invest the place. He set off with a proper force, and three row-galleys, taking also some light field-pieces; rowed down the north shore, passed the fort, and took possession of the islands and coasts below it. At eleven at night the place was completely invested. Isle Gallot and l'Abbé Piquets Island were found abandoned; the enemy having left them in a great hurry; for the scalps they had taken on the Mohawk river, with tools and utensils of various kinds, two swivels, some barrels of pitch, and a quantity of iron, were left behind. The Indians whom the general had with him, on finding the scalps, burnt the chapel, and all the houses. On the 19th, at day-break, the general viewed the islands, with colonel Williamson and lieutenant-colonel Eyre, and fixed the batteries, one on each of the two islands nearest the fort; and one on a point of land on the south shore. Detachments were immediately made to open ground. The enemy kept a front fire at the vessels: but the general ordered his vessels to avoid firing, rather than keep it up, and spent the 19th in preparing fascines, and every necessary for carrying on the siege. Which preparations were so well conducted, that all the batteries began to play on the 23d, and did so much execution, that the enemy drew in their guns, and tried to put them under cover. General Amherst also made a disposition for storming the fort, after some time firing: but he was obliged, for the present, to put it off; his vessels not complying with his orders so well as he could have wished. But, the enemy not able to keep to their guns, and many of their guns being dismounted and disabled, the garrison beat a parley in the afternoon, which ended in a capitulation; by which his majesty was put into possession of a fort and post, that entirely commanded lake Ontario, and effectually covered the Mohawk river, and all that part of his majesty's dominions, from the inroads and barbarities of the savages.

Having repaired the fort, mended the batteaux, fitted out the vessels, and made such other preparations as were judged essentially necessary for the passage of the army down the river, the general proceeded for Montreal, the place of his destination, on the 31st, and arrived at the Isle au Chat, a passage of about twenty-four miles, where he encamped that night; and next day arrived at John's Point, fourteen miles lower, being interrupted and delayed by the parties of the enemy that lined, and fired upon the batteaux from the shore, as they passed the Long Saut; and by the rapids and broken waves, which filled

many of the batteaux with water, and drowned a corporal and three men of the royal highlanders. On the 2d, this armament rowed twenty-four miles down lake St. Francis, arrived at Point au Beaudet; encamped and hauled in their boats under the shelter of coves, before night; when there arose a very violent storm of rain and wind, which continued all next day. But the army embarked again soon after day-break on the 4th, and arrived that night at Isle Perrott, with the loss of eighty-four men drowned, twenty-nine batteaux of regiments, seventeen of artillery, some artillery and stores, seventeen whale-boats, and one row-galley, occasioned by the rapids. The regulars encamped upon this island, about two miles from the river. But the greatest part of the artillery, and the provincials, encamped on the river side, it being too late for them to proceed to the head-quarters. The islanders abandoned their houses, and fled into the woods, at the approach of the English. But next day, being invited to come in by some of their own people, who were taken and dispatched to them, with assurances of protection, upon their submission and good behaviour; they returned to their habitations, took the oath of allegiance to his Britannic majesty, and, being suffered to keep possession of their houses, they seemed as much surprised with their treatment as they were happy in it. It was the 6th before the boats could be repaired: when, soon after day-break, the whole army embarked, and the boats rowed in four columns by the right, it being intended to land on the left, at La Chine, on the Island of Montreal, which lay at the distance of three leagues only from this place of embarkation: and, the weather proving favourable, they arrived at the place of destination soon in the day, and landed without any other opposition than a few random shot from flying parties, that ran into Montreal, breaking down a bridge between the English camp and the town. General Amherst, determined to make the most of the day, marched on towards the city, repaired the bridge, and, after a march of two leagues, formed the troops on a plain before Montreal; having left the New York troops, and two Connecticut regiments at la Chine, to protect the boats. The army, thus encamped, lay all night on their arms, and got up two 12-pounders, five 6-pounders, and five 3-pounders of light artillery. In this situation general Amherst, next morning, received a letter from the marquis de Vaudreuil; which was brought by two officers, and referred his excellency to colonel Bougainville for particulars: and this conference produced a cessation of arms till twelve o'clock. The colonel brought proposals for a capitulation from the French governor, and they were returned by general Amherst, with such alterations and amendments as he thought proper. But the French commanders shuffled so long about particular articles, that it was next morning before the capitulation could be completed and signed. By this capitulation, not only Montreal, but all Canada, an immense country, was surrendered to the king of Great Britain. Accordingly the British troops took immediate possession of all the fortresses in that province, and the French garrisons were engaged not to serve against Great Britain during the war.

The minds of the English people had been, for some time, agitated and filled with very disagreeable ideas, by the surprise of Newfoundland. The French, apprised of the weak state of that important island, which had been totally neglected, landed in the bay of Bulls, on the 24th of June, 1762. They seized upon the small settlement in the bay, and on the 27th obliged the garrison of St. John's, consisting only of sixty-three men, to surrender prisoners of war, with promise to secure them in their persons and effects. But they destroyed every thing that belonged to the fishery; by which they only injured private property, and ruined many individuals. Having done all the mischief in their power, they set about repairing the fortifications of the town; because they intended to hold the place. When the news of this loss reached England, it

is impossible to describe the indignation with which the people were exasperated against the ministry. It is true, government ordered a squadron and some forces to be got ready for the recovery of the place: but those orders were so delayed, that Newfoundland must have remained in the hands of France at the commencement of the treaty of peace, to our great disadvantage, had not general Amherst, of his own accord, detached a sufficient force to drive them away. He sent his brother, colonel Amherst, before he received any orders from Europe; with a body of troops to join lord Colville, who was stationed with one ship of the line and one frigate only, at Halifax. This junction was happily effected on the 11th of September, and on the 18th the place was re-taken by the British; and we are certainly indebted to the general for the firm possession of this most ancient and important settlement in North America.

Sir Jeffery Amherst was created lord Amherst of Holmesdale on the 20th of May, 1776; and, on the 16th of September, 1788, was made lord Amherst of Montreal, and a general in the army; his lordship is also colonel of the 2d regiment of life-guards, and of the 2d regiment of foot, governor of Guernsey, and a knight of the Bath.

AM'HURST (Nicholas), an English poet and political writer, was born at Marden in Kent, and entered of St. John's college, Oxford; from whence he was expelled for irregularity of conduct and libertine principles. Retaining great resentment against the university on this account, he abused its learning and discipline, in a poem published in 1724, called *Oculus Britannicæ*, and in a book entitled *Terræ Filius*. He published, *A Miscellany of Poems, sacred and profane*; and, *The Convocation*, a poem in five cantos, which was a satire on the bishop of Bangor's antagonists. But he is best known for the share he had in the political paper called *The Craftsman*; though, after having been the drudge of his party for near twenty years, he was as much forgot in the famous compromise of 1742 as if he had never been born; and, when he died in that year of a broken heart, was indebted to the charity of his bookseller for a grave.

AMIALE, *adj.* [*aimable*, Fr. *amabile*, It. *amabile*, Sp. of *amabilis*, Lat. from *amo*, to love.] Lovely; pleasing.—That which is good in the actions of men, doth not only delight as profitable, but as *amiable* also. *Hooker*.—Pretending love; shewing love.—Lay *amiable* siege to the honesty of this Ford's wife; use your art of wooing. *Shakespeare*.

AMIALENESS, *f.* The quality of being amiable; loveliness; power of raising love.—As soon as the natural gaiety and *amiableness* of the young man wears off, they have nothing left to commend them, but lie by among the lumber and refuse of the species. *Addison*.

AMIABLY, *adv.* In an amiable manner; in such a manner as to excite love.

AMIAN'THUS, or EARTH-FLAX, *f.* [*ἀμραντος*, Gr.] In natural history, a fibrous, flexible, elastic, mineral, substance, consisting of short, abrupt, and interwoven, filaments. It is found in Germany, in the strata of iron ore, sometimes forming veins of an inch in diameter. Its fibres are so flexible that cloth has been made of them, and the shorter filaments that separate in the washing of the stone may be made into paper in the common manner. *Anianthus* is classed by Mr. Kirwan in the muriatic genus of earths, because it contains about a fifth part of magnesia. Its other constituents are, flint, mild calcareous earth, barytes, clay, and a very small proportion of iron. It is fusible *per se* in a strong heat, and also with the common fluxes. It differs from asbestos in containing some ponderous earth.

AMICABLE, *adj.* [*amicabilis*, Lat.] Friendly; kind. It is commonly used of more than one; as, They live in an *amicable* manner; but we seldom say, An *amicable* action, or, An *amicable* man, though it be so used in this passage:

AMIA, AND AMMANNIA.

The three-finned Amia, and the Ammannia-octandria.

J. Pass sculp.

O grace serene! oh virtue heav'nly fair,
Divine oblivion of low-thoughted care!
Fresh blooming hope, gay daughter of the sky!
And faith, our early immortality!
Enter each mild, each *amicable*, guest;
Receive and wrap me in eternal rest.

Pope.

AMICABLE BENCHES, in Roman antiquity, were, according to Pitiſcus, lower and leſs honourable ſeats allotted for the *judices pedanei*, or inferior judges, who, upon being admitted of the emperor's council, were dignified by him with the title *amici*.

AMICABLE NUMBERS, denote pairs of numbers, of which each of them is mutually equal to the ſum of all the aliquot parts of the other. So the firſt or leaſt pair of amicable numbers are 220 and 284; all the aliquot parts of which, with their ſums, are as follow, viz.

of 220, they are 1, 2, 4, 5, 10, 11, 20, 22, 44, 55,
110, their ſum - - - - - 284;

of 284, they are 1, 2, 4, 71, 142, and their ſum is 220.

The ſecond pair of amicable numbers are 17296 and 18416, which have alſo the ſame property as above.

And the third pair of amicable numbers are 9363584 and 9437056.

Theſe three pairs of amicable numbers were found out by P. Schooten, ſect. 9 of his *Exercitationes Mathematicæ*, who I believe firſt gave the name of *amicable* to ſuch numbers, though ſuch properties of numbers it ſeems had before been treated of by Rudolphus, Deſcartes, and others. To find the firſt pair, Schooten puts $4x$ and $4yz$, or a^2x and a^2yz for the two numbers where $a=2$; then making each of theſe equal to the ſum of the aliquot parts of the other, gives two equations, from which are found the values of x and z , and conſequently, aſſuming a proper value for y , the two amicable numbers themſelves $4x$ and $4yz$. In like manner for the other pairs of ſuch numbers; in which he finds it neceſſary to aſſume $16x$ and $16yz$, or a^4x and a^4yz for the ſecond pair, and $128x$ and $128yz$, or a^7x and a^7yz for the third pair. Schooten then gives this practical rule, from Deſcartes, for finding amicable numbers, viz. Aſſume the number 2, or ſome power of the number 2, ſuch that if unity, or 1, be ſubtracted from each of theſe three following quantities, viz.

From 3 times the aſſumed number,

Alſo from 6 times the aſſumed number,

And from 18 times the ſquare of the aſſumed number, the three remainders may be all prime numbers; then, the laſt prime number being multiplied by double the aſſumed number, the product will be one of the amicable numbers ſought, and the ſum of its aliquot parts will be the other.

That is, if a be put = the number 2, and n ſome integer number, ſuch that $3a^n - 1$, and $6a^n - 1$, and $18a^{2n} - 1$, be all three prime numbers; then is $18a^{2n} - 1 \times 2a^n$ one of the amicable numbers; and the ſum of its aliquot parts is the other.

AMICABLENESS, *f.* The quality of being amicable; friendlineſs; good-will.

AMICABLY, *adv.* In an amicable manner; in a friendly way; with good-will and concord:

They ſee

Through the dun miſt, in blooming beauty freſh,

Two lovely youths, that *amicably* walkt

O'er verdant meads, and pleas'd, perhaps, revolv'd

Anna's late conqueſts.

Philips.

A'MICE, *f.* [*amicus*, Lat. *amicus*, Fr.] The firſt or undermoſt part of a prieſt's habit, over which he wears the alb:

Thus paſſ'd the night ſo foul, till morning fair

Came forth with pilgrim ſteps in *amice* grey.

Milton.

On ſome a prieſt, ſuccinct in *amice* white,
Attends.

Pope.

A'MICUS CU'RIAE, in law. If a judge is doubtful or miſtaken in matter of law, a ſtander-by may inform the court as *amicus curiæ*. 2 Co. Inſt. 178.

AMIDA, a god worſhipped by the Japanefe, who has

many temples erected to him in the iſland of Japan, of which the principal is at Jedo. The Japanefe have ſuch a confidence in their idol Amida, that they hope to attain eternal felicity by the frequent invocation of his name. One of the figures of this idol is repreſented at Rome.

AMIDA, a principal city of Meſopotamia; ſituated on a high mountain, on the borders of Aſſyria, on the Tigris, where it receives the Nymphius. It was taken from the Romans, in the time of the emperor Conſtans, by Sapore king of Perſia. The ſiege is ſaid to have coſt him 30,000 men; however, he reduced it to ſuch ruin, that the emperor afterwards wept over it. According to Ammianus Marcellinus, the city was raiſed; the chief officers were crucified; and the reſt, with the foldiers and inhabitants, either put to the ſword or carried into captivity. The inhabitants of Niſibis, however, being obliged to leave their own city by Jovian's treaty with the Perſians, ſoon reſtored Amida to its former ſtrength; but it was again taken by Cavades in 501, but was reſtored to the Romans in 503. On the declenſion of the Roman power, it fell again into the hands of the Perſians; but was taken from them by the Saracens in 899. It is now in the poſſeſſion of the Turks. Here are above 20,000 Chriſtians, who are better treated by the Turks than in other places. A great trade is carried on in this city, of red Turkey leather, and cotton cloth of the ſame colour. The Arabian name of Amida is *Diarbekir*, and the Turkiſh one *Kara-Amid*. Lat. 36. 58. N. lon. 39. 0. E.

AMIDST, or AMID, *prep.* [from *a* and *mid*, or *midſt*.] In the midſt; equally diſtant from either extremity. Mingled with; ſurrounded by; in the ambit of another thing. Amongſt; conjoined with:

What though no real voice nor found

Amid their radiant orbs be found?

In reaſon's ear they all rejoice,

And utter forth a glorious voice,

For ever ſinging, as they ſhine,

"The hand that made us is divine."

Addiſon.

A'MIENS, a large handſome city of France, in the department of Somme, and late province of Picardy. It is a place of great antiquity; being mentioned by Cæſar as a town that had made a vigorous reſiſtance againſt the Romans, and where he convened a general aſſembly of the Gauls after having made himſelf maſter of it. The emperors Antoninus and Marcus Aurelius enlarged it; and Conſtantine, Conſtans, Julian, and ſeveral others, reſided here a conſiderable time. The river Somme enters A-miens by three different channels, over which are as many bridges; and theſe channels, after waſhing the town in ſeveral places, unite at the other end by the bridge of St. Michael. The houſes are well built; the ſtreets ſpacious, embellished with handſome ſquares and good buildings; and the number of inhabitants between forty and fifty thouſand. The cathedral is one of the largeſt and moſt magnificent churches in France; adorned with handſome paintings, fine pillars, chapels, and tombs; particularly the nave is greatly admired. Amiens was taken by the Spaniards, in 1597, by the following ſtratagem: foldiers, diſguiſed like peaſants, conducted a cart laden with nuts, and let a bag of them fall juſt as the gate was opened. While the guard was buſy in gathering up the nuts, the Spaniards entered and became maſters of the town. It was retaken by Henry IV. who built a citadel here.

Here are manufactures of linen and woollen cloth, which employ in the city and adjacent country 30,000 people. It is on the road from Calais to Paris, twenty miles S. E. of Abbeville, and 75 N. of Paris. Lat. 49. 54. N. long. 2. 28. E.

AMILCAR, the name of ſeveral Carthaginian captains. The moſt celebrated of them is Amilcar Barca, the father of Hannibal, who during five years infeſted the coaſt of Italy; when the Romans ſending out their whole naval ſtrength, defeated him near Trapani, 242 years before Chriſt; and this put an end to the firſt Punic war. Amilcar began the ſecond, and landed in Spain, where he ſubdued

subdued the most warlike nations; but, as he was preparing for an expedition against Italy, he was killed in battle, 278 years before the Christian era. He left three sons, whom he had educated, as he said, like three lions, to tear Rome in pieces; and made Hannibal, his eldest son, swear an eternal enmity against the Romans.

AMILICTI, *f.* in the Chaldaic theology, denote a kind of intellectual powers or persons in the divine hierarchy. The amilicti are represented as three in number; and constitute one of the triad, in the third order of the hierarchy.

AMIMO'NE, a daughter of Danaus, changed into a fountain which is near Argos, and flows into the lake Lerna. *Ovid.*

AMIN'ADAB, אֱמִינָדָב, Heb. a free or willing people;] the father of Naassan.

AMIRAN'TE, in the Spanish polity, a great officer of state, answering to our lord high-admiral.

AMISS, *adv.* [from *a*, which, in this form of composition, often signifies *according to*, and *miss*, the English particle, which shews any thing, like the Greek *παρά*, to be wrong, as, to *miscount* to count erroneously; to *misdo*, to commit a crime: *amiss* therefore signifies *not right*, or *out of order*.] Faulty; criminal. Faultily; criminally:

O've powers that search

The heart of man, and weigh his inmost thoughts,
If I have done *amiss*; impute it not! *Addison.*

In an ill sense. Wrong; improper; unfit.—Methinks, though a man had all science, and all principles, yet it might not be *amiss* to have some conscience. *Tillotson.*—Wrong; not according to the perfection of the thing, whatever it be. Reproachful; irreverent. Impaired in health; as, I was somewhat *amiss* yesterday, but am well to-day. *Amis* is marked as an adverb, though it cannot always be adverbially rendered; because it always follows the substantive to which it relates, contrary to the nature of adjectives in English; and, though we say the action was *amiss*, we never say an *amiss* action. *Amis* is used by Shakespeare as a noun substantive:

To my sick soul, as sin's true nature is,
Each toy seems prologue to some great *amiss*. *Shakespeare.*

AMIS'SION, *f.* [*amissio*, Lat.] Loss.

AMISUS, the chief city of the ancient kingdom of Pontus. It was built by the Milesians, and peopled partly by them and partly by a colony from Athens. It was at first a free city, like the other Greek cities in Asia; but afterwards subdued by Pharnaces king of Pontus, who made it his metropolis. It was taken by Lucullus in the Mithridatic war, who restored it to its ancient liberty.

TO AMIT', *v. a.* [*amitto*, Lat.] To lose; a word little in use.—Ice is water congealed by the frigidity of the air, whereby it acquireth no new form, but rather a consistence or determination of its fluidity, and *amitteth* not its essence, but condition of fluidity. *Brown.*

AMITER'NUM, a town of the Sabines, in Italy, now extinct. The ruins are to be seen on the level ridge of a mountain, near St. Vittorino.

AMIT'TERE LEGUM TERRÆ, *f.* in law, a phrase importing the loss of liberty of swearing in any court: the punishment of a champion overcome or yielding it battle, of jurors found guilty in a writ of attain, and of a person outlawed.

AMIZO'DAR, a king of part of Lycia, had a wife called Chimera, whose two brothers were called the Lion and the Dragon, because they murdered all those that fell into their hands.

AMITY, *f.* [*amitié*, Fr. *amicitia*, Lat.] Friendship, whether public between nations, opposed to war; or among the people, opposed to discord; or between private persons.—The prophet David did think, that the very meeting of men together, and their accompanying one another to the house of God, should make the bond of their love insoluble, and tie them in a league of inviolable *amity*.

Hooker.—The monarchy of Great Britain was in league and *amity* with all the world. *Sir John Davis.*

AM'KAS, *f.* a name given to a spacious saloon in the palace of the Great Mogul, where he gives audience to his subjects, and where he appears on solemn festivals with extraordinary magnificence. His throne is supported by six large steps of massy gold, set with rubies, emeralds, and diamonds, estimated at 60,000,000*l.*

AM'MA, *f.* [some derive it of *αμω*, Gr. to connect or join together.] A tying, knitting; a band. With surgeons, a truss for ruptures.

AM'MAN, or **AMMANT**, *f.* in the German and Belgic policy, a judge who has the cognizance of civil causes. It is also used among the French for a public notary, or officer, who draws up instruments and deeds.

AMMAN'NIA, *f.* [from John Ammann, professor of botany at Petersburg.] In botany, a genus of the tetrandria monogynia class, ranking in the natural order of calycanthemæ. The generic characters are—Calyx: Perianthium bell-shaped, oblong, erect, with eight streaks, and folds, quadrangular, eight-toothed; teeth alternate bent in, permanent. Corolla: none, or four-petalled; petals vertically ovate, spreading, inserted into the calyx. Stamina: filaments bristly, the length of the calyx, into which they are inserted: antheræ twin. Pistillum: germin sub-ovate, large, superior; style simple, very short; stigma headed. Pericarpium: a roundish, four-celled, capsule, (berry, *g.*) covered with the calyx. Seeds: numerous, small. The petals are often deficient, but sometimes occur in the same species.—*Essential Character.* Corolla, four-petalled, inserted into the calyx. Calyx, one-leaved, plaited, eight-toothed, inferior. Capsule, four-celled.

Species. 1. *Ammannia latifolia*, or broad-leaved *Ammannia*: leaves half-stem-clasping, stalk square, branches erect. Root annual. It grows about a foot and an half high, with an upright square stalk, and long narrow leaves in form of a triangle; these grow the whole length of the stem; they are of a pale green, and the consistence of purslane leaves; the stalks are also succulent, and of the same colour with those of that plant. The flowers come out in whorls, at the joints where the leaves adhere, in clusters. This grows naturally in moist places in Jamaica, from whence Dr. Houston (about 1731) sent the seeds to England, which succeeded at Chelsea, and have thence been distributed to most of the botanic gardens in Europe.

2. *Ammannia ramosior*, or branching *Ammannia*: leaves half-stem-clasping, stalk square, branches very spreading. This is an annual plant, growing naturally in Virginia and Carolina. It rises about a foot high, with red succulent stalks, putting out side-branches, which are opposite, round and simple. The flowers are produced single from the axils on the lower part of the branches, but toward the top they are in clusters; they have little beauty, and therefore are only preserved in botanic gardens for the sake of variety.

3. *Ammannia baccifera*, or berry-bearing *ammannia*: leaves sub-petiolate, capsules larger than the calyx, and coloured. This is a tender low plant, erect, without branches. It is a native of China, and is now naturalized in Italy. Having but little beauty, it is rarely preserved in gardens.

4. *Ammannia octandra*, or eight-stamened *ammannia*: flowers petaloid, and eight stamened. Found by Koenig in the East Indies.

5. *Ammannia pinnatifida*, or pinnatifid-leaved *ammannia*: stalks procumbent, rooting, compressed, leaves linear, pinnatifid. Found by Sonnerat in the isle of Java.

6. *Ammannia debillis*, or cluster-flowered *ammannia*: leaves lanceolate attenuated at the base, stem branching, flowers in bundles from the axils, capsules two-celled. Annual. Native of the East Indies. Introduced in 1778, by Sir Joseph Banks, bart. It flowers in July and August.

7. *Ammannia sanguinolenta*: leaves half-stem-clasping, cordate at the base, flowers subpeduncled, eight-stamened, petal-bearing. Native of Jamaica and Domingo.

1. *Amomum roseum*, or Indian Ginger. 2. The Sand Eel.

Propagation and Culture. The first and third must be raised from seeds on a hot-bed in the spring, and afterwards removed to another hot-bed to bring them forward. When the plants have acquired strength, they should be transplanted into pots filled with rich light earth, and placed under a frame, observing to shade them till they have taken fresh root; then they should be placed in a glass case or stove to ripen their seeds, for the plants are too tender to thrive in the open air in this country, unless the summer should prove very warm. The second sort, however, will perfect its seeds in the open air, if the plants be raised on a hot-bed in the spring, and planted in a warm border. The other species are stove-plants.

AMMI, f. [from *αμμος*, sand.] In botany, a genus of the pentandria digynia class, ranking in the natural order of umbellales or umbelliferae. The generic characters are—Calyx: universal umbel manifold, frequently of fifty rays; partial short, crowded; universal involucre of many linear, pinnatifid, acute, leaflets, scarcely the length of the umbel; partial many-leaved; leaflets linear, acute, simple, shorter than its umbellet. Proper perianthium scarcely apparent. Corolla: universal uniform, all the floscules fertile; proper of five inflex, heart-shaped petals, of unequal size in the ray; almost in the middle of the disk. Stamina: filaments capillary; anthers roundish. Pistillum: germ inferior; styles reflex; stigmas obtuse. Pericarpium: none. Fruit roundish, smooth, small, streaked, bipartite. Seeds: two, convex and streaked on one side; flat on the other.—*Essential Character.* Involucre, pinnatifid. Corolla, radiate; all hermaphrodite. Fruit, smooth.

Species. 1. *Ammi majus*, or common bishop's weed: lower leaves pinnate; lanceolate, serrate; upper ones multifid, linear. The first sort is annual, and grows in vineyards and fields in the southern parts of Europe, and in the east.

2. *Ammi copticum*: leaves super-decompound, linear; seeds muricate. Found in Egypt by Forskahl. Annual.

3. *Ammi glaucifolium*, or perennial bishop's-weed: subdivisions of all the leaves lanceolate. This has the appearance of being only a variety of the first species. It is annual, as that is. The stem is from one to two feet high, hard, smooth, scarcely grooved, with several upright branches at top, each supported by a small sessile leaf. It is a native of the south of France. Miller describes it as a perennial plant, which is preserved in botanic gardens for variety; but, having little beauty, is rarely admitted into other gardens.

Propagation and Culture. This plant is propagated by seeds, which should be sown in autumn in the place where they are to remain: and in the spring, the ground should be hoed to cut up the weeds, and also to thin the plants in the same manner as is practised for carrots, leaving them four or five inches asunder: or, if the ground is good where they grow, they must be left at least six inches, for they will grow large and cover the ground: after this they will require no farther care, but to keep them clean from weeds. In June they will flower, and their seeds will ripen in August, which should be gathered as they ripen, otherwise they will soon scatter. These seeds are used in medicine, and may be had in plenty with this management; for this plant will grow in any situation that is open, but thrives best on light sandy land. When the seeds are sown in the spring they seldom come up the same year; and, if they should, those plants will be weak, and produce few seeds.

AMMI, f. in botany. See *BUNYUM*, *CICUTA*, *SESELLI*, *SISON*, and *STUM*.

AMMIANUS (Marcellinus), a Grecian soldier, was born at Antioch, and flourished under Constantius and the preceding emperors as late as Theodosius. He served under Julian in the east; and wrote in Latin an interesting history, from the reign of Nerva to the death of Valens, in thirty-one books; of which only eighteen remain. Though a Pagan, he speaks with candour and moderation of the Christian religion. He died about the year 390.

The best edition of his history is that of Gronovius, in 1693.

AMMIRATO (Scipio), an eminent Italian historian, born at Lecca in Naples in 1531. After travelling over great part of Italy, he was engaged by the great duke of Tuscany to write The History of Florence; for which he was presented to a canonry in the cathedral there. He wrote other works while in this station; and died in 1600.

AMMISHAD'DAI, [אֲמִישַׁדַּי Heb. i. e. the people of the Almighty.] A prince of the tribe of Dan.

AMMOCHOSIA, f. A remedy for drying the body, by covering it with hot sand, or salt, which is preferable.

AMMOCHRY'SOS, [from *αμμος*, sand, and *χρυσος*, gold.] A name given to a stone very common in Germany, and seeming to be composed of a golden sand. It is of a yellow gold-like colour, and its particles are very glossy, being all fragments of a coloured talc. It is usually so soft as to be easily rubbed to a powder, and is used only as sand to strew over writing. The Germans call it *katzengold*. There is another kind of it less common, but much more beautiful, consisting of the same sort of glossy spangles, but of a bright red colour, like vermilion.

AMMO'DYTES, or **SAND EEL**, in ichthyology, a genus of fishes belonging to the order of apodes. This fish resembles an eel, and seldom exceeds a foot in length. The head of the ammodytes is compressed, and narrower than the body; the upper jaw is larger than the under; the body is cylindrical, with scales hardly perceptible. There is but one species of the ammodytes, viz. the tobianus, or lancee, a native of Europe. This fish gathers itself into a circle, and pierces the sand with its head in the centre. It is found in most of our sandy shores during the summer months. They are commonly used as baits for other fish, but they are also very delicate eating. These fish are found in the stomach of the porpoise; an argument that the last roots up the sand with its nose, as hogs do the ground.

AMMOIDES, f. in botany. See *SESELLI*.

AMMON, [אֲמֹן Heb. i. e. the son of my people.] the son of Lot. He was the father of the Ammonites, and dwelt to the east of the Dead Sea, in the mountains of Gilead.

AMMON, anciently a city of Marmarica. Arian calls it a place, not a city, in which stood the temple of Jupiter Ammon, round which there was nothing but sandy wastes. Diodorus Siculus says, That the district where the temple stood, though surrounded with deserts, was watered by dews which fell no where else in all that country. It was agreeably adorned with fruitful trees and springs, and full of villages. In the middle stood the acropolis or citadel, encompassed with a triple wall; the first and inmost of which contained the palace; the others the apartments of the women, the relations and children, as also the temple of the god, and the sacred fountain for lustrations. Without the acropolis stood, at no great distance, another temple of Ammon, shaded by a number of tall trees: near which there was a fountain, called that of the sun, or *Solis Fons*, because subject to extraordinary changes according to the time of the day; morning and evening warm, at noon cold, at midnight extremely hot. Here a kind of fossil salt was said to be dug out of the earth in large oblong pieces, as transparent as chrysal. It was said to be a present worthy of kings, and used by the Egyptians in their sacrifices. From this our sal ammoniac is thought by some to have taken its name.

AMMON, or **HAMMON**, in heathen mythology the name of the Egyptian Jupiter, worshipped under the figure of a ram. Bacchus having subdued Asia, and passing with his army through the deserts of Africa, was in great want of water: Jupiter, his father, assuming the shape of a ram, led him to a fountain, where he refreshed himself and his army; in gratitude for which favour, Bacchus built there a temple to Jupiter, under the title of *Ammon*, from the Greek *αμμος*, which signifies *sand*, alluding to the sandy desert where it was built. In this temple was an

oracle of great note, which Alexander the Great consulted, and which lasted till the time of Theodosius. Hammon, the god of the Egyptians, was the same with the Jupiter of the Greeks. He is thought to be the same with Ham, who peopled Africa, and was the father of Mizraim, the founder of the Egyptians.

AMMON (Andreas), a Latin poet, born at Lucca in Italy, was sent by pope Leo X. to England in the characters of prothonotary of the apostolic see and collector-general of this kingdom. Being a man of singular genius and learning, he soon became acquainted with the principal literati of those times; particularly with Erasmus, Colet, Grocin, and others, for the sake of whose company he resided some time at Oxford. The advice which Erasmus gives him, in regard to pushing his fortune, has a good deal of humour in it, and was certainly intended as a satire on the artful methods then practised by the selfish and ambitious clergy. "In the first place," says he, "throw off all sense of shame; thrust yourself into every one's business, and elbow out whomsoever you can; neither love nor hate any one; measure every thing by your own advantage; let this be the scope and drift of all your actions. Give nothing but what is to be returned with usury, and be complaisant to every body." Ammon was Latin secretary to Henry VIII. In 1512 he was made canon and prebendary of St. Stephen's, Westminster. He was likewise prebendary of Wells; and in 1514 was presented to the rectory of Dychial in that diocese. About the same time, by the king's special recommendation, he was also made prebendary of Salisbury. He died in the year 1517, and was buried in St. Stephen's chapel, Westminster. His works are, *Epistolæ ad Erasmus*; *Scotici conflictus historia*; *Bucolicæ vel eclogæ*, Basil 1546, 8vo. *De rebus nihil*; *Panegyricus quidam*; *Varii generis epigrammata*; *Pœmata diversa*.

AMMONIAC, *f.* [called also *armoniacum*, but improperly; *hammoniæ lacryma*; *assac*; *azac*; and in English, *gum ammoniac*. Ammon took its name from *αμμε*, the sands, but the gum and the *sal ammoniac*, from the country called *Ammonia*.] It is a concrete gummi-resinous juice, produced in the East Indies, whence it is brought in masses, consisting of little lumps, which inwardly are very white, but outwardly yellowish or brownish; its whitest parts become yellow on being exposed to the air. From what plant it is obtained, we know not certainly; but, according to Dioscorides, it is from a shrub called *agafyllis*. It has been supposed to be an exudation from a species of *ferula*. It hath a strong sinell, somewhat like that of galbanum, but not so ungrateful, a nauseous sweetish taste mixed with a bitterness. Such pieces as are white, clear, free from foreign matter, dry, and large, should be preferred for internal use. Thrown on live coals, it burns away in flames: it is soluble both in water and vinegar into a kind of milk; but the resinous part, which is nearly one half of the whole, subsides on standing: spirit of wine dissolves near one half of it, taking up all its active parts.

Dr. Dedier says, $\mathfrak{ss}$ i. of this gum, afforded by distillation of phlegm $\mathfrak{z}$ vi. volatile spirit $\mathfrak{z}$ ij. a volatile foetid oil $\mathfrak{z}$ vi. and the remainder was a caput mortuum. But other skilful chemists have failed to obtain any oil from it by this process. Water is very slightly impregnated with it by distillation. This drug is an excellent deobstruent in hysterics, when caused by retarded menses, and in other abdominal obstructions: dissolved in the acet. scillæ, it is a powerful expectorant, for vinegar greatly exalts its virtue in this particular: in old-standing cholicky symptoms, proceeding from viscid matter in the intestines, it produces very happy effects: it is on a par with the *assa foetida* for virtues of the same kind as the *assa foetida* possesseth, though it is less nauseous and less antispasmodic; but its principal virtues are attributed to its expectorant powers in asthma, and difficult breathing: it gently moves the belly, and, externally applied, it has been recommended for resolving indurated tumours, though the theory of this seems to many very doubtful.

The foetid gums agree in their effects with oily aromatics, but have also acrid poignant salts conjoined, and so more forcibly raise, stimulate, and promote secretions; But the gum ammoniac is peculiar, as its oil, which is but little, is not aromatic, but inodorous, and it is not so heating and rarefying as the others are; but it hath the same acid salts; therefore, it may be used in fevers with turgid blood, and in robust habits, having so excellent a stimulus, without the power of rarefaction. Of this sort, among plants, are the viscus and dracontium, among roots the arum and scilla, and most of the vegetable emetics. The dose may be from gr. x. to $\mathfrak{z}$ $\mathfrak{ss}$. three times a day. Dissolved in water it is called *lac ammon*, ammoniacal milk. $\mathfrak{R}$ Gum ammon. opt. $\mathfrak{z}$ ij. aq. distillatæ $\mathfrak{ss}$ m. P. L. 1788. Thus administered, it is more active than in pills; the dose may be two large spoonfuls three or four times in twenty-four hours. It varies only from the old formula, by having the distilled water substituted for that of penny-royal.

SAL AMMONIAC, f. [*ammonia muricata*, called also *cyreniacus sal*, *ammoniac salt*, and *armoniac*; but improperly.] Many writers speak of the natural and artificial. The natural sort spoken of by the ancients, according to Dioscorides, is only the sal gem, and is reckoned by them among the alimentary salts; but many others say that it was made from the urine of camels, and was deposited in the sands near the temple of Jupiter Ammon. We have no evidence of native sal ammoniac of this sort being found. Tournefort observes, that out of the simple native salts other compounded salts are naturally produced, viz. the essential salts which naturally are concreted from the juices of plants, among which are natural ammoniacal salts.

The artificial is the only sort known and used in the shops. It is a neutral sort, composed of a volatile alkaline salt, and the acid of sea-salt; hence the term *ammonia muricata*; this is the only genuine sort, though it may be made with the vitriolic or with the nitrous acid. The different sorts formed of the different mineral acids, are thus distinguished; by dropping oil of vitriol on that made with the acid of sea-salt, white fumes immediately arise; red fumes from that made of the nitrous acid; and no effect follows from that made with the oil of vitriol.

Sal ammoniac is brought to us generally in round cakes, convex on one side, and concave on the other, from the shape of the vessels into which they are sublimed. When these cakes are broken, the salt appears of a needled texture, or composed of stræ, running transversely and parallel to one another; the internal part is generally pure, and of an almost transparent whiteness; the outside for the most part is foul, and of a yellowish green or black hue. In England, this salt is obtained from burnt cow's dung; urinous salt, joined with an acid, produceth ammoniacal salt; it is obtainable from every species of soots by sublimation or solution. At Newcastle, it is made from the bittern, which remains after making common salt, and old urine; from 100 pounds weight of the bitter cathartic salt, and three hogheads of urine, fifty-six pounds of sal ammoniac is obtained. In Egypt it is made from the burnt dung of quadrupeds that feed only on vegetables: this dung is collected in the first four months in the year, when the cattle feed on spring grass, which is a sort of clover: at other seasons, and when the cattle eat other sort of food, it is unfit for this purpose. As to the camel, its excrements are not preferable to those of any other of their cattle which feed on grass, nor is their urine ever used, though so commonly declared by writers on this subject. Mr. Hasselquist says, that the salt-workers in Egypt pretend, that the excrements from men, goats, and sheep, are preferable to all others; and he farther tells us, that March and April are the only times in which they make this salt. See the account in his voyages.

The ammoniac salt hath many and useful properties. It is soluble in water, and spirit of wine, and in the air alone. It renders water extremely cold while continuing to dissolve into it. The crude salt, when dissolved in water,

ter, and mixed with a vitriolic acid, effervesces violently and produces a sense of cold; the volatile salt treated in the same manner effervesces likewise, but produces heat. After solution in water, it shoots into crystals, which resemble feathers, or into long shining spicula. Mixed with a fixed alkaline salt, and then sublimed, it affords a dry volatile salt; but, mixed with quick-lime, its volatile parts are only to be obtained in a liquid form. When unmixed with other matters, it may be sublimed with a considerable degree of heat, without suffering the least change in its nature or properties; but, if the fire is hastily raised during its sublimation, it remarkably volatilizes many kinds of bodies, if mixed with it. On account of its sea-salt, it turns acidum nitrosum dilutum into aqua regia. Crude ammoniac salt does not curdle milk, nor alter the colour of an infusion of roses. Rubbed with quick-lime, or with a fixed alkaline salt, it emits an urinous smell. Dissolved in lime-water, then a little hydrag. mur. being added, the mixture becomes of a yellow colour.

In folding, tinning, and casting shot, the crude salt is much used. It becomes volatile in a heat somewhat greater than that of boiling water.

As a medicine, its effects are to be ranked among the most valuable of its tribe. Boerhaave says, that it preserves all animal substances from putrefaction; that its brine penetrates their most inward parts; that it is the noblest aperient, attenuant, resolvent, errhine, sternutatory, diaphoretic, sudorific, and diuretic. When used externally as a discutient, or detensive, it is mixed with some proper fomentation in the proportion of 3 vi. or 3 i. to ℥ ij. of the liquid. It is more pungent to the taste than common salt, but is less antiseptic; it passes off more freely through the pores than common salt, but does not move the belly so freely. It is perfectly neutral; attenuates viscid juices; promotes a discharge through the skin, or by urine, according as the patient is kept warmer or cooler, or according to the peculiar circumstances of the constitution; in larger doses, as 3 ij. it opens the belly, and in yet larger it proves emetic; it is an excellent febrifuge, and peculiarly assidant to the bark; in many instances where the bark and emetics failed in agues, the crude salt given to ʒ i. every four hours, with an infusion of camomile flowers, for some days; then every six, and at least every eight, hours, hath succeeded; it is used both as an antiseptic and a repellent in gargles; when the throat is inflamed, or otherwise requires such remedies, it powerfully dissolves viscid mucus in the mouth and fauces; in violent hypochondriac cases, it hath been of singular efficacy by a daily use of it in doses just within what are required to render the bowels lax; after taking it six, eight, and twelve, months, the cold bath hath completed the cure. From 3 i. to 3 ij. dissolved in 3 viij. of any simple water, is a good substitute for the common saline mixture, and may be given, as to quantity and time, in the same manner. Great as are the powers attributed to this medicine, they are some of them much doubted by practitioners of eminence, particularly by Dr. Cullen. He does not admit of its resolving powers by attenuating or dissolving the fluids; but, like other saline matters, in passing by the excretions, they may be suited to promote them. In being coupled with the Peruvian bark, it may be of some use as a diaphoretic; but he doubts, that, in obviating the consequences apprehended from the use of the bark, it can be of any service; nor does he allow that, externally applied, it has the power of discussing tumors, otherwise than by giving a moderate stimulus to the vessels on the surface; not by entering the pores, and by that means attenuating the viscid fluids. However, there are some compositions in which this is a principal ingredient, and upon which surgeons have much dependence. Mr. Justamond strongly recommends the following in the cure of the milk-breast. *R. ammoniæ muriatæ 3 j. fss. roris marini ℥ j. m.* Linen rags should be dipped into this, and kept continually on the part affected. As a discutient

this lotion is much employed. *R. ammoniæ muriatæ 3 i. fss. aceti. fss. Vinoli rectificati. ana ℥ i. m.*

AMMONIACAL, *adj.* [from *ammoniac*.] Having the properties of ammoniac salt.—Human blood calcined, yields no fixed salt; nor is it a sal ammoniac; for that remains immutable after repeated distillations; and distillation destroys the *ammoniacal* quality of animal salts, and turns them alkaline; so that it is a salt neither quite fixed, nor quite volatile, nor quite acid, nor quite alkaline, nor quite *ammoniacal*; but soft and benign, approaching nearest to the nature of sal ammoniac. *Arbuthnot.*

AMMONITÆ *f.* in natural history. See CORNU AMMONIS.

AMMONITES, a people descended from Ammon the son of Lot. The Ammonites destroyed those giants which they called Zamzuminis, Deut. ii. 19-21, and seized upon their country. God forbade Moses to attack the Ammonites; because he did not intend to give their lands unto the Hebrews. Before the Israelites entered the land of Canaan, the Amorites had by conquest got great part of the countries belonging to the Ammonites and Moabites. This Moses retook from the Amorites, and divided between the tribes of Gad and Reuben. In the time of Jephtha, the Ammonites declared war against the Israelites, under pretence that they had detained great part of the country which had formerly been theirs before the Amorites possessed it. Jephtha declared, that as this was an acquisition which the Israelites had made in a just war, and what they had taken from the Amorites, who had long enjoyed it by right of conquest, he was under no obligation to restore it. The Ammonites were not satisfied with this reason; wherefore Jephtha gave them battle and defeated them. The Ammonites and Moabites generally united whenever there was any design set on foot of attacking the Israelites. After the death of Othniel, the Ammonites and Amalekites joined with Eglon king of Moab to oppress the Hebrews; whom they subdued, and governed for the space of eighteen years, till they were delivered by Ehud the son of Gera, who slew Eglon king of Moab. Some time after this, the Ammonites made war against the Israelites, and greatly distressed them. But these were at last delivered by the hands of Jephtha; who having attacked the Ammonites, made a very great slaughter among them. In the beginning of Saul's reign, 1 Sam. xi. Naash king of the Ammonites having sat down before Jabbeth-gilead, reduced the inhabitants to the extremity of demanding a capitulation. Naash answered, that he would capitulate with them on no other conditions than their submitting to have every one his right eye plucked out, that so they might be made a reproach to Israel: but Saul, coming seasonably to the relief of Jabbeth, delivered the city and people from the barbarity of the king of the Ammonites. After the tribes of Reuben, Gad, and the half-tribe of Manasseh, were carried into captivity by Tiglath-pileser in the year 3264, the Ammonites and Moabites took possession of the cities belonging to these tribes. Jeremiah reproaches them for it. The ambassadors of the Ammonites were some of those to whom this prophet, chap. xxvii. 2-4. presented the cup of the Lord's fury, and directed to make bonds and yokes for themselves; exhorting them to submit themselves to Nebuchadnezzar, and threatening them, if they did not, with captivity and slavery. Ezekiel denounces their entire destruction; and tells them that God would give them up to the people of the east, who should set their palaces in their country, so that there should be no more mention of the Ammonites among the nations. It is believed that these misfortunes happened to the Ammonites in the fifth year after the taking of Jerusalem, when Nebuchadnezzar made war against all the people that dwelt upon the confines of Judea, in the year of the world 3420. During the persecutions of Antiochus Epiphanes, Josephus informs, that the Ammonites shewed their hatred to the Jews, and exercised great cruelties against such of them as lived about their

their country. Justin Martyr says, that in his time there were still many Animonites remaining; but Origen assures us, that, when he was living, they were known only under the general name of Arabians. Thus was the prediction of Ezekiel, xxv. 10. accomplished; who said, that the Ammonites should be destroyed in such a manner as not to be remembered among the nations.

AMMONITIS, a country of Arabia Petraea, anciently occupied by the children of Ammon, whence the appellation. Its limits, partly to the west and partly to the north, were, the river Jabbok, whose course is no where determined; though Josephus says, that it runs between Rabbath-Ammon, or Philadelphia, and Gerasa, and falls into the Jordan.

AMMONIUS, surnamed SACCAS, was born in Alexandria, and flourished about the beginning of the third century. He was one of the most celebrated philosophers of his age; and, adopting with alterations the Eclectic philosophy, laid the foundations of that sect which was distinguished by the name of the *New Platonics*. This learned man was born of Christian parents, and educated in their religion; the external profession of which, it is said, he never deserted. As his genius was vast and comprehensive, so were his projects bold and singular: for he attempted a general coalition of all sects, whether philosophical or religious, by framing a system of doctrines which he imagined calculated to unite them all, the Christians not excepted, in the most perfect harmony. In pursuance of this design, he maintained, that the great principles of all philosophical and religious truths were to be found equally in all sects; that they differed from each other only in their method of expressing them, and in some opinions of little or no importance; and that, by a proper interpretation of their respective sentiments, they might easily be united into one body. Accordingly, all the Gentile religions, and even the Christian, were to be illustrated and explained by the principles of this universal philosophy. In conformity to this plan, he insisted, that all the religious systems of all nations should be restored to their original purity, and reduced to their primitive standard, viz. the ancient philosophy of the East, preserved uncorrupted by Plato: and he affirmed, that this project was agreeable to the intentions of our Saviour; whose sole view in descending upon earth was to set bounds to the reigning superstition, to remove the errors that had blended themselves with the religions of all nations, but not to abolish the ancient theology from which they were derived. In order to reconcile the popular religions, and particularly the Christian, with this new system, he made the whole history of the heathen gods an allegory; maintaining that they were only celestial ministers, intitled to an inferior kind of worship. This system, so plausible in its first rise, but so comprehensive and complying in its progress, has been the source of innumerable errors and corruptions in the Christian church. At its first establishment, it is said to have had the approbation of Athenagoras Pantenus, and Clemens the Alexandrian, and of all who had the care of the public school belonging to the Christians at Alexandria. It was afterwards adopted by Longinus, the celebrated author of the treatise on the Sublime, Plotinus, Hieronimus, Origen, Porphyry, Jamblichus the disciple of Porphyry, Sopater, Edisus, Eustathius, Maximus of Ephesus, Priscus, Chrysanthius the master of Julian, Julian the apostate, Hieroclis, Proclus, and many others, both Pagans and Christians.

AMMONIUS, surnamed LITHOTOME, a celebrated surgeon of Alexandria; so called from his inventing the operation of extracting the stone from the bladder.

AMMUNITION, *f.* [supposed by some to come from *amonitio*, which, in the barbarous ages, seems to have signified supply of provision; but it surely may be more reasonably derived from *munitio*, fortification; *chofes à munitions*, things for the fortresses.] A general name for all warlike provisions; but more particularly powder, ball, &c. Ammunition, arms, utensils of war, gun-powder, im-

ported without licence from his majesty, are, by the laws of England, forfeited, and triple the value. And again, such licence obtained, except for furnishing his majesty's public stores, is to be void, and the offender to incur a premunire, and to be disabled to hold any office from the crown.

AMMUNITION BREAD, SHOES, &c. such as are served out to the soldiers of an army or garrison.

AM'NESTY, *f.* [*amnestie*, Fr. *amnesia*, Lat. of *αμνηστια*, Gr.] An act of oblivion; an act by which crimes against the government, to a certain time, are so obliterated, that they can never be brought into charge.

AMNI'COLIST, *f.* [*amnicola*, Lat.] Inhabiting near a river.

AMNI'GENOUS, *f.* [*amnigenus*, Lat.] Bred in or near a river.

AMNION, or AMNIOS, *f.* [Martinus thinks it is derived from, or hath its name in allusion to, *αμνιον*, a vessel.] The internal membrane which surrounds the fœtus. It is a fine, thin, transparent, membrane, soft but tough, smooth on its inside, but rough on the outer. Dr. Hunter says, that it runs over the internal surface of the placenta, and that this membrane, which seems not vascular in the human subject, makes the external covering of the navel-string, to which it is most firmly united; and that, viewed in a microscope, it appears to have blood-vessels, but they are lymphatics. However the existence of the allantois may be disputed in the human subject, the amnion is found in all animals both viviparous and oviparous.

AM'NON, [אַמְנוֹן, Heb. i. e. true; also an artificer or schoolmaster.] The first-born son of king David.

AMOEBÆ'UM, *f.* in ancient poetry, a kind of poem representing a dispute between two persons, who are made to answer each other alternately: such are the third and seventh of Virgil's eclogues.

AMO'L, a town of Asia, in the country of the Ussacks, seated on the river Gihon. Lat. 39. 20. N. lon. 64. 30. E.

AMO'MUM, *f.* [*άμύμον*, Gr. from the Arabic.] In botany, ranks in the natural order of scitamineæ. The generic characters are—Calyx: perianthium one-leaved, cylindraceous, unequally trifid. Corolla: monopetalous, funnel-shaped; tube cylindraceous; border three-parted, parts oblong, spreading. Nectary two-leaved or two-lipped; lower lip inserted under the upper segment of the corolla, spreading, almost erect, entire or three-lobed. Stamina: filament none, except the upper lip of the nectary, smaller than the lower and opposite to it, acuminate or three-lobed at the tip; along the middle or at the end of which grows longitudinally a large oblong anthera, germinate, or divided by a longitudinal furrow into two, which are one-valved. Pistillum: germ inferior, oblong; style filiform, drawn through the future of the anthera; stigma turbinate, obtuse, ciliate. Pericarpium: capsule fleshy, ovate, three-cornered, three-celled, three-valved. Seeds several, covered with a sort of berried aril. The inflorescence is in a spike on a distinct scape.—*Essential Character.* Calyx: trifid, unequal, cylindrical. Corolla: three-parted, unequal, spreading. Nectary two-lipped, almost erect.

Species. 1. Amomum zinziber, or narrow-leaved ginger: scape middle-sized, spike ovate, leaves linear-lanceolate. It is a native of the East Indies, and other countries of Asia; and is largely cultivated both there and in the West Indies. The dried roots furnish a considerable export from our West-India islands. These roots, it is well known, are of great use both in the kitchen and in medicine; and, preserved green as a sweetmeat, are preferable to every other sort. It flowers with us in September. The root of ginger appears to be much less liable to heat the constitution, than might be expected from the penetrating warmth and pungency of its taste. It gives out the whole of its virtue to rectified spirit, and great part of it to water. The spirituous tincture inspissated yields a fiery extract, sinelling moderately of the ginger. A syrup made from an infusion of three or four ounces of

the root in three pints of boiling water, is kept in the shops. The cases in which ginger is more immediately serviceable, are flatulent cholics, debility and laxity of the system, and in torpid and phlegmatic constitutions, to excite a brisker action of the vessels. The manner of preparing it for use, in the West Indies, is as follows. When the stalks are wholly withered, the roots are fit to take up; which is generally done in January and February. Being picked and cleared, they are gradually scalded in boiling water: after this they are spread, and exposed to the sun till the whole is sufficiently cured; they are then divided into parcels of about one hundred weight each, and put into bags for the market; this is called black ginger. The white ginger is never scalded, but every root is picked, washed, and scraped, separately, and then dried in the sun and air. To preserve this root in syrup, it is dug when the shoots do not exceed five or six inches in height. Being picked and washed, they are scalded till tender; then put into cold water, and scraped and peeled gradually: this operation may last three or four days, during which time the roots are constantly kept in water, frequently shifted. They are then put into jars, and covered with a thin syrup, which, after two or three days, is shifted, and a richer put on; this is sometimes again removed, and even a fourth put on; but it seldom requires more than three syrups. The shifted syrups are diluted, and fermented into a small pleasant liquor, called cool drink.

2. *Amomum zerumbet*, or broad-leaved ginger, or zerumbet: scape naked, spike oblong, obtuse. This is a native of the East Indies, Cochinchina, &c. Also in Otaheite and the other Society isles. With us it flowers from September to November; when the stalks perish, in the same manner as the true ginger. This is used externally in the East, in cataplasms and fomentations; but not as spice or medicine internally: though Garcias affirms, that it makes a better preserve with sugar than the other.

3. *Amomum sylvestre*, or great wild ginger: scape naked, spike elongate with oblong ventricose bractes, leaves broad-lanceolate. This differs in nothing from the preceding, only the stalk rises eight or nine feet high, having much larger leaves; and, instead of the flowers and fruits being on the end of the same stalk, they are on another about three feet high, immediately springing from the root. It is a native of Jamaica, where it is frequent enough in the woods. Browne says, that its common height is five or six feet, and that the flower-stalks seldom rise above one or two feet from the ground. The root is warm, and stimulates very gently; it may be properly administered as a stomachic and alexipharmic.

4. *Amomum mioga*, or Japanese ginger: scape very short, capsule ovate, leaves ensiform acute. It is a native of Japan, where it flowers in September.

5. *Amomum cardamomum*, or cardamom: scape very simple and short, bractes alternate, loose. The cardamom has thick fleshy roots, which in the spring send forth many green reed-like stalks, and rise to the height of seven or eight feet, garnished with very long narrow leaves, set alternately, closely embracing them at the base. The stalks decay entirely in autumn, and new ones arise from the roots in the spring; but it has not produced any flowers as yet in England, though the roots thrive and increase greatly where they are properly managed. Cardamom is an object of considerable commerce in Malabar. The Indians themselves make great use of it; they mix the seeds with their betel, thinking that it facilitates digestion. The lesser cardamom, which in all probability will prove to be a different species from this, affords an elegant and useful aromatic; very warm, yet not fiery, or subject, like pepper, to produce immoderate heat. The seeds, which are the part used in medicine, give out their warmth to watery as well as to spirituous menstrua, but much more powerfully to the latter. The tincture of cardamoms is occasionally made use of as a pleasant warm cordial, as well as for flavouring other medicines.

6. *Amomum villosum*: scape short reclining, bractes

linear, fruit villose. Native of the mountains of Cochinchina. The seeds are in great request among the Chinese merchants, being much used in medicine in China.

7. *Amomum medium*: spike cauline, branched; fruit oblong, streaked, valveless. Native of China, in the province Yunnan, to the west of Canton. The seeds are used in agues, for culinary purposes, and to increase the strength of any odours whatever.

8. *Amomum globosum*: spike cauline, branched; fruit globose with an even surface. Native of the mountains of China and Cochinchina; and used medicinally in both countries, in disorders of the bowels, &c.

9. *Amomum hirsutum*: spike cauline, simple, reclining; fruit roundish hirsute. Native of Cochinchina, in woods.

10. *Amomum granum paradisi*, or grains of paradise: scape branching, very short. As yet we know very little about this plant. It is a native of Guinea, and of the islands of Ceylon and Madagascar.

11. *Amomum galanga*, or galangale: spike cauline, erect; spathe subtriflorous; capsule three-cornered, ovate, smooth. It is a native of China and Cochinchina, and is cultivated in both countries. The root and seeds are both used there medicinally. The root, as imported to us, has no very grateful smell, and an unpleasant, bitterish, hot, taste. It was formerly in common use as a warm stomachic bitter, and generally made an ingredient in bitter infusions; but it is now almost wholly laid aside, on account of its unpleasant flavour. The spirituous extract is excessively fiery; and the watery extract is very hot and pungent. The essential oil has little smell, and no great pungency. The pungent matter, therefore, seems to be of the same nature with that of pepper; residing, not in the volatile oil, but in a more fixed matter. In the East, they use the fresh root in preserving fish and meat, and to flavour the spirit which they draw from rice and sugar. For this purpose, they bruise it grossly, and make it up into balls, with an equal quantity of rice. These balls are hung up for a long time in a chimney, that they may imbibe the foot. A quantity of this substance is broken into the liquor prepared by boiling for making spirit, and is left in it all night; the next day the liquor is found in a state of fermentation, and is put into the still; and they procure a spirit from this mixture, not inferior to that which is drawn from the coco palm, and probably much more wholesome. The same root is usually given in the shops for galangale and for zedoary.

12. *Amomum arboreum*: stem arboreous, fruit calycine. This is a tree about ten feet in height, with many twisted spreading branches. It has scarcely any taste or smell, and its use is unknown. The wood is very light, and not even fit for the fire. Native of the island of Sumatra, in a wood, on the eastern coast.

Propagation and Culture. All these sorts are tender, and require a warm stove to preserve them in this country. They are easily propagated by parting their roots; the best time for doing this is in the spring, before they put out new shoots; for they should not be transplanted in summer, when they are in full vigour, nor do they succeed so well when they are removed in autumn; because they remain long after in an inactive state; and, during that time, if wet comes to the roots, it often causes them to rot. When the roots are parted, they should not be divided into small pieces, especially if they are designed to have flowers; for, until the roots have spread to the side of the pots, they rarely put out flower-stems, for which reason they should not be planted in very large pots. These plants thrive best in a rich light earth, such as may be found in the kitchen-garden; with this the pots should be filled within two inches of the top, then the roots should be placed in the middle of the pots, observing that their crowns are upwards, and the pots filled up with the same rich earth; after this, the pots should be plunged into a hot-bed of tanner's bark, and must be sparingly watered, until their stalks appear above ground, when they will require a greater share of moisture, especially

during the warm summer months; but in autumn the waterings must not be often, nor in great plenty; and, during the winter, when the roots are inactive, very little water should be given them. The pots with these roots should constantly remain plunged in a tan-bed; for if they are taken out, and placed on shelves in the stove, their fibres frequently shrink, which occasions their roots to decay. With this management these plants have multiplied greatly, and the common ginger has produced roots weighing five or six ounces, but the others have been near a pound weight. In the West Indies the ginger thrives best in a rich cool soil; in a more clayey soil the root shrinks less in scalding. The land laid out for the culture of it is first well cleared and hoed, then slightly trenched, and planted in March or April; it flowers about September. When the stalks are wholly withered, the roots are fit to take up, which is generally done in January and February. See ALPINIA, COSTUS, and SISON.

AMOMUM CURCUMA. See CURCUMA.

AMOMUM PLINII, or AMORIS POMUM. See SOLANUM.

AMO'NG, or AMO'NGST, *prep.* [*among, gemang, Sax.*] Mingled with; placed with other persons or things on every side.—*Amongst* strawberries sow here and there some borage-seed, and you shall find the strawberries under those leaves far more large than their fellows. *Bacon*.—Conjoined with others, so as to make part of the number.—I have then, as you see, observed the failings of many great wits *amongst* the moderns, who have attempted to write an epic poem. *Dryden*.

AMON'TONS (William), an ingenious French experimental philosopher, was born in Normandy, the 31st of August, 1663. While at the grammar-school, he by sickness contracted a deafness that almost excluded him from the conversation of mankind. In this situation, he applied himself to the study of geometry and mechanics; with which he was so delighted, that it is said he refused to try any remedy for his disorder, either because he deemed it incurable, or because it increased his attention to his studies. Among other objects of his study, were the arts of drawing, of land-surveying, and of building; and, shortly after, he acquired some knowledge of those more sublime laws by which the universe is regulated. He studied with great care the nature of barometers and thermometers; and wrote his treatise of "Observations and Experiments concerning a new Hour-glass, and concerning Barometers, Thermometers, and Hygroscopes;" and also some pieces in the Journal des Savans. In 1687, he presented a new hygroscope to the Academy of Sciences, which was much approved. He found out a method of conveying intelligence to a great distance in a short space of time: this was by making signals from one person to another, placed at as great distances from each other as they could see the signals by means of telescopes, and which is the foundation and origin of our present telegraphs. When the Royal Academy was new regulated, in 1699, Amontons was chosen a member of it, as an eleve under the third astronomer; and he read there his "New Theory of Friction," in which he happily cleared up an important object in mechanics. In fact, he had a particular genius for making experiments; his notions were just and delicate; and he knew how to prevent the inconveniencies of his new inventions, and had a wonderful skill in executing them. He died the 11th of October, 1705, being only forty-two years of age.

AMORÆ'ANS, a sect or order of gemaric doctors, or commentators on the Jerusalem Talmud. The Amoræans succeeded the Mischnic doctors. They subsisted 250 years, and were succeeded by the Seburæans.

AMOR'GOS, or AMURGUS, now Morgo, not far from Naxos to the east, one of the European Sporades; the country of Simonides, the iambic poet. To this island criminals were banished. It was famous for a fine flax, called *emorgis*.

AM'ORIST, *f.* An innamorato; a gallant; a man professing love.—Female beauties are as fickle in their faces as their minds; though casualties should spare them, age brings in a necessity of decay; leaving doaters upon red and white perplexed by uncertainty both of the continuance of their mistresses's kindness, and her beauty, both of which are necessary to the *amorist's* joys and quiet. *Boyle*.

AM'ORITES, a people descended from Amorrihæus; according to the Septuagint and Vulgate; Emoræus, according to other expositors; Hæmori, according to the Hebrew; or Emorite, according to our version of the bible; who was the fourth son of Canaan, Gen. x. 16. The Amorites first of all peopled the mountains lying to the west of the Dead Sea. They had likewise establishments to the east of the same sea, between the brooks of Jabbok and Arnon. Moses made a conquest of this country from their kings Sihon and Og, in the year of the world 2553. The prophet Amos (ii. 9.), speaking of the gigantic stature and valour of the Amorites, compares their height with that of cedars, and their strength with that of an oak. The name Amorite is often taken in Scripture for all Canaanites in general. The lands which the Amorites possessed on this side Jordan, were given to the tribe of Judah; and those which they had enjoyed beyond this river, were distributed between the tribes of Reuben and Gad.

AMO'RIMUM, a town of Phrygia Major, near the river Sangarius, on the borders of Galatia. It was taken from the Romans by the Saracens in 668, but soon after retaken by the Romans. A war breaking out again between these two nations in 837, the Roman emperor Theophylus destroyed Sozopetra, the birth-place of the khalif Al' Motafem, notwithstanding his earnest entreaties to him to spare it. This so enraged the khalif, that he ordered every soldier in his army to engrave upon his shield the word *Amorium*, the birth-place of Theophylus, which he resolved at all events to destroy. After a siege of fifty-five days, it was betrayed into his hands by one of the inhabitants, who had abjured the Christian religion. The khalif, exasperated at the loss he had sustained during the siege, put most of the men to the sword, carried the women and children into captivity, and levelled the city with the ground. His forces being distressed for want of water on their return home, the Christian prisoners rose upon some of them, and murdered them; upon which the khalif put 6000 of the prisoners to death. According to the eastern historians, 30,000 of the inhabitants of Amorium were slain, and as many carried into captivity.

AMORO'SO, *f.* [Ital.] A man enamoured.

A'MOROUS, *adj.* [*amoroso, Ital.*] In love; enamoured; with the particle of before the thing loved; in *Shakespeare, on*.—Sure my brother is *amorous on* Hero, and hath withdrawn her father to break with him about it.—Naturally inclined to love; disposed to fondness; fond.—Apes, as soon as they have brought forth their young, keep their eyes fastened on them, and are never weary of admiring their beauty; so *amorous* is nature of whatsoever the produces. *Dryden*.—Relating or belonging to love:

And into all things from her air inspir'd
The spirit of love, and *amorous* delight.

Milton.

A'MOROUSLY, *adv.* Fondly; lovingly.

A'MOROUSNESS, *f.* The quality of being amorous; fondness; lovingness; love.—Lindamor has wit, and *amorousness* enough to make him find it more easy to defend fair ladies than to defend himself against them. *Boyle*.

AMOR'PHA, *f.* [from *a priv.* and *μορφη, form.*] In botany, a genus of the diadelphia decandria class, of the natural order of papilionacæ, or leguminosæ. The generic characters are—Calyx: perianthium one-leaved, tubulous, cylindrical, turbinate; mouth erect, five-toothed, obtuse, the two upper-teeth larger than the others; permanent. Corolla: of one ovate concave petal, scarcely larger than the calyx, erect, inserted into the calyx, between the two larger and upper teeth, and placed at the upper side of it. Stamina: filaments very slightly united

at the base, erect, unequal in length, longer than the corolla: anthera simple. Pistillum: germ roundish; style subulate, the length of the stamens; stigma simple. Pericarpium: legume lunulate, reflex, larger than the calyx, compressed, more reflex at the tip, one-celled, tubercled. Seeds two, oblong-kidney-shaped. — *Essential Character.* Standard of the corolla ovate, concave.

There is but one species, which is named *amorphia fruticosa*, or bastard indigo. It rises with many irregular stems, to the height of twelve or fourteen feet, with very long winged leaves, in shape like those of the common acacia. At the extremity of the same year's shoots, the flowers are produced in long slender spikes, they are small and of a deep purple colour; make their appearance the beginning of July; and the seeds do not ripen in England. This shrub grows naturally in Carolina, where formerly the inhabitants made a coarse sort of indigo from the young shoots, which occasioned their giving it the name of bastard indigo. The seeds were sent to England, by Mr. Mark Catesby, in 1724, from which many plants were raised in the gardens near London; these were of quick growth, and many of them produced flowers in three years. It is become very common in all gardens and nurseries. Thunberg observed it in the great island of Nipon belonging to Japan.

It is generally propagated by seeds, which are annually sent to England from different parts of America, for it is found in many of the northern colonies there; they usually arrive in February, and should be sown as soon as possible, in a light soil. It may also be propagated by laying down the young branches, which in one year will make good roots, and may then be taken off, and planted either in the nursery or in the places where they are designed to remain. If they are put into a nursery, they should not remain there more than one year; for, as the plants make large shoots, they do not remove well when they have remained long in a place: they must have a sheltered situation, otherwise their branches will be broken by the winds. As these shoots are large and soft, their upper parts are generally killed by frost in winter; but they put out shoots again in plenty, below the dead part, the spring following.

AMOR'PHOUS, *adj.* [of *amorphus*, Lat. *αμορφος*, Gr. of a priv. and *μορφη*, form.] Without form or shape; ill-shaped.

AMOR'T, *adv.* [*à la mort*, Fr.] In the state of the dead; dejected; depressed; spiritless.—How fares my Kate? what, sweeting, all *amort*? *Shakespeare.*

AMORTIZA'TION, or AMO'RTIZEMENT, *f.* [*amortissement*, *amortissable*, Fr.] The right or act of transferring lands to mortmain; that is, to some community, that never is to cease.—Every one of the religious orders was confirmed by one pope or other; and they made an especial provision for them, after the laws of *amortization* were devised and put in use by princes. *Ayliffe.*

To AMOR'TIZE, *v. a.* [*amortir*, Fr.] To alien lands or tenements to any corporation, guild, or fraternity, and their successors; which cannot be done without licence of the king, and the lord of the manor. *Blount.*

AMOS, [אָמֹס Heb. i. e. burden, or burdening.] The fourth of the small prophets, who in his youth had been a herdman in Tekoa, was sent to the king of Bashan, that is, to the people of Samaria, to bring them back to repentance, and an amendment of their lives; whence it is thought probable, that he was born within the territories of Israel, and only retired to Tekoa on his being driven from Bethel by Amaziah, the priest of the golden calves at Bethel. The prophet, being thus retired to Tekoa, in the kingdom of Judah, continued to prophesy. He boldly remonstrates against the crying sins that prevailed among the Israelites, as idolatry, oppression, wantonness, and obstinacy. He likewise reproves those of Judah, for their sensuality and injustice. He terrifies them both with frequent threatenings, and pronounces, that their sins will at last end in the ruin of Judah and Israel. Amos

was chosen to the prophetic office in the time of Uzziah, king of Judah, and Jeroboam, the son of Joash, king of Israel, two years before the earthquake, which happened in the twenty-fourth or twenty-fifth year of Uzziah, according to the rabbins and most of the modern commentators. He foretold the misfortunes which the kingdom of Israel should fall into after the death of Jeroboam II. who was then living. He foretold the death of Zeechariah, the invasion of the lands belonging to Israel by Phul and Tiglath-Pileser, kings of Assyria; and he speaks of the captivity of the ten tribes, and their return.

AMOS, [אָמֹס Heb. i. e. stout or strong.] The father of the prophet Isaiah.

To AMO'VE, *v. a.* [*amoveo*, Lat.] To remove from a post or station: a juridical sense. To remove; to move; to alter: a sense now out of use.

To AMO'UNT, *v. n.* [*monter*, Fr.] To rise to in the accumulative quantity; to compose in the whole; with the particle *to*. It is used of several sums in quantities added together.—Let us compute a little more particularly how much this will *amount to*, or how many oceans of water would be necessary to compose this great ocean rolling in the air, without bounds or banks. *Burnet.*—It is used, figuratively, of the consequence rising from any thing taken altogether.—The errors of young men are the ruin of business; but the errors of aged men *amount but to* this, that more might have been done, or sooner. *Bacon.*

AMO'UNT, *f.* The sum total; the result of several sums or quantities accumulated:

And now, ye lying vanities of life,
Where are you now, and what is your *amount*?
Vexation, disappointment, and remorse. *Thomson.*

AMO'UR, *f.* [*amour*, Fr. *amor*, Lat.] An affair of gallantry; an intrigue: generally used of vicious love. The *ou* sounds like *oo* in *poor*.—No man is of so general and diffusive a lust, as to prosecute his *amours* all the world over; and, let it burn never so outrageously, yet the impure flame will either die of itself, or consume the body that harbours it. *South.*

AMOUR'IST, *f.* [*un amoureux*, Fr.] An amorous person, one apt to be in love. Now spelt AMORIST.

A'MOY, an island in the province of Fokien, in China, where the English had a factory; but they have abandoned it on account of the impositions of the inhabitants. Lat. 24. 30. lon. 136. 0. It has a fine port, that will contain many thousand vessels.

AMP'ANA, *f.* in botany. See BORASSUS.

AMP'ELIS, the CHATTERER, *f.* in ornithology, a genus of birds belonging to the order passeris; the distinguishing characters of which are—bill straight, convex: upper mandible longer, somewhat bent inwards, and notched on both sides: nostrils beset with bristles: tongue sharp, cartilaginous, bifid. There are eleven species, one of which inhabits Europe, and the remaining ten the hotter parts of America. They are as follow:

1. *Ampelis teresa*, or blue-breasted, being of a beautiful azure, its back black, and its belly yellowish white.
2. *Garrulus Bohemicus*, or Bohemian, from often migrating there; having the back of its head erected, the secondary wing quills membranous, coloured at the tip.
3. *Ampelis carunculata*, or carunculated; having a pendulous, expandible, and moveable, caruncle at the base of the bill.
4. The *pompadora*, of a beautiful purple colour; the nearest coverts of its wings are sword-shaped, elongated, boat-shaped, and stiff.
5. The *cayana*, or purple-throated; being of a bright blue colour, with its neck violet below.
6. The *carnifex*, having its head and breast red; the stripe at its eyes, the tips of the quills of the wings, and its tail, black.
7. The *maynana*, or silken, from the softness of its plumage, which is a bright blue, with purple neck.
8. The *variegata*, or variegated; its colour is cinereous, and to its throat are attached two lance-shaped caruncles.
9. The

9. The cuprea, or coppery; being of a fine bronze colour, and found in Surinam.

10. The phœnicea, or red-winged, which migrates into Africa.

11. The chrifata, or crested ampelis of America.

Aristotle, lib. ix. 16. has named this bird *γναφάλης*, which signifies a sort of matrafs or pillow, alluding to its silky feathers. Aldrovandus calls it *ampelis*, or vine-bird, because it generally feeds upon grapes; *αμπελος* denoting a vine. Some have reckoned it improperly the *merops* of Aristotle, which is the *bee-eater*; others have taken it for the *avis incendiaria* of the ancients, or the bird of the Hercynian forest, mentioned by Pliny; though its feathers do not cast fire at night, as alleged of that bird, unless this was a metaphorical allusion to the colour of the chattering's eyes, and the red pallets or tears on its wings.

We cannot well assign the cause that determines these birds to leave their ordinary residence, to roam into distant climes; particularly, as their migration is only occasional, happening once in three or four years; when, as Gesner informs us, their numerous host often darkens the sky. But whatever be the countries in which these birds choose to enjoy the sweets of existence, and transmit them to new generations, it is certain that they are not sedentary, but make their excursions far and wide, tenacious of the utmost scope of liberty. They sometimes appear in the north of England, in Scotland, France, Italy, and Spain; and were once superstitiously considered as the presages of plague, pestilence, and war. It is even recorded, that in the year 1551, when these birds made their customary tour of Italy, they spread in vast flocks through Modena, Placentia, and every other part, except Ferrara, as if they had a presentiment of the tremendous earthquake which was then about to happen, and which dispersed or destroyed even the feathered race of that ill-fated country. It is said they penetrate far into the arctic regions, which is confirmed by count Strahlenberg, who saw them in Tartary. They are gregarious, and feed on the berries of the mountain ash, of privet, bramble, juniper, and laurel; also upon almonds, apples, and figs; but the fruit of the vine appears to be their choicest food. They are killed for table throughout all the regions where they migrate, and are esteemed a delicious bird.

The representation given in the annexed plate, was drawn from the real crested chattering of America, which is a very elegant species of the ampelis. The bill is short, a little arched on the top of the upper mandible, and of a dusky colour. Round the base of the upper mandible are small black feathers, which form a bar reaching beyond the eyes, which are of a beautiful red, and shine with uncommon lustre. It hath long feathers on the crown of the head, which it can raise into a crest, or let fall at pleasure. The head and neck are of a reddish brown or bay colour, the breast inclines to white; the belly and thighs are of a pale yellow; the covert feathers beneath the tail are whitish; the back is of a rich brown colour; the rump and covert feathers on the upper side of the tail, and wings, are of a light ash-colour; the three innermost quills on each wing next the back, have their inner webs white to the tips; seven of the middle quills in each wing have small oblong flat pallets or horny substances hanging to their tips, of the colour and gloss of the finest red sealing-wax; the tips of the tail feathers are of a fine golden yellow; and the legs, feet, and claws, are black. In short, the plumage of the ampelis is perfectly elegant when the bird is at rest; but when it expands its wings, and spreads its tail, and erects its crest, in the act of flying, its appearance is charming. The hens of this species are not so bright-coloured as the cocks, and they want the red pallets or drops near the tips of their wing feathers.

AMPELIS, *f.* in botany. See VITIS.

AMPELITES, *f.* a solid, dry, hard, opaque, black, fossil, coal, not fusible, but easily inflammable, and burning with a bright vivid white flame, with much smoke, and a bituminous or pitchy smell. In the north of Eng-

land it is called cannel coal, perhaps by corruption, instead of candle coal, as it is used to supply the place of candles in poor families. An alum ore found in Burgundy, and consisting of clay, pirites, and bitumen, is also distinguished by this name. There is a large quarry of it near Alençon, in France. It is dug in many parts of England, but the finest is in Lancashire and Cheshire. It is capable of a very high and elegant polish; and, in the countries where it is produced, is turned into a vast number of toys, as snuff-boxes, and the like, which bear all the nicety of turning, and are made to pass for jet. Husbandmen smear their vines with it, as it kills the vermin which infests them: It is likewise used for dyeing of hair black. In medicine, it is reputed good in colics, against worms, and of being in general an emollient and discutient; but the present practice takes no notice of it.

AMPELOPRA'SUM, *f.* in botany. See ALLIUM.

AMPELU'SIA, a promontory of Mauritania Tingitana, called Cottes by the natives, which is of the same signification with a town of the same name not far from the river Lixus, near the Straits of Gibraltar; now Cape Spartel. Lat. 36. 0. lon. 6. 30. W.

AM'PER, *f.* [*ampre*, Sax.] A tumour, with inflammation; bile: a word said, by Skinner, to be much in use in Essex; but, perhaps, not found in books.

AMPHARIS'TEROS, *adj.* it is the reverse of ambidexter; that is, not having a proper use of either hand. Figuratively, it signifies unlucky, unfortunate.

AMPHEME'RINOS, *f.* it is the continued fever of Linnæus and Vogel, from *αμφι*, a Greek preposition, signifying a revolution, and *εμερα*, a day; a quotidian intermittent. It is by some considered a remittent fever, and properly put in contradistinction to the febris quotidiana, which is an intermittent, and is defined a kind of remittent fever, whose paroxysms return every day of a similar nature, though it is rarely observed to be regular. Sauvages enumerates no less than twenty-four species. See Sauvages' Nosolog. Meth. 4to. vol. ii. p. 322.

AMPHE'RES, *f.* in antiquity, a kind of vessels, wherein the rowers plied two oars at the same time, one with the right hand and another with the left.

AMPHIARA'US, in pagan mythology, a celebrated prophet, who possessed part of the kingdom of Argos. He was believed to excel in divining by dreams, and is said to be the first who divined by fire. Amphiaras knowing, by the spirit of prophecy, that he should lose his life in the war against Thebes, hid himself, in order to avoid engaging in that expedition: but his wife Eriphyle, being prevailed upon by a present, discovered the place in which he had concealed himself; so that he was obliged to accompany the other princes who marched against Thebes. This proved fatal to him; for, the earth being rent asunder by an earthquake, both he and his chariot were swallowed up in the opening. Amphiaras, after his death, was ranked among the gods; temples were dedicated to him; and his oracle, as well as the sports instituted to his honour, were very famous.

AMPHIARTHRO'SIS, *f.* in anatomy, a mixed sort of articulation; partaking of the diarthrosis and the synarthrosis; it resembles the first in being moveable, and the latter in its connection. The species which compose it have not a particular cartilage belonging to each of them, as in the diarthrosis, but they are both united to a common cartilage, which being more or less pliable, allows them certain degrees of flexibility, though they cannot slide upon each other; such is the connection of the first rib with the sternum, and of the bodies of the vertebrae with each other.

AMPHI'BIA, *f.* in zoology, the name of Linnæus's third class of animals; including all those which live partly in water and partly on land. This class he subdivides into four orders, viz. The amphibia reptiles; the amphibia serpentes; the amphibia nantes; and the amphibia meantes. It has been a question, whether the animals commonly called *amphibious* live most in the water or

AMPELIS.

Edwards del.

Parr sculp.

The Crested Chatterer of America.

London Published as the Act directs, July 2. 1796. by J. H. Fisher.

1. The Pompadour Chatterer. 2. The Purple-throated Chatterer.

or on land. If we consider the words *αμφι* (*utrinque*, both ways), and *βίος* (*vita*, life), from which the term *amphibious* is derived; we should understand, that animals having this title are capable of living as well by land, or in the air, as by water; or of dwelling in either constantly; but it will be difficult to find any animal that can fulfil this definition, by being equally qualified for either. Dr. Parsons, therefore, from considering their economy respectively, divides them into two orders, viz. 1. Such as enjoy their chief functions by land, but occasionally go into the water. 2. Such as chiefly inhabit the water, but occasionally go ashore. What he advances on this subject is curious, and well illustrates the nature of them.

Of the first order, he particularly considers the phocæ; and endeavours to shew, that none of them can live entirely in the water; but that their chief enjoyment of the functions of life is on shore. These animals, he observes, are really quadrupeds; but, as their chief food is fish, they are under a necessity of going out to sea to hunt their prey, and to great distances from shore; taking care that, however great the distance, rocks or small islands are at hand, as resting-places when they are tired, or when their bodies become too much macerated in the water; and they return to the places of their usual resort to sleep, copulate, and bring forth their young, for the following reasons, viz. It is well known, that the only essential difference (as to the general structure of the heart) between amphibious and land animals, or such as never go into the water, is, that in the former the oval hole remains always open. Now, in such as are without this hole, if they were to be immersed in water for but a little time, respiration would cease, and the animal must die; because a great part of the mass of blood passes from the heart by the pulmonary artery through the lungs, and by the pulmonary veins returns to the heart, while the aorta is carrying the greater part of the mass to the head and extremities, &c.

Now, the blood passes through the lungs in a continual uninterrupted stream, while respiration is gentle and moderate; but, when it is violent, then the circulation is interrupted, for inspiration and expiration are now carried to their extent; and, in this state, the blood cannot pass through the lungs, either during the total inspiration or total expiration of the air in breathing: for, in the former case, the inflation compresses the returning veins; and, in the latter, by the collapse of the lungs, these veins are interrupted also; so that it is only between these two violent actions that the blood can pass: and hence it is, that the lives of animals are shortened, and their health impaired, when they are subject to frequent violent respiration; and thus it is, that when animals have once breathed, they must continue to respire ever after, for life is at an end when that ceases.

There are three necessary and principal uses of respiration in all land-animals, and in those kinds that are counted amphibious. The first is, that of promoting the circulation of all the blood through the whole body and extremities. In real fishes, the force of the heart is alone capable of sending the blood to every part, as they are not furnished with limbs or extremities; but, in the others mentioned, being all furnished with extremities, respiration is an assistant force to the arteries in sending blood to the extremities; which, being so remote from the heart, have need of such assistance, otherwise the circulation would be very languid in these parts: thus we see, that, in persons subject to asthmatic complaints, the circulation grows languid, the legs grow cold and cedematous, and other parts suffer by the defect of respiration. A second use of breathing is, that, in inspiration, the variety of particles, of different qualities, which float always in the air, might be drawn into the lungs, to be insinuated into the mass of blood, being highly necessary to temperate and cool the agitated mass, and to contribute refined pabulum to the finer parts of it, which, meeting with the daily supply of chyle, serves to assimilate and more inti-

mately mix the mass, and render its constitution the fitter for supporting the life of the animal. Therefore it is, that valetudinarians, by changing foul or unwholesome air for a fine, good, open, air, often recover from lingering diseases. A third principal use of respiration is, to promote the exhibition of voice in animals; which all those who live on the land do, according to their specific natures.

From these considerations it appears, that the phocæ of every kind are under an absolute necessity of making the land their principal residence. But there is another very convincing argument why they reside on shore the greater part of their time; namely, that the flesh of these creatures is analogous to that of other land-animals; and therefore, by over long maceration, added to the fatigue of chasing their prey, they would suffer such a relaxation as would destroy them. It is well known, that animals which have lain long under water, are reduced to a very lax and even putrid state; and the phoca must bask in the air on shore: for, while the solids are at rest, they acquire their former degree of tension, and the vigour of the animal is restored; and, while he has an uninterrupted placid respiration, his blood is refreshed by the new supply of air, and he is rendered fit for his next cruise: for action waits the most exalted fluids of the body, more or less, according to its duration and violence; and the restorative rest must continue longer or shorter, according to the quantity of the previous fatigue.

We shall next examine by what power these animals are capable of remaining longer under water than land-animals. All these have the oval hole open between the right and left auricles of the heart; and, in many, the canalis arteriosus also: and, while the phoca remains under water, which he may continue an hour or two, more or less, his respiration is stopped; and the blood, not finding the passage through the pulmonary artery free, rushes through the hole from the right to the left auricle, and partly through the arterial canal, being a short passage to the aorta, and thence to every part of the body, maintaining the circulation: but, upon rising to come ashore, the blood finds its passage again through the lungs the moment he respire. Thus the fœtus in utero, during its confinement, having the lungs compressed, and consequently the pulmonary arteries and veins impervious, has the circulation of the blood carried on through the oval hole and the arterial canal. Now, so far, the phoca in the water, and the fœtus in utero, are analogous; but they differ in other material circumstances. One is, that the fœtus, having never respired, remains sufficiently nourished by the maternal blood circulating through him, and continues to grow till the time of his birth, without any want of respiration during nine months confinement: the phoca, having respired the moment of his birth, cannot live very long without it, for the reasons given before; and this hole and canal would be closed in them, as it is in land-animals, if the dam did not, soon after the birth of the cub, carry him so very frequently into the water to teach him; by which practice these passages are kept open during life, otherwise they would not be capable of attaining the food designed for them by Providence. Now, as all fœtuses have these passages open, if a whelp of a true water-spaniel were, immediately after its birth, served as the phoca does her cubs, and immersed in water, to stop respiration for a little time every day, it is probable that the hole and canal would be kept open, and the dog be made capable of remaining as long under water as the phoca.

Frogs, how capable soever of remaining in the water, yet cannot avoid living on land, for they respire; and, if a frog be thrown into a river, he makes to the shore as fast as he can. The lizard kind, such as may be called water-lizards, are all obliged to come to land, to deposit their eggs, to rest, and to sleep. Even the crocodiles, who dwell much in rivers, sleep and lay their eggs on shore, and, while in the water, are compelled to rise to the surface to breathe; yet, from the texture of their scaly covering, they are capable of remaining in the water longer

by far than any species of the phoca, whose skin is analogous to that of a horse or cow. The hippopotamus, who wades into the lakes or rivers, is a quadruped, and remains under the water a considerable time; yet his chief residence is upon land, and he must come on-shore for respiration. The testudo, or sea-tortoise, though he goes out to sea, and is often found far from land; yet, being a respiring animal, cannot remain long under water. He has indeed a power of rendering himself specifically heavier or lighter than water, and therefore can let himself down to avoid an enemy or a storm: yet he is under a necessity of rising frequently to breathe; and his most usual situation, while at sea, is upon the surface of the water, feeding upon the various substances that float in great abundance every where about him; these animals sleep securely upon the surface, but not under water; and can remain longer at sea than any other of this class, except the crocodile; because, like him, his covering is not in danger of being too much macerated; yet they must both go on-shore to copulate and lay their eggs.

The consideration of these is sufficient to inform us of the nature of the first order of the class of amphibious animals; let us now see what is to be said of those which chiefly inhabit the waters, but occasionally go on-shore. These are but of two kinds: the eels and water serpents, or snakes of every kind. It is their form that qualifies them for loco-motion on land, and they know their way back to the water at will; for, by their structure, they have a strong peristaltic motion, by which they can go forward at a pretty good rate: whereas all other kinds of fish, whether vertical or horizontal, are incapable of a voluntary loco-motion on shore; and therefore, as soon as such fish are brought out of the water, after having floundered awhile, they lie motionless, and soon die. The reason is, that fish in general have, instead of lungs, gills, or branchiæ: and as, in land-animals, the lungs have a large portion of the mass of blood circulating through them, which must be stopped if the air has not a free ingress and egress into and from them; so, in fish, there is a great number of blood-vessels that pass through the branchiæ, and a great portion of their blood circulates through them, which must in like manner be totally stopped, if the branchiæ are not perpetually wet with water. So that, as the air is to the lungs in land-animals a constant assistant to the circulation, so is the water to the branchiæ of those of the rivers and seas: for, when these are out of the water, the branchiæ very soon grow crisp and dry, the blood-vessels are shrunk, and the blood is obstructed in its passage; so, when the former are immersed in water, or otherwise prevented from having respiration, the circulation ceases, and the animal dies. Again, as land-animals would be destroyed by too much maceration in water; so fishes would, on the other hand, be ruined by too much exsiccation: the latter being, from their general structure and constitution, made fit to bear, and live in, the water; the former, by their constitution and form, to breathe and dwell in the air. But it may be asked, why eels and water-snakes are capable of living longer in the air than the other kinds of fish? This is answered, by considering the providential care of the great Creator for these and every one of his creatures; for, since they were capable of loco-motion by their form, which they need not be if they were never to go on shore, it seemed necessary that they should be rendered capable of living a considerable time on shore, otherwise their loco-motion would be in vain. This is provided for in a most convenient manner: for this order of fishes have their branchiæ well covered from the external drying air; they are also furnished with a slimy mucus, which hinders them from becoming crisp and dry for many hours; and their very skins always emit a mucous liquor, which keeps them supple and moist for a long time: whereas the branchiæ of other kinds of fish are much exposed to the air, and want the slimy matter to keep them moist. Now, if any of these, when brought out of the water, were laid in a vessel without water, they might be

preserved alive a considerable time, by only keeping the gills and surface of the skin constantly wet, even without any water to swim in.

It has been advanced, that man may, by art, be rendered amphibious, and able to live under water as well as frogs. As the fœtus lives *in utero* without air, and the circulation is there continued by means of the foramen ovale; by preserving the passage open, and the other parts *in statu quo*, after the birth, the same faculty would still continue. Now, the foramen, it is alleged, would be preserved in its open state, were people accustomed, from their infancy, to hold their breath a considerable time once a day, that the blood might be forced to resume its pristine passage, and prevent its drying up, as it usually does. This conjecture seems, in some measure, supported by the practice of divers, who are taught from their childhood to hold their breath, and keep long under water, by which means the ancient channel is kept open. A Calabrian monk, at Madrid, laid claim to this amphibious capacity; making an offer to the king of Spain, to continue twice twenty-four hours under water, without ever coming up to take breath. Kircher gives an account of a Sicilian, named the *fish Colas*, who, by a long habitude from his youth, had so accustomed himself to live in water, that his nature seemed to be quite altered; and he lived rather after the manner of a fish than a man.

AMPHIBIOUS, *adj.* [*amphibie*, Fr. *anfibi*, It. *amphibio*, Sp. *amphibius*, Lat. of *αμφιβιός*, of *αμφι*, both sides, and *βιος*, life, Gr.] That which partakes of two natures, so as to live in two elements; as, in air and water:

A creature of *amphibious* nature,

On land a beast, a fish in water.

Hudibras.

Of a mixed nature, in allusion to animals that live in air and water:

Traulus of *amphibious* breed,

Motley fruit of mongrel seed;

By the dam from lordlings sprung,

By the fire exhal'd from dung.

Swift.

AMPHIBIOUSNESS, *f.* The quality of being able to live in different elements.

AMPHIBLESTROIDES, *f.* [*αμφιβλεστροειδης*, of *αμφιβλεστρον*, a net, Gr.] The retina, or net-like coat of the eye.

AMPHIBOLOGICAL, *adj.* Doubtful.

AMPHIBOLOGICALLY, *adv.* Doubtfully; with a doubtful meaning.

AMPHIBOLOGY, *f.* [*amphibologie*, Fr. *amphibologia*, Lat. of *αμφιβολογια*, of *αμφι*, about, and *βαλλω*, to cast, or throw, Gr.] Discourse of uncertain meaning. It is distinguished from *equivocation*, which means the double signification of a single word; as, *noli regem occidere timere bonum est*, is *amphibology*; *captare lepores*, meaning, by *lepores*, either hares or jests, is *equivocation*.—In defining obvious appearances, we are to use what is most plain and easy; that the mind be not misled by *amphibologies* into fallacious deductions. *Glanville.*

AMPHIBOLOUS, *adj.* [*αμφι* and *βαλλω*, Gr.] Tossed from one to another; striking each way.—Never was there so *amphibolous* a quarrel, both parties declaring themselves for the king, and making use of his name in all their remonstrances, to justify their actions. *Howell.*

AMPHIBRACHYS, *f.* [*αμφι* and *βραχυς*, short, Gr.] In ancient poetry, the name of a foot consisting of three syllables, whereof that in the middle is long, and the other two short; such is the word “*ābīrē*.”

AMPHIBRANCHIA, *f.* [from *αμφι*, about, and *βραγχια*, the gills of a fish; some say, *βραγχια*, the fauces, and some say the jaws.] The fauces or parts about the tonsils.

AMPHICOME, *f.* A kind of figured stone, of a round shape, but rugged, and beset with eminences, celebrated on account of its use in divination. The word is originally

AMPHISBÆNA.

Idle delin.

Pige sculp.

The Fuliginosa and Alba Serpents.

London Published as the Act directs, 23rd August 1796, by J. Wilkes.

nally Greek, ἀμφικροίαι, *utrinque comata*, or "hairy on all sides." This stone is also called *erotylos*, ἐρωτυλός, *amatoria*, probably on account of its supposed power of creating love. The amphirome is mentioned by Democritus and Pliny, though little known among the moderns.

AMPHICTYONS, *f.* [Some suppose the word ἀμφικτιόνες to be formed of ἀμφί, about, and κτείνω or κτείνειν, Gr. in regard the inhabitants of the country round about met here in council; others, with more probability, from Amphictyon, son of Deucalion, whom they suppose to have been the founder of this assembly; though others will have Acrisius, king of the Argives, to have been the first who gave a form and laws to it.] In Grecian antiquity, an assembly composed of deputies from the different states of Greece; and resembling, in some measure, the diet of the German empire. Authors give different accounts of the number of the Amphyctions, as well as of the states that were entitled to have their representatives in this council. They decided all public differences and disputes between any of the cities of Greece; but, before they entered on business, they jointly sacrificed an ox cut into small pieces, as a symbol of their union. Their determinations were received with the greatest veneration, and even held sacred and inviolable. The stated terms of their meeting were in spring and autumn; the spring was called *Εαρινή Πύλαια*, that in autumn *Μετοπωρινή*. On extraordinary occasions, however, they met at any time of the year, or even continued sitting all the year round. Philip of Macedon usurped the right of presiding in the assembly of the Amphictions, and of first consulting the oracle which was called *Προμαντεία*.

AMPHIDAMAS, the son of Busiris, king of Egypt, was offered to Hercules on the same altar that his father had sacrificed all strangers that he could get into his possession.

AMPHIDROMIA, *f.* [ἀμφιδρόμα, of ἀμφί, about, and δρόμος, Gr. a course.] A festival observed in Athens by private families, upon the fifth day after the birth of a child, it being the custom for the sponsors to run round the fire with the infant in their arms; and then, having delivered it to the nurse, they were entertained with feasting and dancing.

AMPHIDRYON, *f.* in ecclesiastical writers, denotes the veil or curtain which was drawn before the door of the bema in ancient churches.

AMPHILOCHIA, the territory of the city of Argos in Acarnania. A town also of Spain, in Gallacia, built by Teucer, and denominated from Amphilochus one of his companions; now *Orense*. Lat. 42. 36. lon. 8. 20. W.

AMPHILOCHIUS, bishop of Iconium, in the fourth century, was the friend of St. Gregory Nazianzen and St. Basil. He assisted at the first general council of Constantinople in 381; presided at the council of Sidæ; and was a strenuous opposer of the Arians. He died in 394; and his works were published in Greek and Latin at Paris 1644, by Francis Combefis.

AMPHILOCHUS, son of Amphiarus and Eriphyle, was a celebrated diviner. He had an altar erected to him at Athens, and an oracle at Mallus, in Cilicia, which city was founded by him and Mopsus. The answers of this oracle were given by dreams; the party enquiring used to pass a night in the temple, and that night's dream was the answer.

AMPHILOGY, *f.* [ἀμφί and λόγος, Gr.] Equivocation; ambiguity.

AMPHIMACER, *f.* [ἀμφί and μακρός, Gr.] In ancient poetry, a foot consisting of three syllables, whereof the first and last are long, and that in the middle short; such is the word "castitas."

AMPHIMEDON, the son of Melantheus, one of the lovers of Penelope, who was slain by her son Telemachus.

AMPHINOME, the name of one of the fifty Nereides, according to Homer.

AMPHION, a son of Jupiter, by Antiope daughter

of Nycteus, who had married Lycus, and had been repudiated by him when he married Dirce. Amphion was born at the same birth as Zethus, on mount Cythron, where Antiope had fled to avoid the resentment of Dirce. He made such uncommon progress in music, that he is said to have built the walls of Thebes by the harmony of his lyre. He and Zethus united to avenge the wrongs of their mother; they besieged and took Thebes, put Lycus to death, and tied Dirce to the tail of a wild bull, who dragged her till she expired. A son of Jafus king of Orchomenos, by Persephone daughter of Minus. He married Niobe, by whom he had many children, but all of them and himself were destroyed, for her insolence to Latona, except Chloris, who became the wife of Neleus.

AMPHIPOLES, in antiquity, the principal magistrates of Syracuse. They were established by Timoleon in the 109th Olympiad, after the expulsion of the tyrant Dionysius. They governed Syracuse for the space of 300 years: and Diodorus Siculus says, that they subsisted in his time.

AMPHIPOLIS, an ancient decayed city of Macedon, an Athenian colony, on the Strymon, but on which side is not certain. Also a town of Syria, on the Euphrates, said to have been built by Seleucus, and called by the Syrians *Turmeda*; supposed to have been only renewed and adorned by Seleucus, because long famous before his time.

AMPHIPILI, *f.* in Grecian antiquity, soldiers who, in war, used two horses without saddles, and were dexterous enough to leap from one to the other.

AMPHIPROREÆ, *f.* in the naval affairs of the ancients, vessels with a prow at each end. They were used chiefly in rapid rivers and narrow channels, where it was not easy to tack about.

AMPHIPROSOTYLE, *f.* [ἀμφίπροστυλός, Gr.] A term in architecture, used of those temples, in ancient times, which had four columns or pillars in the front, and the same number behind.

AMPHISBÆNA, *f.* [ἀμφισβæνα, of ἀμφί and βæνω, Gr. to go.] A genus of serpents belonging to the order of amphibia serpentes, so called from the notion of its having two heads, because the head and tail are nearly of the same dimensions and appearance, and because it moves with either end foremost. The head of the amphisbæna is small, smooth, and blunt; the nostrils are very small; the eyes are minute and blackish; and the mouth is furnished with a great number of small teeth. The body is cylindrical, and divided into about 200 annular convex segments, like those of a worm; and it has a number of longitudinal streaks on each side, which intersect each other in the form of small crosses. The anus is a transverse slit; and the last ring, or segment, of the belly has eight small papillæ, forming a transverse line before the anus; the tail, and all the space below the anus, is short, consisting of thirty annular segments, and is thick and blunt at the point. The colour of the whole animal is beautifully variegated, being adorned with yellow, green, black, and cochineal. We know as yet but of two species, viz.

1. The fuliginosa, which answers exactly to the above description, and is found in Libya, and in different parts of America, in the hotter regions of which they grow to a large size.

2. The alba, which is of a silvery white, a little tinted with a beautiful green, that only appears in the shades occasioned by the folds of its body in moving along, is a native of the East and West Indies, as well as of America, and it is generally found in the ant-hillocks. The bite of the amphisbæna is reckoned to be mortal by many authors; but, as it is not furnished with dog-fangs, (the usual instrument of conveying the poison of serpents,) later writers esteem it not to be poisonous. They feed upon ants and earth-worms, but particularly the latter. The figures represented in the annexed plate are taken from the drawings of madam Merian, preserved in the British Museum. The broken egg shews a young serpent just emerging from the shell, as drawn from the life by the above celebrated naturalist.

AMPHISBÆNA AQUATICA, a name given by authors to that long and slender insect commonly called the *sta aquatic*, and *vermisetarius*. It has the name *amphisbæna*, from its going backwards or forwards with equal ease and celerity. The usual size is four or five inches long, and the thickness of a large hair. Two or three of these worms are generally to be found in the body of the common black beetle. When put into water they will live a considerable time, and swim nimbly about; but often put up their heads as if endeavouring to escape; and sometimes fastening themselves by the mouth to the sides of the vessel, and drawing their whole bodies after them. These creatures are not only found in water, but buried in earth, and sometimes on leaves of trees, in gardens and hedges.

AMPHIS'CH, *f.* [*αμφισχιος*, of *αμφι*, on both sides, and *σχια*, Gr. shadows.] A name applied to the people who inhabit the torrid zone. The *amphiseii* have their shadows one part of the year towards the north, and the other towards the south, according to the sun's place in the ecliptic. They are also called *Asii*.

AMPHIS'MILA, *f.* [from *αμφι*, on both sides, and *μιλη*, Gr. an incision knife.] A dissecting knife with an edge on each side.

AMPHIS'SA, anciently the capital of the Loeri Oxolæ, fifteen miles to the west of Delphi, and so named, because surrounded on all sides by mountains. Hence *Amphissei*, the inhabitants; who plundered the temple at Delphi. Also a town of Magna Græcia, at the mouth of the Sagra, on the coast of the farther Calabria, situated between Locri and Caulonia; now called *Rocella*.

AM'PHITANE, *f.* [*αμφιτανη*, Gr.] Among ancient naturalists, a stone said to attract gold as the loadstone does iron. Pliny says it was found in that part of the Indies where the native gold lay so near the surface of the earth as to be turned up in small masses among the earth of ant-hills; and describes it to have been of a square figure, and of the colour and brightness of gold. The description plainly points out a well-known fossil, called by Dr. Hill *pyriticubum*: this is common in the mines of most parts of the world; but its power of attracting gold is fabulous.

AMPHITHE'ATRE, *f.* [*amphitheatrum*, Lat. of *αμφιθεατρον*, of *αμφι*, about, and *θεατρον*, Gr. to behold.] In antiquity, a spacious edifice, built either round or oval, with a number of rising seats, upon which the people used to behold the combats of gladiators, of wild beasts; and other sports. Amphitheatres were at first only of wood; and it was not till the reign of Augustus, that Statilius Taurus built one, for the first time, of stone. The lowest part was of an oval figure, and called *arena*, because, for the conveniency of the combatants, it was usually strewn with sand; and round the arena were vaults styled *caveæ*, in which were confined the wild beasts appointed for the shows. Above the caveæ was erected a large circular peristyle, or podium, adorned with columns. This was the place of the emperors, senators, and other persons of distinction. The rows of benches were above the podium. Their figure was circular; and they were entered by avenues, at the end of which were gates called *vomitoria*. Their theatre was built in form of a semicircle, only exceeding a just semicircle by one-fourth part of the diameter; and the amphitheatre was nothing else but a double theatre, or two theatres joined together: so that the longest diameter of the amphitheatre was to the shortest as one and a half to one.

There are amphitheatres still standing at Rome, at Pola, at Nismes, &c. The amphitheatre of Vespasian, called the *Coliseum*, and that at Verona in Italy, are the most celebrated now remaining of all antiquity. Remains of amphitheatres are shown also at Arles, Bourdeaux, &c. The amphitheatre at Polla, an ancient republic of Ithria, is very entire: it consists of two orders of Tuscan pillars, one over the other. The lower have pedestals, which is extraordinary; this order having scarcely ever more than bases to support them. The amphitheatre of Vespasian

is computed to have been capable of holding 87,000 spectators. That of Verona is the best preserved: for, though most of the great and best stones of the outside are picked out, yet the great vault, on which the rows of the seats are laid, is entire; the rows also, which are forty-four in number, are entire. Every row is a foot and a half high, and as much in breadth; so that a man fits conveniently in them; and, allowing for a seat a foot and a half, the whole will hold 23,000 persons. Pliny mentions an amphitheatre built by Curio, which turned on large iron pivots; so that of the same amphitheatre two several theatres were occasionally made, whereon different entertainments were sometimes presented at the same time. Mr. Brydone mentions an amphitheatre at Syracuse, the theatre of which is so entire, that the *gradini* for seats still remain; but it is small in comparison of the others.

AMPHITHEATRE, in gardening, certain dispositions of trees and shrubs on the sides of hilly places, which, if the hill or rising be naturally of a circular figure, always have the best effect. They are to be formed of evergreens; such as hollies, phillæreas, larnistines, bays, and such plants, observing to plant the shortest growing trees in the front, and those which will be the tallest behind, such as pines, firs, cedars of Lebanon, &c.

AMPHITRI'TE, [*αμφιτριτη*, Gr. from *circumferendo*, Lat.] The daughter of Oceanus and Tethys, with whom Neptune fell in love; but she, desirous to continue a virgin, fled from him and hid herself; whereupon he sent two dolphins, who found her by mount Atlas, and persuaded her to marry Neptune; and, having conveyed her to him in a car, in the form of a shell, he on her begat Triton. She is sometimes called Salacia, and is often taken for the sea itself by the poets.

AMPHI'TRYON, the son of Alcæus, and grandson of Perseus, married to his cousin Alcmena. During the war with the Thebans, Alcmena became pregnant of Hercules by Jupiter, who, to deceive Alcmena, had assumed the shape of her husband. When Amphitryon returned from the war, he killed his father-in-law, Electryon, king of Mycenæ, by accident, for which he was obliged to fly and retire to Thebes with Alcmena.

AMPHO'RA, *f.* in antiquity, a liquid measure among the Greeks and Romans. The Roman amphora contained forty-eight sextaries, equal to about seven gallons one pint English wine-measure; and the Grecian or Attic amphora contained one-third more. **AMPHORA** was also a dry measure used by the Romans, and contained about three bushels. **AMPHORA**, among the Venetians, is the largest measure used for liquids, containing about sixteen quarts.

AMPHORA'RIVM VINUM, in antiquity, denotes that which is drawn or poured into *amphora* or pitchers; by way of distinction from *vinum doliare*, or cask wine. The Romans had a method of keeping wine in amphoræ for many years to ripen, by fastening the lids tight down with pitch or gypsum, and placing them either in a situation where smoke came, or under ground.

AM'PHOTIDES, *f.* a kind of armour or covering for the ears, worn by the ancient pugilists, to prevent their adversaries from laying hold of that part.

AMPHRY'SIUS, a river of Thessaly, running by the foot of mount Othrys, from south to north, into the Enipeus at Thebes of Thessaly; where Apollo fed the herds of king Admetus. Another Amphryus in Phrygia, rendering women barren, according to Pliny; hence the epithet *Amphrysiacus*. Also a town of Phocis, at the foot of mount Parnassus, encompassed with a double wall by the Thebans, in the war with Philip king of Macedon.

AM'PLE, *adj.* [*amplus*, Lat.] Large; wide; extended:

Heav'n descends

In universal bounty, shedding herbs,
And fruits, and flowers, on nature's ample lap. *Thomson.*

Great in bulk. Unlimited; without restriction. Liberal; large; without parsimony.—If we speak of strict justice,

AMPHITRITE.

Four curious and rare Species of Amphitrite.

J. Pass sculpt.

justice, God could no way have been bound to requite man's labours in so large and ample manner as human felicity doth import; in as much as the dignity of this exceedeth so far the other's value. *Hooker*.—Magnificent; splendid. Diffusive; not contracted; as, An ample narrative, that is, not an epitome.

AMPLENESS, *f.* The quality of being ample; largeness; splendour.—Impossible it is for a person of my condition to produce any thing in proportion either to the *ampleness* of the body you represent, or of the places you bear. *South*.

AMPLEPU'IS, a town in the department of Rhone and Loire. It is celebrated for its wines, and is sixteen miles east of Rouanne.

To AMPLIATE, *v. a.* [*amplio*, Lat.] To enlarge; to make greater; to extend.—He shall look upon it, not to traduce or extenuate, but to explain and dilucidate, to add and *ampliate*. *Brown*.

AMPLIATION, *f.* Enlargement; exaggeration; extension. Diffuseness.—The obscurity of the subject, and the prejudice and prepossession of most readers, may plead excuse for any *ampliations* or repetitions that may be found, whilst I labour to express myself plain and full. *Holder*.

On a medal of the emperor Antoninus Pius, we find the title *Ampliator civium* given him, on account of his having extended the *jus civitatis*, or right of citizenship, to many states and people before excluded from that privilege. In effect, it is generally supposed to have been this prince that made the famous constitution, whereby all the subjects of the empire were made citizens of Rome.

AMPLIATION, in Roman antiquity, was the deferring to pass sentence in certain causes. This the judge did, by pronouncing the word *amplius*; or by writing the letters N. L. for *non liquet*; thereby signifying, that, as the cause was not clear, it would be necessary to bring further evidence.

To AMPLIFICATE, *v. a.* [*amplifico*, Lat.] To enlarge; to spread out; to amplify.

AMPLIFICATION, *f.* [*amplification*, Fr. *amplificatio*, Lat.] Enlargement; extension.

AMPLIFICATION, in rhetoric, part of a discourse or speech, wherein a crime is aggravated, a praise or commendation heightened, or a narration enlarged, by an enumeration of circumstances; so as to excite the proper emotions in the souls of the auditors. Such is the passage in Virgil, where, instead of saying merely that Turnus died, he amplifies the circumstances of his death:

—*Ast illi solvuntur frigore membra,
Vitaque cum genitu fugit indignata sub umbras.*

The masters of eloquence make amplification to be the soul of discourse. See ORATORY.

AMPLIFIER, *f.* One that enlarges any thing; one that exaggerates; one that represents any thing with a large display of the best circumstances; it being usually taken in a good sense.

To AMPLIFY, *v. a.* [*amplifier*, Fr.] To enlarge; to increase any material substance, or object of sense. To enlarge, or extend any thing incorporeal. To exaggerate any thing; to enlarge it by the manner of representation. To improve by new additions.—I feel age advancing, and my health is insufficient to increase and *amplify* these remarks, to confirm and improve these rules, and to illuminate the several pages. *Watts*.

To AMPLIFY, *v. n.* To speak largely in many words; to lay one's self out in diffusion. It is used frequently with the particle *on*.—When you affect to *amplify on* the former branches of a discourse, you will often lay a necessity upon yourself of contracting the latter, and prevent yourself in the most important part of your design. *Watts*.—To form large or pompous representations.—Homer *amplifies*, not invents; and, as there was really a people called Cyclopeans, so they might be men of great stature, or giants. *Pope*.

AMPLITUDE, *f.* [*amplitude*, Fr. *amplitudo*, Lat.] Extent.—Whatever I look upon, within the *amplitude* of heaven and earth, is evidence of human ignorance. *Glanville*.

—Largeness; greatness.—Men should learn how severe a thing the true inquisition of nature is, and accustom themselves, by the light of particulars, to enlarge their minds to the *amplitude* of the world, and not reduce the world to the narrowness of their minds. *Bacon*.—Capacity; extent of intellectual faculties. Splendour; grandeur; dignity. Copiousness; abundance.—In the great frame of kingdoms and commonwealths, it is in the power of princes, or estates, to add *amplitude* and greatness to their kingdoms. *Bacon*.

AMPLITUDE, in astronomy, is an arch of the horizon, intercepted between the true east or west point, and the centre of the sun or a star at its rising or setting: so that the amplitude is of two kinds; *ortive* or eastern, and *occiduous* or western. Each of these amplitudes is also either northern or southern, according as the point of rising or setting is in the northern or southern part of the horizon: and the complement of the amplitude, or the arch of distance of the point of rising or setting, from the north or south point of the horizon, is the azimuth. The amplitude is of use in navigation, to find the variation of the compass or magnetic needle. And the rule to find it is this: As the cosine of the latitude is to radius, so is the sine of the sun's or star's declination to the sine of the amplitude. So in the latitude of London, viz. $51^{\circ} 31'$, when the sun's declination is $23^{\circ} 28'$; then

Cos. $51^{\circ} 31'$ the lat.	-	-	-	9.7939907
Sin. $23^{\circ} 28'$ the decl.	-	-	-	+9.6001181

Sin. $39^{\circ} 47'$ the ampl.	-	-	-	9.8061274

That is, the sun rises or sets $39^{\circ} 47'$ from the east or west point to the north or south, according as the declination is north or south.

Magnetical AMPLITUDE, is an arch of the horizon, contained between the sun or star, at the rising or setting, and the magnetical east or west point of the horizon, pointed out by the magnetical compass, or the amplitude or azimuth compass. And the difference between this magnetical amplitude, so observed, and the true amplitude, as computed in the last article, is the variation of the compass. So if, for instance, the magnetical amplitude be observed, by the compass, to be $61^{\circ} 47'$, at the time when it is computed to be $39^{\circ} 47'$;

then the difference - - - $22^{\circ} 0'$ is the variation west.

AMPLIVAGOUS, *adj.* [*amplivagus*, Lat.] That wanders wide, or far and near; that stretches out far, having a large scope.

AMPLY, *adv.* [*amplè*, Lat.] Largely; liberally. At large; without reserve:

At return

Of him so lately promis'd to thy aid,
The woman's seed, obscurely then foretold,
Now *amplier* known, thy Saviour and thy Lord. *Milton*.

At large; copiously; with a diffusive detail.—Some parts of a poem require to be *amplly* written, and with all the force and elegance of words; others must be cast into shadows; that is, passed over in silence, or but faintly touched. *Dryden*.

AMPSA'GA, a river of ancient Numidia.

AMPSAN'CTI VALLIS, or AMPSANCTI LACUS, a cave or lake in the heart of the Hirpini, or Principato Ultra, near the city Tricento. It is now called *Mossitta*, from Mephitis, the goddess of stench, who had a temple there. The Mossitta is thus described by Mr. Swinburn: "We were led into a narrow valley, extending a considerable way to the south-west, and pressed in on both sides by high ridges thickly covered with copses of oak. The bottom of the dell is bare and arid: in the lowest part, and close under one of the hills, is an oval pond of muddy ash-coloured water, not above fifty feet in diameter: it boils up in several places with great force in irregular fits, which are always preceded by a hissing sound. The water was several times spouted up as high as our heads in a diagonal direction, a whirl-pool being formed round the tube, like a basin,

to receive it as it fell. A large body of vapour is continually thrown out with a loud rumbling noise. The stones on the rising ground that hangs over the pool are quite yellow, being stained with the fumes of sulphur and sal ammoniac. A most nauseous smell rising with the steam obliged us to watch the wind, and keep clear of it, to avoid suffocation. The water is quite insipid both as to taste and smell; the clay at the edges is white, and carried into Puglia to rub upon scabby sheep, on which account the lake is farmed out at 100 ducats a year.

AMPT'HILL, Bedfordshire, is a small neat regular well-built town, delightfully situated between two hills; it has two principal streets, crossing each other nearly at right angles. It has a good market on Thursday, and two fairs, the 4th of May and 30th of November; also a statute sessions, for hiring servants, generally a few days before Old Michaelmas. Here is a school endowed for teaching thirteen poor children, and an hospital, with good allowance for ten poor men, founded by Mr. Stone.

Ampt'hill Park, the seat of the right honourable earl of Upper Ossory, is a small distance from the town. Here was the residence of the injured princess Catharine of Aragon, during the period in which her divorce from Henry VIII. was in agitation; to whose memory, in 1774, the earl of Upper Ossory, in the site of the castle, erected a Gothic column, designed by the late Mr. Effex of Cambridge, to perpetuate the memory of this ill-fated queen, with an inscription.

AMPUL'LA, in antiquity, a round big-bellied vessel which the ancients used in their baths, to contain oil for anointing their bodies. Also a cup for drinking out of.

AMPULLA, among ecclesiastical writers, denotes one of the sacred vessels used at the altars. Ampullæ were also used for holding the oil used in chrismation, consecration, coronation, &c. Among the ornaments of churches we find frequent mention made of ampuls or vials. In the inventory of the cathedral of Lincoln we meet with ampuls of crystal, variously enriched with silver feet and covers; one containing a tooth of St. Christopher, another a tooth of St. Cecily, another a bone of the head of St. John the Baptist.

Knights of St. AMPULLA, belong to an order instituted by Clovis I. king of France; at the coronation they bear up the canopy under which the ampulla is carried in procession.

AMPU'RA, a province of the kingdom of Peru, before its conquest by the Spaniards. Here the inhabitants worshipped two lofty mountains from a principle of gratitude, because of the descent of the water from them by which their lands were fertilized. It is said to have been conquered by Virachoca the eighth inca.

To AMPUTATE, *v. a.* [*amputo*, Lat.] To cut off a limb: a word used in chirurgery.

AMPUTATION, *f.* [*amputatio*, Lat.] In surgery, the cutting off a limb, or other part from the body. See **SURGERY**.

AM'RAM, [אֶרְאִי of אֶרְאִי a people, and רַם high, Heb. i. e. an high people.] the father of Moses.

AMRAPHEL, [אַמְרַפֶּל of אֶרֶץ he hath spoke, and נַפְלָה destruction, Heb. i. e. a speaking destruction.] the king of Shinar, or Babylonia, confederated with Cherdorlaomer, king of the Elamites, and two other kings, to make war against the kings of Pentapolis; that is to say, of Sodom, Gomorrah, and the three neighbouring cities. The kings who were in league with Amraphel worsted those of Pentapolis, plundered their city, and carried off abundance of captives, among whom was Lot, Abraham's nephew: but Abraham pursued them, re-took Lot, and recovered all.

AM'RAS. See **AMBRAS**.

AM'SANCTI. See **AMPSANCTI**.

AMSDORFIANS, in church history, a sect of Protestants in the sixteenth century, who took their name from Amsdorf their leader. They maintained, that good works were not only unprofitable, but were obstacles to salvation.

AMSONIA, *f.* in botany. See **TABERNÆMONTANA**.

AMSTERDAM, the capital city of the province of Holland and of the United Netherlands, is seated on the river Amstel and an arm of the sea called the *Wye*. In 1204, it was nothing but a small castle which its lords made a retreat for fishermen, who at first lived in huts covered with thatch: but it soon became considerable, though, till the year 1490, it was surrounded with nothing but a weak palisado. The walls were then built with brick, to defend it from the incursions of the inhabitants of Utrecht, with whom the Hollanders were often quarrelling; but some time after it was almost totally reduced to ashes. In 1512, it was besieged by the people of Guelderland; who, not being able to take it, set fire to the ships in the harbour. In 1525, an Anabaptist leader, with 600 of his followers, got into the city in the night-time, attacked the town-house, and defeated those that made any resistance; but, when day appeared, the citizens fell upon them on all sides, and forced them to retire into the town-house, where most of them were cut to pieces. About ten years after, there was another tumult raised by a parcel of fanatics, consisting of men and women, who ran about the streets stark naked, and had a design of making themselves masters of the town-house: Their shrieks and cries soon alarmed the inhabitants, who gave them the chastisement they deserved. Amsterdam was one of the last cities that embraced the reformed religion. It was besieged by the Hollanders in 1578, and submitted after a siege of ten months. One article of the capitulation was, a free exercise of the Roman Catholic religion: but this was not observed by the Protestants; for they soon drove the ecclesiastics, monks, and nuns, out of the city, broke the images, and demolished the altars. After this time it became the general rendezvous of all nations and of every sect; and to the good sense and candour of the Dutch, in thus making it an asylum for all professions of religion, when persecution prevailed in other parts, we may attribute the grandeur and opulence it now enjoys. The inhabitants were often obliged to enlarge the bounds of their city, and in 1675 it was increased to its present extent. It was surrounded with a brick wall, and a large ditch eighty feet broad full of running water. The walls were fortified with twenty-six bastions, on each of which there is now a windmill. There are eight gates towards the land, and one towards the water.

Amsterdam, being seated on a marshy soil, is built on piles of wood; for which reason no coaches are allowed, except to great men and physicians, who pay a tax for that privilege; and all kinds of goods are drawn on sledges. It stands so low, that they would be exposed to inundations, if they did not secure themselves by dykes and sluices. The finest streets are, the Keyfar's Graft, or Emperor's Canal; the Heer Graft, or Lord's Canal; the Cingel; and the street of Haerlem. The principal canal is remarkable for its houses, which are magnificent structures of an equal height. Here are three prodigious sluices, and a great number of canals, which cross the city in many parts, and render the streets clean and pleasant. The canals are deep, their sides are lined with hewn stone, and they have many stone-bridges over different parts of them. The finest is that called the *Ammarack*, which is formed by the waters of the Amstel, into which the tide comes up, and on the sides of which are two large quays. This canal has several bridges. The principal is that next the sea, called *Pont Neuf*, or the "New Bridge:" it is 600 feet long, and seventy broad, with iron balustrades on each side; it has thirty-six arches, of which eleven are very high, and eight are shut up to inclose the yachts. From this bridge there is a most charming prospect of the city, harbour, and sea. The harbour, though difficult of access on account of the shoals, is one of the largest and finest in Europe, and is always filled with a multitude of ships and vessels, which look like a forest, or rather a floating city. The streets in general are well paved, and the houses built of brick or stone. Towards the sides of the haven, the city is inclosed with great poles driven into the

the ground, which are joined by large beams placed horizontally. There are openings to let the ships in and out, which are shut every night at the ringing of a bell. Amsterdam is computed to be half as big as London, next to which it is the most commercial city in the world. There are people here of almost every nation and religion in Europe. There are eleven churches for the Dutch of the established or Calvinistical religion, with two French and one High Dutch. The English have also three churches, one for the Presbyterians, a second for those of the church of England, and a third for the Brownists. All these churches or congregations make up only one-third part of the inhabitants. The Roman Catholics, who have twenty-seven houses or chapels for their worship, form another third part; and the other third part is made up of Jews, Lutherans, Arminians, Anabaptists, &c. The Jews, who are very considerable in this place, have two synagogues; one of which, namely the Portuguese, is the largest in Europe.

The most remarkable of the religious buildings is the new church dedicated to St. Catharine. It was begun in the year 1408, others say 1414; and was 100 years in building. The foundation of a steeple is laid before this church, which was designed to be very high. The piles on which it was to be erected are 100 feet square and 6334 in number, and those very large; nevertheless it was thought that these vast piles, or rather the ground, were not able to support the prodigious weight they intended to lay upon it; for which reason the steeple remains unfinished. The pulpit is a master-piece of the kind, where the four evangelists and many other curious pieces of sculpture are represented. The glass-windows are adorned with paintings, among which the emperor Maximilian is presenting an imperial crown to the burgomasters of Amsterdam for the crest of the arms of the city. The organ is very large, and reckoned one of the best in the world. It has a set of pipes that counterfeit a chorus of voices, and has fifty-two whole stops besides half stops, with two rows of keys for the feet, and three rows of keys for the hands. Those who hear it play for the first time imagine they hear a human voice. The grate dividing the chancel from the body of the church is all of Corinthian brass. The branches of candlesticks are the richest in the Seven Provinces. There is a very fine marble monument erected to admiral Ruyter, who was killed at Messina.

The public buildings of a civil nature are very magnificent. The *stadt-houfe* was founded in 1648. It is built upon 14,000 wooden piles; and its front is 232 feet long, its sides 255 feet, and its height to the roof 116. There is a marble pediment in the front, whereon a woman is carved in relievo, holding the arms of the city; she is seated in a chair, supported by two lions, with an olive-branch in her right hand; on each side are four Naiads, who present her with a crown of palm and laurel, and two other marine goddesses present her with different sorts of fruit; besides, there is Neptune with his trident, accompanied with Tritons, a sea-unicorn, and a sea-horse. On the top stands three statues in bronze, representing Justice, Strength, and Plenty. On the top of the structure is a round tower, fifty feet above the roof, adorned with statues, and an harmonious chime of bells, the biggest of which weighs about 7000 pounds, and the next 6000. They are made to play different tunes every month. On the floor of the great hall are two globes, the celestial and terrestrial, which are twenty-two feet in diameter and sixty-nine in circumference. They are made of black and white marble, and are inlaid with jasper and copper. While this *stadt-houfe* was building, the old one was set on fire, and consumed with all the archives and registers. Under the *stadt-houfe* is a prodigious vault, wherein is kept the bank of Amsterdam, which is said to be inexhaustibly rich, and is under excellent regulations. Sir William Temple, in his time, supposed it to contain the greatest treasure, either real or imaginary, in the known world. Mr. Anderson supposes that the cash, bullion, and

pawned jewels, in this bank amount to thirty-six millions sterling. The bourse, or exchange, where the merchants assemble, is all of free-stone, and built upon 2000 wooden piles. Its length is about 250 feet, and its breadth 140. The galleries are supported by twenty-six marble columns, upon each of which are the names of the people that are to meet there. They are all numbered; and there is a place fixed for every merchandize under some one of these numbers. On the right hand of the gate is a superb stair-case which leads to the galleries; on one side of which there are several shops, and on the other a place to sell clothes. It is not unlike the royal exchange in London. The admiralty-office is in a house which formerly belonged to the prince of Orange. The arsenal for their men of war is in the harbour. This is a very handsome building, 200 feet long and twenty-two feet broad. Near this edifice is the dock, or yard where they build their men of war, and which is plentifully supplied with every necessary for the construction of ships.

The East-India company occupy a large building divided into several offices or apartments. In the new part of this city they have a magazine or palace, which may properly be called an *arsenal*. The ground on which this building stands is 2000 feet, and square every way, reckoning the moats or burgwall about it. In this arsenal they build the ships belonging to the India chamber of Amsterdam; for which purpose they have all sorts of workhouses here for the artificers that serve the company.

The academy called the *Illustrious School*, is likewise a very fine building. It was formerly a convent belonging to the nuns of St. Agnes. Here they teach Latin, the oriental languages, theology, philosophy, history, &c. Besides these there are several hospitals, or houses for orphans, for poor widows; for sick persons, and for mad people; all which are regulated with great prudence. There are two suburbs to this city; one at the gate of the regulars; and the other reaches to Overtown, a village a little way from Amsterdam, where boats which come from Leyden are rolled over land upon wooden rollers. Here is likewise an hospital for those that are infected with the plague; which was built in the year 1639, and has 360 windows.

This city is governed by a senate or council, which consists of thirty-six persons, called a *vroedschap*, who enjoy their places for life; and when any of them dies, the remainder choose another in his stead. This senate elects deputies to be sent to the States of Holland, and appoints the chief magistrates of the city, called *burgomasters* or *echevins*, who are like our aldermen. The number is twelve; out of which four are chosen every year to execute the office, and are called *burgomasters-regent*. Three of these are discharged every year, to make room for three others. One of the four is kept in to inform the new ones of the state of affairs, and also presides the three first months in the year, and the others three months each; so that, when they are in this office, they may be compared to the lord-mayor of the city of London. These alterations and appointments are made by their own body. They dispose of all inferior offices which become vacant during their regency. They have likewise the direction of all public works, which regard the safety, tranquillity, and embellishment, of the place. The keys of the famous bank of this city are in the hands of these magistrates.

The college consists of new burgomasters or echevins, who are judges in all criminal affairs, without appeal; but in civil causes they may appeal to the council of the province. There are two treasurers, a bailiff, and a pensionary. The bailiff continues in his office three years; and searches after criminals, takes care to prosecute them, and sees their sentence executed. The city of Amsterdam contributes to the public income above 30,000 livres per day, besides the excise of beer, flesh, and corn; which in all amounts to above 1,600,000l. a year. This is more than is paid by all the rest of the provinces put together; and yet Amsterdam bears but the fifth rank in the assembly

bly of the states of Holland, with this distinction, that, whereas other cities send two members, this sends four.

The militia of Amsterdam is very considerable. They have sixty companies, each of which has from 200 to 300 men. Jews and Anabaptists are excluded from this service, not being admitted to bear arms: but they are obliged to contribute to the maintenance of the city-guard, which consists of 1400 soldiers; as also to the night-watch, who patrol about the streets, and proclaim the hour. Besides these, there are trumpeters on every church steeple, who sound every half hour; and, if there happens a fire, they ring the fire-bell, and shew where it is. The inhabitants have excellent contrivances to extinguish it speedily.

The trade of Amsterdam is prodigious: for almost the whole business of the East-India company centres in this city, which besides carries on a commerce with all the rest of the world, inasmuch that it may be called the magazine or storehouse of Europe. They import a vast deal of corn from the Baltic, not so much for present consumption, as to lay up against times of scarcity. The richest spices are entirely in the hands of the East-India company, who furnish all Europe therewith. They have vast quantities of military stores, with which they supply several nations; which is owing to their engrossing most of the iron works on the Rhine and other great rivers that run into Holland. Notwithstanding all these advantages, and the neatness and cleanliness that is every where observed within doors, Amsterdam labours under two very great inconveniences; bad air, and the want of fresh wholesome water, which obliges the inhabitants to preserve their rain-water in reservoirs. It is situated 65 miles north of Antwerp, 175 east by north of London, 240 north by east of Paris, and 560 north-west of Vienna. Lat. $52^{\circ}23'$ lon. $4^{\circ}50'$ E.

AMSTERDAM, is also the name of an island in the South Sea, said to have been discovered by Tasman a Dutch navigator. It was visited by captain Cook in his late voyages. Its greatest extent from east to west is about twenty-one miles, and from north to south about thirteen. It is broad at the east end, and runs taper towards the west, where it turns and runs to a point due north. It is about six leagues to the west of Middleburgh. The shore is surrounded by a coral rock, and its most elevated parts are not above six or eight yards above the level of the sea. Lat. 21.11 S. lon. 175.0 W. It is wholly laid out in plantations in which are cultivated some of the richest productions of nature. Here are bread-fruit, cocoa-nut, plantains, bananas, shaddock, yams, and some other roots, sugar-canes, and a fruit like the nectarine called by the natives *fighega*. There did not appear an inch of waste ground: the roads occupied no more space than was absolutely necessary: the fences did not take up above four inches each; and even these were not wholly lost, for in many grew some useful trees or plants: it was every where the same, change of place altered not the scene: nature, assisted by art, no where appeared with more splendour than on this island. Casuarinas, pandangs, and wild sago-palms, appear here with their various tints of green, and barringtonia as big as the loftiest oaks.

Both men and women are of the common size of Europeans, and their colour is that of a lightish copper; they are well-shaped, have regular features, are active, brisk, and lively. They have fine eyes, and in general good teeth, even to an advanced age. The women are the merriest creatures imaginable, and incessant talkers. In general, they appear to be modest; although there was no want of those of a different stamp. Among the natives, who swam about the ship very vociferously, were a considerable number of women, who wanted in the water like amphibious creatures, and were easily persuaded to come on-board perfectly naked; but none of them ventured to stay after sunset, but returned to the shore to pass the night, like the greater part of the inhabitants, under the shade of the wild woods which lined the coast. There they lighted great fires, and were heard conversing almost the whole night. The hair of both sexes in general is

black, but especially that of the women; both sexes wear it short, except a single lock on the top of the head, and a small quantity on each side. The dress of both sexes consists of a piece of cloth or matting wrapped round the waist, and hanging down below the knees. From the waist upwards they are generally naked, and it seems to be a custom to anoint these parts every morning. The practice of tattooing, or puncturing the skin, likewise prevails. The men are tattooed from the middle of the thigh to above the hips; the women have it only on their arms and fingers, and on those parts but very slightly. Their ornaments are amulets, necklaces, and bracelets, the bone, shells, and beads of mother-of-pearl, tortoise-shell, &c. which are worn by men as well as women. They have also a curious apron, made of the cocoa-nut shell; and composed of a number of small pieces sewed together in such a manner as to form stars, half-moons, little squares, &c. it is studded with beads and shells, and covered with red feathers, so as to have a pleasing effect. They make the same kind of cloth, and of the same materials, as at Otaheite, though they have not such a variety, nor do they make any so fine; but, as they have a method of glazing it, it is more durable, and will resist rain for some time, which the other cloth would not. Their colours are black, brown, yellow, purple, and red; all made from vegetables. They make various sorts of matting, some of a very fine texture, which is generally used for cloathing; and the thick and stronger sort serves to sleep upon, and to make sails for their canoes. Among other useful utensils, they have various sorts of baskets, made of the twisted fibres of cocoa-nuts. These are not only durable, but beautiful, being generally composed of different colours, and studded with beads made of shells or bones. They have many little nicknacks among them, which shews that they neither want taste to design, nor skill to execute whatever they take in hand.

AMULET, *f.* [amulette, Fr. *amuletum*, or *amuletum*, quod *malum amolitur*, Lat.] a charm, or preservative against mischief, witchcraft, or disease. These the Latins called *amuleta*, probably from *amovere*, "to remove, or take away." They also called them *præbia*, or *præbra*, from *prohibere*, "to guard, or defend." The Greeks call them *apotropaia*, *phylacteria*, *amyteria*, *alexiteria*, and *alexipharmaca*, because they imagined that these remedies could defend them, not only against such diseases as proceed from natural causes, but also against the power of other enchantments. Amulets were made of stone, metals, simples, animals, and in a word of every thing that imagination suggested. Sometimes they consisted of words, characters, and sentences, ranged in a particular order and engraved upon wood, &c. and worn about the neck, or some other part of the body. At other times they were neither written nor engraved; but prepared with many superstitious ceremonies, great regard being usually paid to the influence of the stars. The Arabians have given to this species of amulet the name of *talisman*. All nations have been fond of amulets: the Jews were extremely superstitious in the use of them, to drive away diseases; and the Misna forbids them, unless received from an improved man who had cured at least three persons before by the same means.

Amulets are now much fallen from the repute they were anciently in; yet the great Mr. Boyle alleges them as an instance of the increase of external effluvia into the habit, in order to shew the great porosity of the human body. He adds, that he is persuaded some of these external medicines do answer; for that he himself, having once been subject to bleed at the nose, and reduced to use several remedies to check it, found the moss of a dead man's skull, though only applied so as to touch the skin till the moss was warm thereby, the most effectual of any. The same Mr. Boyle shews how the effluvia, even of cold amulets, may, in tract of time, pervade the pores of a living animal; by supposing an agreement between the pores of the skin and the figure of the corpufcles. Bellini has demonstrated the possibility of the thing in his last propositions

tions *De Febribus*; and the like is done by Dr. Wainwright, Dr. Keill, &c.

AMULIUS, king of Alba, was son of Procas, and younger brother to Numitor. He dispossessed his brother of the crown, and even put to death his son Lausus, and consecrated his daughter Ilia a vestal virgin, to prevent her ever becoming a mother. Notwithstanding these precautions, Ilia became pregnant by the god Mars, and brought forth Romulus and Remus, who afterwards put Anulus to death, and restored the crown to their grandfather.

AM'URAT, or AM'URATH I. the fourth emperor of the Turks, and one of the greatest princes of the Ottoman empire, succeeded Solymán in 1360. He took from the Greeks Gallipoli, Thrace, and Adrianople, which last he chose for the place of his residence. He defeated the prince of Bulgaria, conquered Misnia, chastised his rebellious bashaws, and is said to have gained thirty-six battles. This prince, in order to form a body of devoted troops that might serve as the immediate guards of his person and dignity, appointed his officers to seize annually, as the imperial property, the fifth part of the Christian youth taken in war. These, after being instructed in the Mahometan religion, inured to obedience by severe discipline, and trained to warlike exercises, were formed into a body distinguished by the name of *Janissaries*, or "new soldiers." Every sentiment which enthusiasm can inspire, every mark of distinction that the favour of the prince could confer, were employed in order to animate this body with martial ardour, and with a consciousness of its own pre-eminence. The janissaries soon became the chief strength and pride of the Ottoman armies, and were distinguished above all the troops whose duty it was to attend on the person of the sultan. At length the death of Lazarus, despot of Servia, who had endeavoured in vain to stop the progress of Amurat's arms, touched Milo, one of his servants, in so sensible a manner, that, in revenge, he stabbed the sultan in the midst of his troops, and killed him upon the spot, A. D. 1389, after he had reigned twenty-three years.

AMURAT II. the tenth emperor of the Turks, was the eldest son of Mahomet I. and succeeded his father in 1421. He besieged Constantinople and Belgrade without success; but he took Thessalonica from the Venetians, and compelled the prince of Bosnia and John Castriot prince of Albany to pay him tribute. He obliged the latter to send his three sons as hostages; among whom was George, celebrated in history by the name of *Scanderbeg*. John Hunniades defeated Amurat's troops, and obliged him to make peace with the Christian princes, in 1442. These princes afterwards breaking the peace, Amurat defeated them in the famous battle of Varna, November 10, 1444, which proved so fatal to the Christians, and in which Ladislaus king of Hungary was killed. He afterwards defeated Hunniades, and killed above 20,000 of his men; but George Castriot, better known by the name of *Scanderbeg*, being re-established in the estates of his father, defeated the Turks several times, and obliged Amurat to raise the siege of Croia, the capital of Albany. Amurat died, chagrined with his ill-success, and infirm with age, February 11, 1451, at Adrianople. It is observed to this prince's honour, that he always kept his treaties with the greatest fidelity.

AMURCO'SITY, *f.* [*amurca*, Lat.] The quality of lees, or mother of any thing.

To AMUSE, *v. a.* [*amuser*, Fr.] To entertain with tranquillity; to fill with thoughts that engage the mind without distracting it. To *divert* implies something more lively, and to *please* something more important. It is therefore frequently taken in a sense bordering on contempt.—I cannot think it natural for a man, who is much in love, to *amuse* himself with trifles. *Walsh*.—To draw on from time to time; to keep in expectation; as, He *amused* his followers with idle promises.

AMUSEMENT, *f.* [*amusement*, Fr.] That which amuses; entertainment.—Every interest or pleasure of life,

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even the most trifling *amusement*, is suffered to postpone the one thing necessary. *Rogers*.

AMU'SER, *f.* [*amuseur*, Fr.] He that amuses, as with false promises. The French word is always taken in an ill sense.

AMU'SIVE, *adj.* [from *amuse*.] That which has the power of amusing:

But amaz'd,

Beholds th' *amusive* arch before him fly,

Then vanish quite away.

Thomson.

AM'WELL, a village in Hertfordshire, a little to the south of the Ware, and twenty-one miles from London. One part is called Amwell-Magna, and the other Amwell-Parva; the head or source of the New River, which supplies London with water, is at the latter place. This canal was projected by Hugh Middleton; he began it in 1606, and finished it in 1612, by the assistance of the city of London, and by aid of parliament; but with a considerable loss of his own property, he perfected the work. The extent of the canal is near thirty-nine miles; it has forty-three sluices, and there are 215 bridges over it.

A'MY, [*amie*, Fr. a she-friend.] A proper name of women.

AMY' PROCHAIN, in law, the next friend who is to be entrusted for an infant or orphan. And infants may sue either by *prochain amy*, or *guardian*; but must answer by guardian. 3 *Salk*. 196.

AMY'CHE, *f.* [from *αμύχω*, Gr. to scratch.] A superficial exulceration, laceration, or scarification, of the skin.

AMY'CLÆ, a city of Laconia, distant about eighteen miles from the metropolis, founded by Amyclus the son of Lacedæmon, and famed afterwards for the birth of Castor and Pollux the sons of Tydæus, eighth king of Sparta. It was afterwards famed for sending a considerable colony of its own inhabitants into Upper Calabria, who built there a city which they called by the same name. This last city was situated between Caieta and Terracina, and gave its name to the neighbouring sea. According to Pliny and Solinus, the territory of Amyclæ was so infested with vipers and other serpents, that the inhabitants were obliged to abandon their dwellings, and settle elsewhere.

AMY'CLUS, son of Lacedæmon and Sparta, and brother to Eurydice the wife of Acrisius. He built the city of Amyclæ, where Apollo had a temple and was surnamed Amyclæus.

AMY'CUS, son of Neptune and Melia, king of the Bebrycians, famous for his skill in the management of the cestus. He challenged all strangers to a trial of strength, and was killed by Pollux when he attempted to overcome him by fraud. Also a companion of Æneas, killed by Turnus, brother to Hippolyta, queen of the Amazons; who opposing the passage of Hercules, who came to wage war with his sister, he was slain by that hero.

AMYG'DALATE, *adj.* [*amygdala*, Lat.] Made of almonds.

AMYG'DALINE, *adj.* [*amygdala*, Lat.] Relating to almonds; resembling almonds.

AMYG'DALIS SIMILIS, *f.* in botany. See THEOBROMA.

AMYG'DALUS, *f.* [*αμυγδαλεα*, from the lines or furrows on the stone, which the Greeks call *αμυγχα*.] In botany, a genus of the icofandria monogynia class, ranking in the natural order of pomaceæ. The generic characters are—Calyx: perianthium one-leaved, tubulous, inferior, quinquefid, deciduous; divisions spreading, obtuse. Corolla: of five petals, oblong-ovate, obtuse, concave, inserted into the calyx. Stamina: filaments about thirty, filiform, erect, shorter by half than the corolla, inserted into the calyx; antheræ simple. Pistillum: germ roundish, villose; style simple, length of the filaments; stigma headed. Pericarpium: a drupe, roundish, villose, large, with a longitudinal furrow. Seed: a nut, ovate, compressed, acute, with prominent sutures on each side, reticulated.

6 K

culated with furrows, and dotted with small holes.—*Essential Character*. Calyx quinquefid, inferior; petals five; drupe having a shell perforated with pores; skin pubescent.

Species. 1. *Amygdalus persica*: all the serratures of the leaves acute, the flowers sessile and solitary. The peach, in its natural state of growth, is a small tree, with spreading branches; the leaves larger than those of the almond. The fruit is roundish, abounding with a grateful sweet-acid juice; the outside is of a pale greenish colour, with a bluish or tawny redness frequently towards the sun, and the skin is lanuginose or woolly; the stone is very thick and hard, full of deep irregular furrows, and incloses a bitter kernel. The wood of this tree is of a reddish brown colour, darker towards the middle, and is fit for the use of the turner. It is of quick growth, and not of very long duration. The original country of its nativity is not known. The Latin name of *malus persica* indicates no more than that it came to the Romans from Persia. It has been cultivated time immemorial in most parts of Asia, has been adopted by almost every nation of Europe, and now flourishes abundantly in America, wherever it has been introduced by the Europeans. We have no exact tradition concerning the time of its first introduction into Greece or Italy. Before we proceed to the varieties of the fruit, for which the peach-tree is principally cultivated, it may be proper to observe, that there are few trees more ornamental in plantations, shrubberies, and wilderness quarters, particularly within view of the house, and in sheltered situations, where they will display their beautiful blossoms early in the spring, about the beginning of April; when flowers, especially on trees, are particularly valuable. The variety with double flowers is highly ornamental for the same purpose, and is certainly one of the most beautiful flowering trees that will admit of cultivation in our climate, in the open air. It will produce some fruit, notwithstanding the flowers are double, but it is of no value unless the trees be trained against walls. The blossoms appear about three weeks later than the common peach.

Parkinson mentions twenty-one sorts of peach cultivated in his time for the fruit.

Mr. Ray, sixty years after Parkinson, gives a list of eighteen different sorts of peaches then in most esteem.

Mr. Miller enumerates thirty-one sorts as the principal known in his time in England; and which in his opinion are sufficient for any gentleman to have a collection continuing through the whole season of fruit.

A good peach ought to have a firm flesh; the skin should be thin, of a deep or bright red colour next the sun, and of a yellowish cast next the wall. The flesh should be of a yellowish colour, full of juice, which should be high-flavoured; the stone small, and the pulp or flesh very thick. When a peach has all these qualities, it may be esteemed a valuable fruit.

The *nectarine* is deemed by botanists to be a variety only of the peach-tree. It is certainly not easy for a common eye to distinguish these trees, when they are not in a state of fructification, nor are their differences such as to warrant our considering them as specifically separate. The nectarine is commonly a smaller tree than the peach; the trunk and larger branches covered with a lighter bark; the smaller branches or twigs more tender and inclining to red; the flowers are less than those of the peach, and of a darker red colour. These differences however are frequently trifling, and by no means constant. The principal distinction certainly is in the fruit, which is smaller and rounder, without any lateral cleft; the flesh or pulp firmer than in the peach, and the rind perfectly smooth.

Parkinson gives six varieties of the nectarine; to these Ray adds six more; but Mr. Miller has only ten varieties:

2. *Amygdalus communis*, or the almond-tree: the lower serratures of the leaves glandular; the flowers sessile and in couplets. The common almond will grow to the height of near twenty feet, with spreading branches. The leaves resemble those of the peach very much, but the lower serratures are glandular; they proceed from buds

both above and below the flowers, whereas in the peach they proceed from the ends of the shoots above and not below the flowers. The form of the flowers is not very different, but they come out usually in pairs, and vary more in their colour from the fine blush of the apple-blossom to a snowy whiteness. The chief obvious distinction is in the fruit, which is flatter, with a coriaceous covering, instead of the rich pulp of the peach and nectarine, opening spontaneously when the kernel is ripe. The shell is never so hard as in the first species, and is sometimes even tender and exceedingly brittle; it is flatter, smoother, and the furrows or holes are more superficial. This tree is scarcely worth considering in England, for the sake of the fruit which it produces. It is a great object in some parts of Italy, and in the south of France, where there are vast plantations of almonds in Provence and Dauphiné. It is common in China and most of the eastern countries; and in Barbary, where it is a native. It seems not to have been cultivated in Italy in the time of Cato, who calls the fruit *nuxes Græcæ*, or Greek nuts. With us however it is very valuable as an ornamental tree in clumps, shrubberies, &c. within view of the mansion: for it displays its delicate red-purple bloom in the month of March, when few other trees have either leaves or flowers. An almond-tree covered with its beautiful blossoms is one of the most elegant objects in nature. In a forward spring they often appear in February, but in this case the frost generally destroys them, and they bear little or no fruit; whereas, when the trees do not flower till March, they seldom fail to bear plenty of fruit, many of which will be very sweet and fit for the table when green, but they will not keep long.

Sweet almonds used in food are difficult of digestion, and afford very little nourishment, unless extremely well comminuted. As medicines, they contribute, on account of their soft unctuous quality, to blunt acrimonious humours in the first passages, and thus, sometimes, give present relief in heart-burns. On expression, they yield near half their weight of oil, which is more agreeable than most of the common expressed oils, and is therefore employed medicinally for obtunding acrid juices, softening and relaxing the solids, in tickling coughs, hoarseness, costiveness, nephritic pains, &c. On triturating the almond with water, it unites with the fluid, into an emulsion or milky liquor, which is prescribed for the same purposes as the oil itself; particularly in heat of urine and stranguries; as a diluent in acute diseases; and for supplying, in some degree, the place of animal milk, with which it has a great analogy. An ounce of almonds forms an emulsion of a due consistence with a quart of water. Gum arabic is an useful addition in most cases. The pure oil triturated with a thick mucilage of gum arabic forms a more permanent emulsion: one part of gum, with an equal quantity of water, is sufficient for four parts of the oil. They are also an useful medicine for uniting substances with water, which of themselves are not miscible with it. Camphor, and the purgative and other resins, triturated with about six times their quantity of almonds, dissolve in water into a milky liquor, and are thus fitted for being taken in a liquid form. The oil of bitter almonds is not distinguishable from the other; and therefore the colleges of London and Edinburgh allow them to be used indiscriminately. The matter which remains after the expression of the oil, retains all the bitterness. Bitter almonds, and emulsions made from them, have been recommended as aperients, resolvents, diuretics, and anthelmintics. The almonds in substance taken freely occasion sickness and vomiting: to dogs, and some other animals, they are poisonous. A simple water, strongly impregnated with their volatile parts by distillation, has been found also poisonous to brutes, and there are instances of cordial spirits flavoured by them being poisonous to man. It is probable, that the noxious matter is that in which its bitterness and flavour reside; and, that the activity of this matter is increased, by its separation from the gross oil and farinaceous substance.

1. The Orange Nectarine. 2. The Sweet Almond. 3. The creeping Dwarf Almond.

substance by which it was enveloped in the kernel itself. The kernels of other fruits, that have any bitterness or particular flavour, appear to be impregnated with a substance of a similar nature to this poisonous principle of bitter-almonds.

3. *Amygdalus pumila*, or double-flowered dwarf almond: leaves veined-wrinkled. These shrubs make a very agreeable variety amongst low-flowering trees, in small wilderness quarters. The single sort flowers the beginning of April, and the double is commonly three weeks later. Its native country is Africa.

4. *Amygdalus nana*, or common dwarf almond: leaves attenuated at the base. The wood of this little tree is hard, of a yellowish chestnut colour, and veined; but the trunk is seldom an inch in thickness. It varies very much in size; the vast plains on the banks of the Volga being annually set on fire, it never rises to any height, but is low and shrubby, creeps very much at the root, and impedes the plough. In Cherson it scarcely attains a span in height; whereas in the Ukraine it grows a fathom high, as it does in gardens, where the leaves are somewhat broader; these are sometimes five inches in length. It blooms in April, at which time all the young shoots are covered with flowers, which are of a peach-blossom colour, and make a fine appearance when intermixed with shrubs of the same growth. It is a native of the northern parts of Asia, particularly abundant in Calmuc Tartary, and very frequent on the banks of the Volga.

5. *Amygdalus incana*, or hoary dwarf almond: leaves lanceolate ferrate wrinkled subsessile, white-tomentose beneath. It may be doubted whether this be any thing more than a variety of *amygdalus nana*.

6. *Amygdalus orientalis*, or silvery-leaved almond: leaves lanceolate quite entire silvery perennial, petiole shorter. The leaves of the eastern or silver-leaved almond are silvery, and very like those of the sea purslane, continuing moist of the year. The flowers are very small, and have not been succeeded by fruit yet in England. It was found growing near Aleppo, from whence the fruit was sent to the duke D'Ayen in France, who raised several of the plants in his curious garden at St. Germain's. Mr. Miller procured some of them, which endured the open air in the Chelsea garden, for some years, against a wall, without any covering. It is a native of the Levant.

7. *Amygdalus Cochinchinensis*: leaves ovate quite entire, racemes small subterminal. This is a large tree, with spreading branches; and is a native of the vast woods of Cochinchina.

Propagation and Culture. All the different sorts of peaches have been originally obtained from the stones; so that, where persons have garden enough to allow room for propagating these fruits from seeds, there is no doubt but many good sorts may be obtained, which will be better adapted to our climate than such as are brought from warmer countries; there will be many of them good for nothing, but if we can obtain only two or three valuable sorts, it is sufficient to make amends for the trouble of raising them; but great regard should be had to the sorts; and, if the fruits were permitted to remain upon the trees until they dropped off, the kernels would be fitter for planting, and more likely to grow. The best sorts for sowing are those whose flesh is firm, and cleaves to the stone; and from amongst these you should chuse such as ripen pretty early, and have a rich vinous juice. The stones should be planted in autumn, on a bed of light dry earth, about three inches deep, and four inches asunder; and in the winter the beds should be covered to protect them from the frost, which, if permitted to enter deep into the ground, will destroy them. In the spring, when the plants come up, they should be carefully cleared from the weeds, which should also be observed throughout the summer; and, if the spring should prove very dry, if you refresh them now and then with a little water, it will greatly promote their growth. In this bed they should remain until the following spring, when they should be carefully

taken up, so as not to break their tender roots, and transplanted into a nursery in rows three feet apart, and one foot distant plant from plant in the rows, observing to lay a little mulch upon the surface of the ground about their roots, to prevent its drying too fast; and, if the spring should prove very dry, you should give them a little water once a week, until they have taken root; after which they should be constantly kept clear from weeds, and the ground between the rows carefully dug up every spring to loosen it, so as that the tender fibres may strike out on every side. In this nursery they may continue one or two years, according to the progress they make; after which they should be transplanted where they are to remain, to produce fruit. In removing these trees, you should observe to prune their downright roots, if they have any, pretty short, and to cut off all bruised parts of the roots, as also all the small fibres, which generally dry, and, when left upon the roots after planting again, grow mouldy and decay, so that they are injurious to the new fibres which are shot out from the roots, and very often prevent the growth of the trees; but you should by no means prune their heads, for the plants which are produced from stones are generally of a more spongy texture, therefore more liable to decay when cut, than those which are budded upon other stocks. Besides, as these trees are designed for standards, (for it is not proper to plant them against walls, until you see the produce of the fruit, to shew which of them deserves to be cultivated,) they will never require any other pruning; but only to cut out decayed branches, or such as shoot out very irregular from the sides; for more than this is generally very injurious to them. In planting the trees, it will be the better way to dispose them singly in the quarters of the kitchen garden, where they will thrive, and produce fruit much better than if they are planted near each other in rows; and, as they are thus singly disposed, they will not do much injury to the crops which grow under them. When they have produced fruit, you will soon be a judge of their goodness, and such of them as you dislike may be destroyed; but those which are good may be propagated by inoculating them upon other stocks, which is the common method now practised to propagate these fruits.

You should be provided with stocks of the muscle and white-pear plumbs, which are generally esteemed the two best sorts of plumbs for stocks to inoculate peaches and nectarines upon; as also some almond and apricot stocks, for some tender sorts of peaches which will not grow upon plum-stocks. These should be all produced from the stone, and not from suckers; and they should be transplanted when they have had one year's growth in the seed-bed, for the younger they are transplanted the better they will succeed, and hereby they will be prevented from sending tap-roots deep in the ground; for, by shortening those roots which seem so disposed, it will cause them to put out horizontal roots. These stocks should be planted in rows three feet asunder, and one foot apart in the rows. This is wider than most nurserymen plant them, but we are persuaded they will answer better. When the stocks have grown in the nursery two years, they will be strong enough to bud; the season for which is commonly about Midsummer, or any time in July, when the rind will easily separate from the wood; and you should make choice of some good cuttings of the sorts of fruit you intend to propagate, always observing to take them from healthy trees, and such as generally produce a good quantity of well-tasted fruit; for it is very certain, that any sort of fruit may be so far degenerated, where this care is wanting, as not to be like the same kind. Besides, whenever a tree is unhealthy, the buds taken from that tree will always retain the distemper, in a greater or less degree, according as it has imbibed a greater or less quantity of the distempered juice. Thus, for instance, where a peach or nectarine tree has been greatly blighted, so as that the shoots have grown busled, and the leaves curled up to a great degree, that distemper is seldom recovered again by the greatest art, or at least not under several years management;

for,

for, let the seasons prove ever so favourable, yet these trees will continually shew the same distemper, which many persons are so weak as to suppose a fresh blight, whereas in reality it is no other but the remains of the former sickness, which are spread and intermixed with all the juices of the tree; so that whatever buds are taken from such trees will always retain a part of the distemper. Upon the care which is taken in the choice of the buds, the whole success depends; in general no more is regarded by those nurserymen who are the most careful in propagating the several sorts of fruit-trees, than the taking their buds or grafts from the true kinds of fruit-trees; but there is still more care required to have sound healthy trees, especially in peaches and nectarines; for, if the buds are taken from young plants in the nursery which have produced fruit, the shoots of which are generally very strong and vigorous, these buds will have so vicious a habit, as rarely to be corrected and brought into good order; for they will shoot more like the willow than the peach, the joints being extended to a great distance from each other, the shoots very gross, and the wood pithy; therefore, where the practice of taking the buds from nursery-trees is long continued, there can be little hopes of the trees for aised. I would therefore recommend it to every curious person, to procure their buds from such trees as have been long growing, whose fruit is well flavoured, and the trees perfectly sound; as also never to make choice of the strongest or most luxuriant shoots of these trees, but such shoots as are well conditioned, and whose buds grow pretty close together. And, although these do not make so strong shoots the following years as those which are taken from luxuriant branches, yet they will be better disposed to bear fruit, and will make much better trees. The cuttings with which you are thus to be provided, should always be taken from the trees either in a morning or evening, or else in a cloudy day; for, if they are cut off when the sun is very hot, the shoots will perspire so freely, as to leave the buds destitute of moisture, which is often the cause of their miscarrying; and, the sooner they are put into the stocks when cut from the trees, the better they will take.

In the choice of the trees, you should observe the stocks upon which they have been budded, that they are of the right sort, whether plumb or apricot; that they are sound and young, not such as had been budded the preceding year and failed, nor those which have been cut down. If the size of the stock is near that of a man's finger, it will be better than if they are larger; these should be clear of moss or canker. The buds should be of one year's growth only, and not such as have been cut down in the spring, and made a second shoot; nor should those trees be chosen whose shoots are very strong and luxuriant, but such as have clean shoots, of a moderate size, whose joints are not too far asunder; and those trees which stand on the outside rows, or near the ends of the rows, where they have most air, are generally such; for, where they stand close in the nursery, their shoots are drawn up in length, their joints are much farther asunder, and their buds or eyes are flat; for which reason, we have before advised the planting of the stocks at a greater distance than the nurserymen generally allow them; and, if a careful discreet nurseryman would be at the trouble and expence in the raising of his peach-trees according to this method, he would better deserve three shillings per tree, than one in the manner they are commonly raised; for every person who is at the expence of building walls for fruit, should not think of saving a few shillings in the purchase of their trees; because, if they are bad, or not of the right kinds, there is a great loss of time and expence to no purpose, and the disappointment will be so great, after waiting three or four years, as to discourage many from making farther trials, thinking themselves liable to the same ill-success. When the trees are chosen in the nursery, the next care must be to have them carefully taken up out of the ground, so as not to break or tear their

roots, nor injure their bark; for, as these trees are very apt to gum in those places where they are wounded, there cannot be too much care taken of this. If the trees are to be transported to a distant place, their roots should be closely wrapped either with hay-bands, straw, or pease-haulm, and mats sewed over these, to prevent the air from drying their roots and branches. If the leaves of the trees are not fallen when they are taken up, they should be carefully stripped off before the trees are packed up; for, when there are many of them left, they are very apt to heat, if long in their passage, and often occasion a mouldiness very hurtful to the branches.

We come next to the preparing of the ground to receive the trees. The best earth for peach-trees is such as is taken from a pasture-ground, that is neither too stiff and moist, nor over dry, but of a middling nature, such as is termed hazel loam. This should be dug from the surface of the ground about ten inches deep, taking the turf with it, and should be laid in heaps eight or ten months at least; but that which is prepared one year or more before it be used is still better, that it may have the winter's frost, and summer's heat, to mellow it; during which time it should be often turned, to rot the turf and break the clods, whereby it will be rendered very light and easy to work; and about the beginning of September you should carry it into the garden, and make the borders, which must be raised in height proportionable to the moisture of the garden; but, if the ground be very wet, it will be advisable to lay some rubbish in the bottom of the border to drain off the moisture, and to prevent the roots of the trees from running downward; and in this case it will be proper to make some under-ground drains at the bottom of the border, to convey off the superfluous moisture; which, if detained about the roots of the trees, will greatly prejudice them; then raise a border of earth at least a foot, or in very wet land two feet, above the level of the ground, so that the roots of the trees may always remain dry; but, if the ground be pretty dry, the borders should not be raised above six or eight inches higher than the surface, which will be sufficient to allow for their sinking. As to the breadth of these borders, that cannot be too great; but should never be less than six or eight feet, where fruit-trees are planted, for, when the borders are made very narrow, the roots of the trees will be so confined in four or five years time, that they will seldom thrive well afterwards. The depth of these borders should not be greater than two feet and a half; for, when they are prepared to a great depth, it only entices the roots of the trees downward, which may be the cause of their future barrenness; for, their roots being got down below the influences of the sun and showers, imbibe a great quantity of crude juices, which only add to the luxuriant growth of the trees, and destroy their fruitfulness; besides, whatever fruit are produced from such trees, are not near so well tasted as those are which grow upon trees whose roots lie near the surface, and enjoy the kindly benefit of the sun's heat, to correct and digest whatever crudities there may be in the earth. Where the natural soil of the garden is shallow, and either chalk, clay, or gravel, lies near the surface, these should not be dug out to make pits to receive the earth for the border, as is by some practised, for this will be no better than planting the trees in tubs or cases, for their roots will be confined to these pits; so that when they are extended to the sides, and can get no farther, the trees will blight and decay; and, if it is clay on the sides, the wet will be detained as in a basin, and the earth of the border will be like mud in very wet seasons, unfit therefore for the roots of these trees. Whenever then it so happens that the ground is of either of the sorts before-mentioned, it will be the best way to raise the borders of a proper thickness of good earth over these, rather than to sink down into them; for, when the roots of the trees lie near the surface of the ground, they will extend to a great distance in search of nourishment; but, if they get below the staple of the land, they can find

nothing but four crude pasture, very unfit for vegetation. Your borders, being thus prepared, should lie about three weeks or a month to settle, by which time the season for planting will be come, which should be performed as soon as the leaves begin to decay, that the trees may put out new roots before the frost comes on to prevent them. Your ground being ready, and the trees brought carefully to the place, the next work is to prepare them for planting, which is to be performed in the following manner: you must shorten all the roots, cut off smooth broken or bruised roots, and take off all the small fibres; where any of the roots cross each other, the worst of them must be cut out, that they may not injure the others.

Having thus prepared your trees, you should measure out their distance, which ought never to be less than twelve feet; but, where the ground is very good, they should be planted fourteen feet asunder. After you have marked out the places where each tree is to stand, you must with your spade make a hole wide enough to receive the roots of the tree; then you should place it down, observing to turn the bud outwards, that the wounded part of the stock may be hid from sight; and let the stem of the tree be placed about four or five inches from the wall, with its head inclining thereto; then fill in the earth with your hands, observing to break the clods, that the earth may fall in between the roots, so as no void spaces may be left about them. You should also gently shake the tree with your hands, to settle the earth down the better between the roots; then with your foot gently press down the earth about the stem, but do not tread it down too hard, which is many times a very great fault; for, when the ground is inclinable to bind, the treading it close often renders the ground so hard, as that the tender fibres of the roots cannot strike into it, whereby the tree remains at a stand for some time; and, if the earth be not loosened in time, it frequently dies; so that, whenever you observe the earth of your borders to be bound, either by great rains, or from any other cause; you should dig or fork it, to loosen it again, observing always to do it in dry weather; if in spring or winter; but in summer it should be done in a moist season. Although we have here given directions for the choice of trees from the nursery, after the usual method of planting these trees, which is that of taking such as have made one year's shoot, yet we would prefer those which were budded the preceding summer, and have made no shoot; for, if the bud is found and plump, and the bark of the stock well closed where the bud is inserted, there will be no danger of its growing; and, when the bud has made a shoot the following spring the length of five or six inches, if it is stopped by pinching off the top, it will put out lateral branches, which may be trained to the wall; and this will prevent any cutting off the head, as must be done to those trees which have had one year's growth in the nursery; for these trees do not well bear those large amputations, especially some of the more tender sorts; so by this method of planting these trees in bud, no time will be lost, when it is considered that the trees which have shot must be cut down, and there is a hazard of their shooting again; therefore, we are convinced from experience, that it is the best method.

After you have thus planted your trees, which have made their shoots in the nursery, you should fasten their heads to the wall, to prevent their being shaken by the wind, which would disturb their roots, and break off the tender fibres soon after they were produced, to the no small prejudice of the trees; you should also lay some mulch upon the surface of the ground about their roots, before the frost sets in, to prevent it from penetrating the ground, which would injure, if not destroy, the small fibres; but this mulch should not be laid upon the ground too early, lest it prevent the autumnal rains from penetrating to the roots.

These things being duly observed, they will require no farther care till the beginning or middle of March, according as the season is earlier or later; when you must

cut off the heads of the new planted trees, leaving only four or five eyes above the bud; in doing of which, you must be very careful not to disturb their roots; to prevent which, you should place your foot down close to the stem of the tree, and take fast hold of that part of the stock below the bud with one hand, to hold it steady, while with the other hand you gently slope off the head of the tree with a sharp knife at the intended place, which should always be just above a bud; this should always be done in dry weather; for, if there should be much rain soon after it is done, there will be some danger that the wet will enter the wounded part, and damage the tree; nor should it be done in frosty weather for the same reason, for that would enter the wounded part and prevent its healing over. After you have headed the trees, you should gently loosen the earth of the borders, to admit the fibres of the roots; but you must be very careful in doing this, not to cut or bruise their new roots, which would also damage them; and, if the mulch which was laid about their roots in autumn be rotten, you may dig it into the border at some distance from the roots of the trees; and, when the dry weather comes on, you should pare off some turf from a pasture ground, which should be laid upon the surface of the border about the roots of the trees, turning the grass downward, which will preserve a gentle moisture in the earth, better than any sort of mulch; and this will not harbour insects, as most sorts of dung and litter do, to the no small detriment of the trees. Those trees which are planted in bud, and have not made any shoots, should have their stocks cut down at this season just above the bud, for the buds will rarely shoot unless this is performed; and, the nearer they are cut to the bud, the sooner will the head of the stock be covered by the buds; for, although it may be necessary to leave a part of the stock above the bud, in those trees which are in the nursery, to which the shoots made by the buds may be fastened, to prevent their being broken by the wind; yet, as these are placed against the wall, to which the shoots may be fastened, there will be no want of any part of the stock. In watering these new-planted trees, which should not be done unless the spring proves very dry, you should observe to do it with a nozzle upon the watering-pot, so as to let it out in drops; for, when it is hastily poured down, it causes the ground to bind; and, if you water over the head of the tree, it will be of great service to it. Your waterings should not be repeated too often, nor should they be given in great quantity, both being very injurious to new-planted trees.

In the middle or latter end of May, when these trees will have several shoots six or eight inches in length, you should nail them to the wall, observing to train them horizontally, rubbing off all fore-right shoots, or such as are weak, whereby those which are preserved will be much stronger; but if there are not more than two shoots produced, and those very strong, you should at the same time nip off their tops, which will cause each of them to push out two or more shoots, whereby the wall will be better supplied with branches; you must also continue to refresh them with water in dry weather, during the whole season, otherwise they will be apt to suffer; for their roots having but little hold of the ground the first year after transplanting, if the season should prove very dry, it will greatly retard their growth, if due care be not taken to water them. In the beginning of October, when you observe the trees have done shooting, you should prune them; in doing of which, you must shorten the branches in proportion to the strength of the tree; which, if strong, may be left eight inches long; but, if weak, should be shortened to four or five; then you should train them horizontally to the wall, as was before directed, so that the middle of the trees may be void of branches, for that part of the tree will be easily furnished with wood afterwards; whereas, if the shoots are trained perpendicularly to the wall, those which are the strongest will draw the greatest share of the sap from the roots, and mount up-

wards; so that the side branches will be deprived of their nourishment and grow weaker, until they many times decay; and this is the reason why we see so many peach-trees with one or two upright shoots in the middle, and the two sides wholly unfurnished with branches, whereby the middle of each tree cannot produce any fruit, that being filled with large wood, which never produces any bearing shoots. Nor can the two sides of the trees be regularly filled with fruitful branches, when this defect happens to them; therefore this method should be carefully observed in the training up young trees; for, when they are permitted to run into disorder at first, it will be impossible to reduce them into a regular healthful state afterwards, the wood of the trees being too soft and pithy to admit of being cut down, as may be practised on many other hardy fruit-trees, which will shoot out vigorously again; whereas these will gum at the places where they are wounded, and in a few years entirely decay. The summer following, when the trees begin to shoot, you should carefully look over them, to rub off all fore-right buds, or such as are ill placed, and train those which are designed to remain horizontally to the wall, in their due order as they are produced, for this is the principal season when you can best order the trees as you would have them; whereas, if they are neglected until Midsummer, as is the common practice, a great part of the nourishment will be exhausted by the fore-right shoots, and other useless branches, which must afterwards be cut off: and hereby the remaining shoots will be rendered very weak, and perhaps some part of the wall be entirely unfurnished with branches; which might have been easily supplied in May, by stopping some of the stronger shoots in such parts of the tree where there is a necessity for more branches, which would cause each of them to shoot up two or more side branches below the ends of the shoots, which may be guided into the vacant parts of the tree as they are produced, so as that every part may be regularly furnished with proper wood, which is the greatest beauty and excellency of wall-trees; but you should always forbear stopping the shoots in summer, where there is not a necessity for branches to fill the wall; for there cannot be a greater fault committed than that of multiplying the number of shoots, so as to cause a confusion, whereby the branches will be too weak to produce good fruit; besides, when they are too close laid in against the wall, the air is excluded from the shoots by the great number of leaves, so that the fruit is never duly ripened, and cannot be so well tasted as that which is produced upon such trees where the shoots receive all the advantages of the sun and air to bring it to maturity.

In the pruning of peach and nectarine trees, (which require the same management,) the two following rules should be strictly observed, viz. first, that every part of the tree be equally furnished with bearing wood; and, secondly, that the branches be not laid in too close to each other. As to the first, it must be observed, that peach and nectarine trees produce their fruit upon the young wood, either of the preceding year, or, at most, the two-year shoots, after which age they do not bear; therefore, the branches should be shortened, so as to cause them to produce new shoots annually in every part of the tree; which cannot be done in the ordinary method of pruning, where persons neglect their trees at the proper season when they are most capable of management, which is in April, May, and June; at which time the luxuriant growth of branches may be checked by pinching, and new shoots produced where they are wanting, by stopping the neighbouring branches; which shoots, being produced at that season, will have time enough to ripen and gain strength before the autumn comes on; whereas, all those shoots produced after the middle of June, will be crude and pithy; and, though they may sometimes produce a few blossoms, yet those rarely bring fruit; nor are the future branches good which are produced from such wood, the vessels being too large to strain the juices, so that they

easily admit of great quantities of crude nourishment to pass through them. Therefore, those persons who only regard their wall-trees at two different seasons, viz. the winter and midsummer pruning, cannot possibly have them in good order; for, when all the branches which were produced in the spring are permitted to remain until the middle or latter end of June, (as is the common practice,) some of the most vigorous will draw the greatest part of the nourishment from the weaker branches, which, when the strong ones are taken off, will be too weak to produce fair fruit; and hereby the strength of the tree is exhausted, to nourish the useless branches which are annually cut off; and thus are too many trees managed, and at the same time complaints made of their luxuriance; because two or three shoots, by drawing away the greatest share of the nourishment, grow very strong and woody, (whereas, if the nourishment had been equally distributed to a regular quantity of branches, there would be no sign of their too great strength,) until, by often cutting off these vigorous branches, the trees are either entirely destroyed, or at least rendered so weak as not to be able to produce fruit; for, although by thus weakening the branches, it is often the means to produce a good number of blossoms, as may many times be observed also upon autumnal shoots, yet the utmost of their strength is spent in expanding the flowers, so that they rarely produce fruit; and, very often, the greatest part of the branches die soon after, which is supposed to be occasioned by a blight, when in reality it is nothing less than the fault of those who have the management of the trees. It is therefore of the greatest consequence to wall-trees, especially of these sorts, to go over them two or three times in the months of April, May, and June, to rub off all irregular shoots, and to train in the branches that are left in due order to the wall, that each shoot may have an equal advantage of sun and air, both of which are absolutely necessary to ripen and prepare the wood for the next year's bearing; therefore the oftener the trees are looked over, to divest them of the useless branches, from the time they first begin to shoot in the spring till the autumn, the better will the wood be ripened for the succeeding year. And, by duly observing this in summer, there will not be occasion for so much cutting as is often practised on peach-trees, to their great injury; for their wood-branches are generally soft, tender, and pithy, which, when greatly wounded, are not healed over again so soon as in many other sorts of trees; and the wet, insinuating into the wounded parts, often causes the branches to canker and die; which may be entirely avoided by the gentle easy method of pinching and rubbing off the buds in the manner here directed.

The distance which the branches of these trees should be allowed against the wall, must be proportioned to the size of the fruit or the length of the leaves; for, if we observe how the branches of the trees are naturally disposed to grow, we shall always find them placed at a great distance, as their leaves are larger or smaller; and there is no surer guide to a curious artist than nature, from whence a gardener should always be directed in every part of his profession, since his business is to aid and assist nature, where she is not capable of bringing her productions to maturity; or, where there is room, to make considerable improvements by art; which cannot be any otherwise effected, than by gently assisting her in her own way. But to return to pruning these trees: the branches being carefully trained in, as before directed, in the spring and summer seasons, we come now to treat of the winter pruning, which is commonly performed in February or March; but the best season for this work is in October, when their leaves begin to fall, which will be early enough for their wounds to heal before the frost comes on, so that there will be no danger of being hurt hereby; and the branches of the trees being proportioned to the strength of the roots at that season, all the ascending sap in the spring will be employed to nourish only those useful parts of the branches which are left; whereas, if they are left unpruned

till February, the sap in the branches being then in motion, as may be observed by the swelling of the buds, the greatest part of it will be drawn up to the extreme parts of the branches, to nourish such blossoms as must be afterwards cut off.

Having said thus much concerning the time of pruning, we shall give some general directions how it is to be performed on peach and nectarine trees, which require a very different management from most other sorts of fruits. In pruning these trees, you should always observe where branches are shortened, to cut them behind a wood-bud, which may be easily distinguished from the blossom-buds, which are shorter, rounder, and more turgid, than the wood-buds; for, if the shoot have not a leading bud where it is cut, it is very apt to die down to the next leading bud; so that what fruit may be produced above that will come to nothing, there being always a necessity of a leading bud to attract the nourishment; for, it is not sufficient to have a leaf-bud, as some have imagined, since that will attract but a small quantity of nourishment, the great use the leaves being to perspire away such crude juices as are unfit to enter the fruit. The length you should leave these branches, should be proportioned to the strength of the tree, which, in a healthy strong tree, may be left ten or twelve inches, or more; but, in a weak one, they should not be more than six inches: however, in this you must be guided by the position of the leading bud; for, it is better to leave a shoot three or four inches longer, or to cut it two or three inches shorter than it might be proper to do, provided there be one of these buds, it being absolutely necessary for the future welfare of the tree; you should also cut out entirely all weak shoots, though they may have many blossom-buds upon them; for these have not strength enough to nourish the fruit, but they will weaken the other parts of the tree. In nailing the shoots to the wall, you must be careful to place them at as equal distances as possible, that their leaves, when come out, may have room to grow without shading the branches too much; and you should never nail them upright, if it can be avoided: for, when they are thus trained, they are very subject to shoot from the uppermost eyes, and the lower part of the shoots will thereby become naked.

There is not any thing in the business of gardening which has more exercised the thoughts of the curious, than how to preserve their tender sorts of fruit from being blighted in the spring of the year; and yet there has been little written on this subject which is worth notice. The blights, which are so often complained of, do not so much proceed from any external cause, or inclemency in the season, as from a dis temper or weakness in the trees; for, if we observe the trees at that season, where they are the most subject to what is called a blight, we shall find the branches very small, weak, and not half ripened, as also trained in very close to each other; these branches are, for the most part, full of blossom-buds, which is chiefly occasioned by their want of strength. These buds do indeed open, and, to persons not skilled in fruit-trees, shew a great prospect of a plentiful crop of fruit; whereas the whole strength of the branches is spent in nourishing the flowers, and, being unable to do any more, the blossoms fall off; and the small efforts of the leaf-buds are checked, so that many times great part of the branches die away, and this is called a great blight; whereas, at the same time, it may be often observed, that some trees of a different sort, nay, even some of the same sort, were stronger and in health, though placed in the same soil, exposed to the same aspect, and subject to the same inclemency of air, have escaped very well, when the weak trees have appeared to be almost dead; which is a plain indication, that it proceeds from some cause within the tree, and not from any external blight. All this will therefore be remedied, by observing the foregoing directions in the pruning and management of the trees, so as never to overburden them with branches, nor to suffer any particular part of the trees to exhaust the whole nourishment from

the root, which will cause the other parts to be very weak; but to distribute the nourishment equally to every shoot, that there may be none too vigorous, at the same time that others are too weak; and, by continually rubbing off useless or fore-right shoots as they are produced, the strength of the trees will not be spent, to nourish such branches as must be afterwards cut out, which is too often seen in the management of these trees. It sometimes happens, that the roots of these trees are buried too deep in the ground, which, in a cold or moist soil, is one of the greatest disadvantages that can attend these tender fruits; for the sap which is contained in the branches, being by the warmth of the sun put strongly into motion early in the spring, is exhausted in nourishing the blossoms; and a part of it is perspired through the wood-branches, so that its strength is lost before the warmth can reach to their roots, to put them into an equal motion in search of fresh nourishment, to supply the expence of the branches; for want of which, the blossoms fall off and decay, and the shoots seem to be at a stand, until the farther advance of the warmth penetrates to the roots, and sets them in motion; when, suddenly after, the trees, which before looked weak and decaying, make prodigious progress in their shoots; and, before the summer is spent, are furnished with much stronger branches than those trees which have the full advantage of sun and showers, and are more fruitful and healthy; which must certainly be owing to the cause here mentioned, as also to their drawing in a great quantity of crude moisture, which, though productive of wood, is yet unkindly for fruit: if, therefore, this be the case, there is no way of helping it, but by raising up the trees, if they are young; or, if they are too old to remove, it is the better way to root them out, and make new borders of fresh earth, and plant down young trees. This may also proceed from the trees wanting nourishment, which is many times the case, where they are planted in a hard gravelly soil, in which it is the common practice to dig borders three or four feet wide, and three feet deep into the rock of gravel, which is filled with good fresh earth, into which the trees are planted, where they will thrive pretty well for two years, until their roots reach the gravel, where they are confined as if planted in a pot; and, for want of proper nourishment, the branches continually decay every year. This cannot be helped where the trees have been growing some years, without taking them entirely up, or by digging away the gravel from their roots, and adding a large quantity of fresh earth, that may afford them a supply of nourishment a few years longer; but trees so planted, cannot by any art be continued long in health. But if the unfruitfulness of the trees does not proceed from any of the before-mentioned causes, and is the effect of unkindly seasons, then the best method yet known is, in dry weather, to sprinkle the branches of the trees gently with water soon after the blossoming season, and while the young-set fruit is tender, which should always be done before noon, that the moisture may evaporate before the night comes on; and, if in the night you carefully cover the trees with mats, canvas, or some such light covering, it will be of great service to them: however, where the trees are strong and vigorous, they are not so liable to suffer by a small inclemency as are those which are weak, so that there will be few seasons in which there may not be hopes of a moderate quantity of fruit from them, though there should be no covering used; for, where these coverings are used, if it is not performed with great care and diligence, it is much better to have none, but to trust to the clemency of the season; for, if the coverings are kept too close, or continued too long, the trees will receive more injury thereby than if they had not been covered. However, I must repeat in this place, a management generally attended with success; which is, the putting up two feather-edge deal boards joined together, over the top of the trees, so as to form a pent-house, to cast off perpendicular wet. These should be fixed up when the trees begin to blossom, and should remain till the

the fruit is well set, when they should be taken down to admit the dew and rain to the leaves and branches of the trees; and, where the wall is long, and exposed to currents of wind, if, at the distance of forty feet from each other, some cross reed-hedges be fixed, to project about ten feet from the wall, these will break the force of the wind, and prevent its destroying the blossoms; and these may be removed as soon as the danger is over. These things have been practised with great success; and, as there will be little trouble in covering and uncovering by this method, after they are fixed up, there is less danger of neglect than where the trouble is great, or to be often repeated.

When your fruit is set, and grown to the bigness of a small nut, you should look over the trees and thin them, leaving the fruit at least five or six inches asunder; the sooner this is done, the better it will be for the remaining fruit; and, if it should sometimes happen, that a part of those left should be destroyed, yet the remaining ones will be much the larger or better tasted for it, and the trees will gain more strength; the fruit, when but few, will be much larger, better tasted, and the trees in a condition to bear well the succeeding year; whereas, when they are overcharged with fruit, it is always small, ill-tasted, and the trees are generally so much weakened, as not to be in a condition for bearing well for two or three years after. The quantity of fruit to be left on large full-grown trees, should never be greater than five dozen upon each; but on middling trees, three or four dozen will be enough.

If the season should prove hot and dry, it will be proper to draw up the earth round the stem of each tree, to form a hollow basin of about six feet diameter, and cover the surface of the ground in this basin with mulch; and, once in a week or fortnight, according to the heat and drought of the season, pour down eight or ten gallons of water to the root of each tree; or, where there is an engine which will disperse the water in gentle easy drops like rain, if the same or a larger quantity of water be sprinkled all over the branches of the trees; this, soaking down to the roots will keep the fruit constantly growing, which will prevent its falling off the trees, as it generally does where this method is not practised; and the fruit, being thus constantly nourished, will be much better tasted, and hereby the trees will be maintained in vigour; so that it is what we can from long experience recommend, as one of the most necessary things to be practised by all lovers of good fruit. But this should not be continued longer than while the fruit is growing, for afterwards it will be hurtful to the trees and fruit, for a dry autumn ripens both wood and fruit better than a moist later season.

When the peach-trees are carefully managed in the spring of the year, according to the rules laid down, all the nourishment which the roots can supply will be usefully employed in the support of such shoots only as are to be continued, as also the quantity of fruit which is proper for each tree, therefore both must of consequence be rendered better; for where there is not this care, the trees soon grow ragged, and are not furnished properly with branches; and those shoots which are produced, are some of them very weak, and others very luxuriant, whereby the trees are rendered very unsightly, as also unhealthy, and never continue many years fruitful; and by thus training the branches to the wall as they are produced, the fruit will be always exposed to the sun and air; which, in the common method of managing these trees, by letting their branches grow long all the spring, they are deprived of; and, by the timely rubbing off all luxuriant shoots, it will save much trouble, and prevent the use of the knife in summer, which is very hurtful to these trees, for there will be no need to shorten any of the shoots in summer.

The culture of the nectarine differs in nothing from that of the peach: only the buds should be taken from bearing trees, and not from young nursery trees, as is too often practised.

The common and dwarf almonds are propagated by

inoculating a bud of these trees into a plum, almond, or peach, stock, in the month of July. The next spring, when the buds shoot, you may train them up either for standards, or suffer them to grow for half-standards, according to your own fancy; though the usual method is to bud them to the height the stems are intended to be; and, the second year after budding, they may be removed to the places where they are to remain. This is the only method by which the sort can be continued with certainty: but, if a variety of fruit be wanted, or stocks for budding, they must be raised from the fruit. In order to which, having procured a quantity of well-ripened almonds, either sow them in October or November, or preserve them in sand till February or March. The seminary should be in a good light soil, and the stones should be put in two inches deep, in rows a foot distant from each other. When they are two years old, plant them out in the nursery, in rows three feet wide, and eighteen inches asunder in the rows. Train them with single stems, from five to eight feet in height, by pruning off all the side shoots; then top them with your knife at the proper height, to force out a set of branches, in order to give the head its first regular form, letting them afterwards branch out in their own way; but, if they be intended as stocks for budding, they must not be headed, but trained straight up till after the budding is performed. The best season for transplanting these trees, if for dry ground, is in October, as soon as the leaves begin to decay; but, for a wet soil, February is much preferable: and observe always to bud upon plum stocks for wet ground, and upon those of almonds and peaches for dry.

AMYGDALUS ÆTHIOPICA. See BRABEUM.

AMYGDALUS INDICUS. See TERMINALIA.

AMY'LACEOUS, *f.* [from *amylum*, Lat. starch.] A term applied to the fine flour of farinaceous seeds, in which consists their nutritive parts.

AM'YMONE, one of the fifty Danaides; she married Enceladus, and killed him the first night of their nuptials, in pursuance of her father's order: but, feeling a remorse of conscience, she retired into a wood; where, intending to shoot a deer, she wounded a satyr, who pursued her and even offered her violence; but she, imploring the help of Neptune, was delivered by him, but suffered from him what she only apprehended from the satyr, and brought forth Nauplis.

AMYN'TA, *f.* in literary history, a beautiful pastoral comedy, composed by Tasso; the model of all dramatic pieces wherein shepherds are actors. The *Pastor Fido*, and *Filii di Sciro*, are only copies of this excellent piece.

AMYN'TOR *f.* [αμυντωρ, formed of the verb αμυνω, *I defend*, or *avenge*.] properly denotes a person who defends or vindicates a cause. In this sense, Mr. Toland intitles his defence of Milton's life, *Amyntor*, as being a vindication of that work against Mr. Blackhall and others, who had charged him with questioning the authority of some of the books of the New Testament.

AMYN'TOR, king of the Dolopes, a people of Epirus, who was killed by Hercules for refusing him a passage through his country. A son of Egyptus, who was killed by his wife Damone the first night of his nuptials.

AM'YON, *f.* [from α priv. and μυς, a muscle.] A limb so emaciated that the muscles scarcely appear.

AM'YOT (James), bishop of Auxerre and great almoner of France, was born of an obscure family at Melun, the 30th of October, 1514, and studied philosophy, at Paris, in the college of cardinal Le Moine. He was naturally dull and heavy; but, diligence and application made amends for these natural defects. He left Paris at the age of twenty-three; and went to Berri with the Sieur Colin, who had the abbey of St. Ambrose in that city. At the recommendation of this abbot, a secretary of state took Amyot into his house to be tutor to his children. The cause of his advancement at court is said to be as follows:

As Henry II. was making a progress through his kingdom, he stopped at a small inn in Berri to sup. After supper,

supper, a young man sent in to his majesty a copy of Greek verses. The king being no scholar, gave them to his chancellor to read, who was so pleased with them, that he recommended to his majesty to take the young man to Paris, and to make him tutor to his children. Charles IX. to whom Amyot had been preceptor, on the post of great almoner of France being vacant, gave him that honourable piece of ecclesiastical preferment; and gave him, some time afterwards, the bishopric of Auxerre, as well as a rich abbey; with all which Amyot appeared to be so little contented that he asked for another rich abbey to append to them. Charles was much surprised, and reminded Amyot, that he had always assured him that he had bounded his desires to a few hundred pounds a-year. "True, sire," replied the prelate, *mais l'appetit vient en mangeant*; "the appetite encreases by eating." Henry III. who had also been his pupil, gave him the Order of the Holy Ghost. Amyot died in 1593, at the age of seventy-nine. Not long before his death, he was much pressed to write the history of his country. "I love my sovereigns too well," said he, "to write their lives." Amyot's translation of Plutarch will ensure him immortality: it is the best translation ever made of that entertaining and instructive writer. The French language owes him the obligation of having refined and polished it. The edition of Amyot's Plutarch, printed by Vascosan, in 13 vols. 12mo. is the edition preferred by the connoisseurs in books for the elegance of its typography.

AMYRALDISM, *f.* a name given by some writers to the doctrine of universal grace, as explained and asserted by Amyraldis, or Moses Amyrault, and others his followers, among the reformed in France, towards the middle of the 17th century.

AMYRAULT (Moses), an eminent French Protestant divine, born at Bourguet in Touraine in 1596. He studied at Saumur, where he was chosen professor of theology; and his learned works gained him the esteem of Catholics as well as Protestants, particularly of cardinal Richelieu, who consulted him on a plan of re-uniting their churches, which however, as may well be supposed, came to nothing. He published a piece in which he attempted to explain the mystery of predestination and grace, which occasioned a controversy between him and some other divines. He also wrote, An Apology for the Protestants; a Paraphrase on the New Testament; and several other books. This eminent divine died in 1664.

AMYRIS, *f.* [from *a* intensive, and *μυρον*, ointment or balm.] In botany, a genus of the octandria monogynia class, in the natural of terebinthaceæ. The generic characters are—Calyx: perianthium one-leafed, four-toothed, acute, erect, small, permanent. Corolla: of four, oblong, concave, spreading petals. Stamina: filaments awl-shaped, erect. Antheræ oblong, erect, the length of the corolla. Pistillum: germ superior, ovate; style thickish, the length of the stamens; stigmas four-cornered. Pericarpium: a drupaceous roundish berry. Seed: a round shining nut.—*Essential Character.* Calyx, four-toothed. Petal, four, oblong. Stigma, four-cornered. Berry, drupaceous.

Species. 1. *Amyris elemifera*, or gum-elemi tree: leaves ternate, and pinnate with five lobes, downy, underneath. Marcgraaff describes it as a lofty tree with a small trunk, covered with a smooth grey bark; growing almost in the manner of a beech-tree. The flowers come out very close together at the axils of the leaves. The fruit is the size and figure of an olive, and the colour of a pomegranate, having an odoriferous pulp within it. Gummi elemi is a resin from this tree, brought over in oblong roundish cakes, generally wrapped up in flag-leaves. The best sort is softish, somewhat transparent, of a pale whitish-yellow colour, inclining a little to greenish. This resin is only used as an ingredient in a digestive ointment called *unguentum elemi*, which is made from one pound of gum elemi, ten ounces of turpentine, two pounds of prepared

mutton suet, and two ounces of oil of olives. Native of Carolina and Brazil.

2. *Amyris sylvatica*: leaves ternate, crenate, acute. A shrub erect, leafy, branching, but little, from two to fifteen feet high, according to the soil and situation. The whole abounds in turpentine of a strong disagreeable smell. Gum elemi has erroneously been supposed to be yielded by this plant. Found plentifully about Carthagera, in woods near the sea. Flowers in August.

3. *Amyris maritima*, or small shrubby sweet wood: leaves ternate, crenulate, obtuse. A dwarf shrub, branching, with a juice like that of the former, but pleasanter, and smelling like rue. It is always found about the Havannah, on rocks by the sea-side; flowering from June to September.

4. *Amyris Gileadenfis*, or balsam of Gilead tree: leaves ternate, quite entire; peduncles one-flowered, lateral. The balsam of Gilead tree is a shrub with purplish branches, straited a little, having protuberant buds loaded with balsamic resin.

5. *Amyris opobalsamum*, or balsam of Mecca tree: leaves pinnate, leaflets sessile. The true opobalsamum, according to Prosper Alpinus, is at first turbid and white, of a very strong pungent smell, like that of turpentine; but much sweeter and more fragrant, like mint, varying according to its goodness, and of a bitter, acrid, astringent, taste: on being kept it becomes thin, limpid, light, of a greenish hue, and then of a gold colour; after which, it grows thick, like turpentine, and loses much of its fragrance. A curious balsam is sometimes met with, smelling like a mixture of rosemary and sage flowers, exceedingly fragrant, limpid, and thin: dropped on water, it spreads itself all over the surface, imparting to the liquor a considerable share of its taste and smell: the grosser part, that remains on the top of the water, is so tenacious, as to be easily taken up at once with the point of a needle, which is reckoned a characteristic of the true balsam. This seems to be the same with that which Bergius says he has had from England, under the name of balsam of Gilead. Gerlach (as quoted by Bergius) relates, that the trees which produce the opobalsamum, or balsam of Mecca, grow near Bederhounin, a village between Mecca and Medina, in a sandy rocky soil, confined to a small tract, about a mile in length. In the beginning of April, the trees drop their juice from gashes which are made in the smaller branches, into vessels set under them to receive it. A gash does not yield above three or four drops in a day, weighing about a drachm; nor will even the best trees yield more upon the whole in a season than from ten to fifteen drachms. The inhabitants use it as a sudorific, particularly in the rheumatism: but it is adulterated upon the spot. Lady Mary Wortley Montague informs us, that the balm of Mecca, of the best quality, is not easy to be got, even at Constantinople: that, applying some of it to her face, it became swelled and red during three days, but that her complexion was much mended by the operation: and that the ladies all use it at Constantinople, and have the loveliest bloom in the world. Its great scarcity has prevented its coming into use among us: nor are its virtues; probably, superior to those of some of the resinous juices more common in the shops; all these substances being in their general qualities alike, though differing in the degree of their gratefulness, pungency, and warmth. An inferior sort of balsam is prepared from boiling the young twigs and leaves gently in a large quantity of water; the balsamic matter rises to the surface, which is skimmed off. After they have thus procured all they can, it is said that they increase the fire, and a large quantity of thicker balsam like turpentine rises, which is preserved by itself, and is that principally which we have in Europe. The other only can be obtained by presents; and, that which distils naturally from the trees, scarcely supplying the fragrant and great officers, there is none of it sent out of the country.

Hasselquist describes the true balsam of Mecca as being yellow and pellucid, with a most fragrant resinous balsamic smell; as being very tenacious, and drawing out into long threads: that it is taken to three grains to strengthen a weak stomach, and that it is a most excellent remedy for wounds. To know whether it be adulterated, they drop some into a glass of water; if it remain still on the surface, it is of little value; but if it instantly extend itself over the whole surface, and may be taken off the water with a hair, silk, or thread, it is then of the best kind. The drugs used to adulterate this balsam, are oil of sesamum, cyprus turpentine, and ostrich fat. Mr. Bruce has given two figures of the balsam tree; one of the whole tree, the other a single branch with the dissection of the fruit. These he says may be depended on, as being carefully drawn, after an exact examination, from two very fine trees brought from Beder Hunein. One of these was five feet two inches high from where the red root begins, or which was buried in the earth, to where it divides itself first into branches. The trunk at thickest was about five inches diameter, the wood light and open, and incapable of being polished, covered with a smooth bark of bluish-white, like a standard cherry-tree in good health, which has not above half that diameter; indeed a part of the bark is a reddish brown; it flattens at top like trees that are exposed to snow, blasts, or sea-air, which gives it a stunted appearance. It is remarkable for a penury of leaves. The flowers are like those of the acacia tree, white and round, only that three hang upon three filaments or stalks, where the acacia has but one. Two of these flowers fall off and leave a single fruit; the branches that bear this are the shoots of the present year; they are of a reddish colour, and tougher than the old wood; it is these that are cut off and put into little fagots, and sent to Venice for the theriaca, when bruised or drawn by fire, and formerly these made the xylobalfamum. The great value set upon this drug in the east remounts to very early ages. We know from scripture, that the Ishmaelites, or Arabian carriers and merchants, trafficking with Indian commodities to Egypt, brought with them balm as part of the cargo. Strabo alone of all the ancients, has given us a true account of the place of its origin. "Near to this," says he, "is the most happy land of the Sabeans, and they are a very great people. Among these frankincense, myrrh, and cinnamon, grow, and in the coast that is about Saba, the balsam also." Among the myrrh trees behind Azab, all along the coast to the straits of Babelmandel is its native country. It grows to a tree above fourteen feet high, spontaneously and without culture, like the myrrh, the coffee, and frankincense, tree; they are all equally the wood of the country, and are occasionally cut down and used for fuel. We need not doubt but that it was early transplanted into Arabia, that is, into the south part of Arabia Felix, immediately fronting Azab: the high country of Arabia was too cold for it, being all mountainous, and water freezing there. The first plantation that succeeded seems to have been at Petra, the ancient metropolis of Arabia, now called Beder or Beder Hunein. Afterwards, being transplanted into Palestine, it obtained the name of *balsamum judaicum*, and balm of Gilead, and became an article of commerce there. Prosper Alpinus says, that Messener, an eunuch, governor of Cairo 1519, caused to be brought from Arabia forty plants, which he placed in the garden of Mattareah. Bellonius relates, that in his time there were ten plants at Mattareah. There were none existing when Mr. Bruce visited Cairo, but some of the Christians then living there remembered one plant in that garden. There were three productions from this tree very much esteemed among the ancients. The first was called *opobalsamum* or juice of the balsam, which was the finest kind, composed of that greenish liquor found in the kernel of the fruit: the next was *carpobalsamum*, made by the expression of the fruit when in maturity: the third was *xylobalfamum*, the worst of all; it was an expression or

decoction of the small new twigs of a reddish colour. But the principal quantity of balsam in all times was produced by incision, as at this day. The wound is made by an axe, when the juice is in its strongest circulation in July, August, and the beginning of September. It is then received into a small earthen bottle, and every day's produce is poured into a larger, which is kept closely corked. The Arabs Harb, a noble family of Beni Koreish, are the proprietors of it, and of Beder, where it grows. It is a station of the emir Hadje, or pilgrims going to Mecca, half way between that city and Medina. Some books speak of a white sort, brought by the caravans from Mecca; and others of a balsam of Judea, but these are counterfeits and adulterations. The balsam of Judea was lost long ago, but as late as Galen's time it was growing in many places of Palestine besides Jericho. When Sultan Selim conquered Egypt and Arabia in 1516, three pounds was then the tribute ordered to be sent to Constantinople yearly, and this is still kept up. The remainder is sold or farmed out to some merchants; who, to increase the quantity, adulterate it with oil of olives and wax, and several other mixtures, consulting only the agreement of colour; formerly, we are told, it was done with art, but nothing is easier detected than this fraud now. It does not appear that the ancients had ever seen this plant, they describe it so variously; and Prosper Alpinus corroborates the errors of the ancients, by saying it is a kind of vine (*viticofus*). The figure he has given is a very bad one. The juice, when first received into the bottle from the wound, is of a light yellow colour, apparently turbid, in which there is a whitish cast, which arises from the globules of air that pervade the whole in its first state of fermentation; it then appears very light upon shaking. As it settles and cools, it turns clear, and loses that milkiness. It then has the colour of honey, and appears more fixed and heavy than at first. After being kept some years, it becomes of a much deeper yellow, and of the colour of gold, but continues perfectly fluid, and loses very little of taste, smell, or weight. The smell at first is violent and strongly pungent, like that of volatile salts. In its pure and freest state it dissolves easily in water. If dropped on a woollen cloth, it will wash out easily, and leaves no stain. It is of an acrid, rough, pungent, taste; is used by the Arabs in all complaints of the stomach and bowels, is reckoned a powerful antispetic, and of use in preventing any infection of the plague. These qualities it enjoys probably in common with balsam of Tolu, Peru, &c. which we have received from America. It is always used and particularly esteemed by the ladies, as a cosmetic; as such it has kept up its reputation in the east to this day. The manner of applying it is this: you first go into the tepid bath till the pores are sufficiently opened, you then anoint yourself with a small quantity, and as much as the vessels will absorb; never-fading youth and beauty are said to be the consequences.

6. *Amyris toxifera*, or poison ash: leaves pinnate; leaflets petiolate, plane. Catesby describes his poison-wood as a small tree, with a light-coloured smooth bark. The mid-rib of the leaf as seven or eight inches long, and the pedicles as an inch in length. The fruit as hanging in bunches, shaped like a pear, of a purple colour, covering an oblong hard stone. From the trunk a liquor distils as black as ink, which the inhabitants say is poison. Birds feed on the fruit. Native of America.

7. *Amyris protium*: leaves pinnate, leaflets petiolate, waved. Native of the East Indies. Perennial.

8. *Amyris ambrosiaca*: leaves pinnate, petiolate; panicles crowded, axillary. A tree with a trunk thirty feet high, branching at the top. The whole tree is extremely sweet-scented, and pours out a very odorous balsam from the wounded trunk or branches, which is used in the dysentery; the dose is one drachm in red wine: this is also used in houses and churches to burn as a perfume. It grows in the woods of Guiana and by the sea-shore, flowering and fruiting in September.

3. *Amyris balsamifera*, or sweet amyris, or white candle-wood, or rose-wood: leaves two-paired. It grows to a considerable size, and is one of the most valuable timber-trees in the island of Jamaica, but not common. The wood is white, and of a curled grain when young, but grows of a dirty clouded ash-colour with age: it bears a fine polish, and has a pleasant smell. It is heavy, and in great repute among cabinet-makers. All the parts of this tree are full of warm aromatic particles, and may be used in baths and fomentations. The berries are oblong, and have much of the taste of the balsam copaiba. An infusion of the leaves has a very pleasant flavour, is highly cephalic, strengthens the nerves, and is particularly restorative to weak eyes. There are several species of amyris in Jamaica, the leaves and bark of which are impregnated with a fine balsamic juice; and, if the body was tapped at the proper season, might be found to transude a thick liquor resembling that of the Gilead balsam, to which the taste of this bark, and wood of the smaller branches, bears a very exact relation. See *XIMENIA*.

AN, art. [*anc*, Sax. *een*, Dut. *ene*, Ger.] The article indefinite, used before a vowel, or *h* mute. One, but with less emphasis; as, there stands *a* house.—Since he cannot be always employed in study, reading, and conversation, there will be many *an* hour, besides what his exercises will take up. *Locke*.—Any, or some; as, *an* elephant might swim in this water:

A wit's a feather, and a chief a rod;
An honest man's the noblest work of God.

Pope.

Sometimes it signifies, like *a*, some particular state; but this is now disused.—It is certain that odours do, in a small degree, nourish; especially the odour of wine; and we see men *an* hungred do love to smell hot bread. *Bacon*.

—*An* is sometimes, in old authors, a contraction of *and* if:

He can't flatter, he!

An honest mind and plain; he must speak truth.
An they will take it, so; if not, he's plain. *Shakespeare*.

Sometimes a contraction of *and* before *if*:

Well I know

The clerk will ne'er wear hair on's face that had it.
—He will *an' if* he live to be a man. *Shakespeare*.

Sometimes it is a contraction of *as* if.—My next pretty correspondent, like Shakespeare's lion in Pyramus and Thisbe, roars *an'* it were any nightingale. *Addison*.

ANA, adv. [*ana*]—A word used in the prescriptions of physic, importing the like quantity; as, wine and honey, *a* or *ana* ℥ii; that is, of wine and honey each two ounces.

In the same weight innocence and prudence take,
Ana of each does the just mixture make. *Cowley*.

ANA, *f.* in matters of literature, a Latin termination, adopted into the titles of several books in other languages. *Anas*, or *books in ana*, are collections of the memorable sayings of persons of learning and wit; much the same with what we otherwise call *table-talk*. Wolfius has given the history of books in *ana*, in the preface to the *Casauboniana*. He there observes, that, though such titles be new, the thing itself is very old; that Xenophon's books of the deeds and sayings of Socrates, as well as the dialogues of Plato, are *Socraticana*; that the apophthegms of the philosophers called by Diogenes Laertius the sentences of Pythagoras and those of Epictetus, the works of Athenæus, Stobæus, and divers others, are so many *anas*. Even the Gemara of the Jews, with several other oriental writings, according to Wolfius, properly belong to the same class. To this head of *ana* may likewise be referred the *Orphica*, the *Pythagoræa*, *Æsopica*, *Perrhœnea*, &c. Scaligerana was the first piece that appeared with a title in *ana*. It was composed by Isan de Vassan, a young Champanois, recommended to Jos. Scaliger by Casaubon. Being much with Scaliger, who was daily visited by the men of learning at Leyden, De Vassan wrote down whatever things of

any moment he heard Scaliger say. And thus arose the *Scaligerana*, which was not printed till many years after, at Geneva in 1666. *Patin*. *Let.* 431. Soon after came the *Perroniana*, *Thuana*, *Naudæana*, *Patineana*, *Soberiana*, *Menagiana*, *Anti-Menagiana*, *Furetiana*, *Chevæana*, *Leibnitziana*, *Arlequiniana*, *Poggiana*, &c.

ANABAPTISTION, *f.* the same with *ABAPTISTION*.

ANABAPTISTS, [*Anabaptiste*, Fr. of *ana* *βαπτίζω*, Gr. i. e. to rebaptize.] a name which has been indiscriminately applied to Christians of very different principles and practices; though many of them object to the denomination, and hold nothing in common, besides the opinion that baptism ought always to be performed by immersion, and not administered before the age of discretion.

The Donatists may be considered as a kind of Anabaptists in the earlier ages, though not then denoted by this name; for they contended, that those Christians of the catholic church who joined themselves to their respective parties should be rebaptized. But we must not class under the same denomination those bishops of Asia and Africa, who, in the third century, maintained, that baptism administered by those whom they called heretics was not valid, and therefore that such of them as returned into their churches ought to be rebaptized. Nor do the English and Dutch Baptists consider the denomination as at all applicable to their sect: by whom the baptism appointed by Christ is held to be “nothing short of immersion, upon a personal profession of faith;” of which profession infants being incapable, and sprinkling being no adequate symbol of the thing intended, the baptizing of profelytes to their communion, who in their infancy had undergone the ceremony of sprinkling, cannot, it is urged, be interpreted a repetition of the baptismal ordinance.

Anabaptists, in a strict and proper sense, appear to be those who not only rebaptize, when they arrive at an adult age, persons that were baptized in their infancy, but also, as often as any person comes from one of their sects to another, or as often as any one is excluded from their communion and again received into the bosom of their church, they baptize him. And such were many of the German Baptists. But the single opinion common to all the sects to which the name of *Anabaptists* has been indiscriminately applied, is that of the invalidity of infant baptism, in whatever way administered: and hence the general denomination of *Antipadobaptists*; which includes Anabaptists, Baptists, Mennonites, Waterlandians, &c. as distinguished by their respective peculiarities; though *Anabaptists* seems to have been adopted by most writers as the general term.

The Anabaptists appear to have made little noise, or to have been little noticed, before the time of the reformation in Germany. The most prudent and rational part of them considered it possible, by human wisdom, industry, and vigilance, to purify the church from the contagion of the wicked, provided the manners and spirit of the primitive Christians could but recover their lost dignity and lustre; and seeing the attempts of Luther, seconded by several persons of eminent piety, prove so successful, they hoped that the happy period was arrived in which the restoration of the church to purity was to be accomplished, under the divine protection, by the labours and counsels of pious and eminent men. Others, far from being satisfied with the plan of reformation proposed by Luther, looked upon it as much beneath the sublimity of their views; and consequently undertook a more perfect reformation, or, to express more properly their visionary enterprise, they proposed to found a new church, entirely spiritual, and truly divine.

This sect was soon joined by great numbers, and by many persons whose characters and capacities were very different, though their views seemed to turn upon the same object. Their progress was rapid; for, in a very short time, their discourses, visions, and predictions, excited commotions in a great part of Europe, and drew into their communion a prodigious multitude, whose ignorance rendered them easy victims to the illusions of enthusiasm.

thusiasm. The most pernicious faction of all those which composed this motley multitude, was that which pretended that the founders of the *new and perfect church*, were under the direction of a divine impulse, and were armed against all opposition by the power of working miracles. It was this faction that, in the year 1521, began their fanatical work, under the guidance of Munzer, Stubner, Storck, &c.

These persons were disciples of Luther; but, well-knowing that their opinions were such as would receive no sanction from him, they availed themselves of his absence to disseminate them in Wittenberg, and had the address to over-reach the piety of Melancthon. Their principal purpose was to gain over the populace, and to form a considerable party. To effect this, says Bayle, they were industrious and active, each in his own way. Storck, wanting knowledge, boasted of inspiration; and Stubner, who had both genius and erudition, laboured at commodious explications of Scripture. Not content with discrediting the court of Rome, and decrying the authority of consistories, they taught, That among Christians, who had the precepts of the gospel to direct and the Spirit of God to guide them, the office of magistracy was not only unnecessary, but an unlawful encroachment on their spiritual liberty; that the distinctions occasioned by birth, or rank, or wealth, being contrary to the spirit of the gospel, which considers all men as equal, should be entirely abolished; that all Christians, throwing their possessions into one common stock, should live together in that state of equality which becomes members of the same family; that, as neither the laws of nature nor the precepts of the New Testament had placed any restraint upon men with regard to the number of wives which they might marry, they should use that liberty which God himself had granted to the patriarchs.

They employed at first the various arts of persuasion to propagate their doctrine. They preached, exhorted, admonished, and reasoned, in a manner that seemed proper to impress the multitude; and related a number of visions and revelations with which they pretended to have been favoured from above. But when they saw that these methods of making profelytes were not attended with such success as they expected, and that the ministry of Luther and other eminent reformers was detrimental to their cause, they had recourse to more expeditious measures, and attempted to propagate their doctrine by force of arms. Munzer and his associates, in the year 1525, put themselves at the head of a numerous army, composed for the most part of the peasants of Suabia, Thuringia, Franconia, and Saxony; and declared war against all laws, government, and magistrates of every kind, under the pretext that Christ was now to take the reins of civil and ecclesiastical government into his own hands, and to rule alone over the nations. But this seditious crowd was soon routed and dispersed by the elector of Saxony and other princes; and Munzer their ringleader ignominiously put to death, and his factious counsellors scattered abroad in different places. Many of his followers, however, survived, and propagated their opinions through Germany, Switzerland, and Holland. In the year 1533, a party of them settled at Munster under the direction of two Anabaptist prophets, John Matthias a baker of Haerlem, and John Bockholdt a journeyman taylor of Leyden. Having made themselves masters of the city, they deposed the magistrates, confiscated the estates of such as had escaped, and deposited the wealth they had amassed in a public treasury, for common use. They made preparations of every kind for the defence of the city; and sent out emissaries to the Anabaptists in the Low Countries, inviting them to assemble at Munster, which was now dignified with the name of Mount Sion, that from hence they might be deputed to reduce all nations of the earth under their dominion. Matthias, who was the first in command, was soon cut off in an act of phrensy by the bishop of Munster's army; and was succeeded by Bockholdt, who was proclaimed by a special

designation of heaven, as he pretended, king of Sion, and invested with legislative powers like those of Moses. The extravagancies of Bockholdt were too numerous to be recited: it will be sufficient to add, that the city of Munster was taken after a long siege and an obstinate resistance; and Bockholdt the mock monarch was punished with a most painful and ignominious death. It must, however, be acknowledged, that the rise of the numerous insurrections of this period ought not to be wholly attributed to religious opinions. The first insurgents groaned under the most grievous oppressions; they took up arms principally in defence of their civil liberties; and of the commotions that took place, the Anabaptist leaders above-mentioned seem rather to have availed themselves of the opportunity, than to have been the prime movers. That a great part of the main body consisted of Anabaptists, seems indisputable; but it appears from history, that a great part also consisted of Roman Catholics, and a still greater number of persons who had scarcely any religious principles at all. Indeed, when we read of the vast numbers that were concerned in those insurrections, of whom it is reported that 100,000 fell by the sword, it is reasonable to conclude that a great majority of them were not Anabaptists.

The Baptists in England and Holland are to be considered in a very different light from the enthusiasts we have been describing; and it appears equally uncandid and invidious, to trace up their distinguishing sentiment, as some of their adversaries have done, to those obnoxious characters, in order to associate with it the ideas of turbulence and fanaticism, with which it certainly has no natural connection. Their coincidence with some of those oppressed and infatuated people in denying baptism to infants, is acknowledged by the Baptists: but they disavow the practice which the appellation of *Anabaptists* implies; and their doctrines seem referable to a more ancient and respectable origin. They are supported by history in considering themselves as the descendants of the Waldenses, who were so grievously oppressed and persecuted by the despotic heads of the Romish hierarchy; and they profess an equal aversion to all principles of rebellion on one hand, and to all suggestions of fanaticism on the other. The denomination of *Menonites*, by which they are distinguished in Holland, they derive from Menno, the famous man who finally gave confidence and stability to their sect.

ANABA'SII, *f.* in antiquity, were couriers who were sent on horseback, or in chariots, with important dispatches.

ANABA'SIS, *f.* [*αναβαινω*, Gr. to ascend or climb.] In botany, a genus of the pentandria digynia class, ranking in the natural order of holoraceæ. The generic characters are—Calyx: perianthium three-leaved; leaflets roundish, concave, obtuse, spreading. Corolla: five-petalled; petals ovate, equal, less than the calyx, permanent. Stamina: filaments filiform, longer than the corolla; antheræ roundish. Pistillum: germ roundish, acuminate, ending in two styles; stigmas obtuse. Pericarpium: a berry, roundish, surrounded by the calyx, dilated. Seed: single, screw-shaped.—*Essential Character.* Calyx three-leaved; corolla five-petalled; berry one-seeded, surrounded by the calyx.

Species. 1. *Anabasis aphylla*, or leafless anabasis: without leaves; the joints emarginate. It is a perennial plant, and has been found wild on the shores of the Caspian.

2. *Anabasis foliosa*, or leafy anabasis: leaves sub-clavate. This is seldom more than half a foot in height; more or less branched; and is annual. Found wild on the shores of the Caspian.

3. *Anabasis tamariscifolia*, or tamarisk-leaved anabasis: leaves awl-shaped; pericarps juiceless. A shrub with white branches, very smooth. Native of Spain.

4. *Anabasis spinosissima*, or thorny anabasis: shrubby; branches without leaves, but full of spines. Its native place of growth is unknown.

ANABA'THRA, *f.* in ancient writers, denote a kind of steps or ladder whereby to ascend to some eminence. In this sense we read of the anabathra of theatres, pulpits, &c.

ANACARDIUM.

The Acajou or Cashew-nut Tree.

&c. Anabathra appears to have been sometimes also applied to ranges of seats rising gradually over each other.

ANABATHRA is more particularly applied to a kind of stone blocks raised by the highway sides, to assist travellers in mounting or alighting, before the use of stirrups was invented.

ANABIBA'ZON, *f.* in astronomy, the Dragon's Head, or the northern node of the moon, where she passes the ecliptic from the south to the north latitude.

ANABLEPS, *f.* in ichthyology, the trivial name of a species of cobitis. See COBITIS.

ANABO'A, a small island situated near the coast of Loango in Africa, in E. lon. 9°. N. Lat. 1°. Here are several fertile valleys, which produce plenty of bananas, oranges, pine-apples, lemons, citrons, tamarinds, coconuts, &c. together with vast quantities of cotton.

ANABO'LÆUM, or ANABO'LE, *f.* in antiquity, a kind of great or upper coat, worn over the tunica.

ANABO'LEUS, *f.* in antiquity, an appellation given to grooms of the stable, or equerries, who assisted their masters in mounting their horses. As the ancients had no stirrups, or instruments that are now in use for mounting a horse, they either jumped upon his back, or were aided in mounting by anabolei.

ANABROCHIS'MOS, or ANABROCHISMUS, *f.* [from *ανα, sursum*, and *βροχος*, Gr. a noose.] An operation which was used to be performed on the hair of the eye-lids when they are offensive to the eye.

ANABRO'SIS, *f.* [*αναβρωσκω*, Gr. to devour.] A corrosion of the solid parts by sharp humours, or any medicine. The same as *diabrosis*; it occasions a discharge of blood, and often happens in the lungs.

ANACALYPTE'RIA, *f.* [of *ανακαλυπτω*, Gr. to reveal,] according to Suidas, were presents made to the bride by her husband's relations and friends when the first uncovered her face and shewed herself to men. These presents were also called *επαυλαια*: for, among the Greeks, virgins before marriage were under strict confinement, being rarely permitted to appear in public, or converse with the other sex; and, when allowed that liberty, wore a veil over their faces, termed *καλυπτεον*, or *καλυπτρα*, which was not left off in the presence of men till the third day after marriage; whence, according to Hesychius, this day was also called *anacalypterion*.

ANACAMP'SEROS, *f.* in botany. See CLAYTONIA, PORTULACA, and SEDUM.

ANACAMPTE'RIA, *f.* in ecclesiastical antiquity, a kind of little edifices adjacent to the churches, designed for the entertainment of strangers and poor persons.

ANACAMP'TIC, *adj.* [*ανακαμπω*, Gr. to bend back, to reflect; commonly said of echoes, which are sounds produced anacampitically, or by reflection.] Reflecting, or reflected. An *anacampitic* sound, an echo; an *anacampitic* hill, a hill that produces an echo.

ANACAMP'TICS, *f.* The doctrine of reflected light, or catoptrics. It has no singular.

ANACAR'DIUM, *f.* [*ανα, sine*, and *καρδια, cor*; without heart: because the pulp of the fruit, instead of having the seed inclosed, as is usually the case, has the nut growing out at the end of it.] In botany, a genus of the polygamia monoecia class, ranking in the natural order of holoraceæ. The generic characters are—I. Hermaphrodite flower. Calyx: perianthium five-leaved; leaflets ovate, concave, coloured, erect, deciduous. Corolla: petals five, lanceolate, acute, three times as long as the calyx, upright at bottom, reflex at the end. Stamina: filaments ten, united at the base, upright; nine of them capillary, shorter than the calyx; one thicker, double the length of the others, lying on the germ in front; antheræ roundish; in the longer filament large and fertile, in the rest small. Pistillum: germ kidney-shaped, obliquely emarginate in front; style subulate, bent in, the length of the corolla; stigma small, roundish, depressed, concave. Pericarpium: none; receptacle fleshy, very large, obovate. Seed: nut

kidney-shaped, large, at the top of the receptacle; with a thick shell, cellular within, and abounding in oil. II. Male flowers, either mixed with the hermaphrodites, or on a distinct tree. Calyx, corolla, and stamina: as in the hermaphrodites. Pistillum: germ none or abortive.—*Essential Character.* Calyx five-leaved; petals five, reflex; antheræ ten, one only fertile; nut kidney-shaped, on the top of a fleshy receptacle.

There is only one species, known by the name of *anacardium occidentale*, or cashew-nut, cassu, or acajou. It is an elegant tree, twenty-feet high. According to Browne, not more than twelve or sixteen feet in height, spreading much as it rises, and beginning to branch at the distance of five feet from the ground. Long, on the contrary, affirms, that in good soils it spreads to the size of a walnut-tree, which it much resembles in the shape and smell of the leaves. The trunk seldom exceeds half a foot in diameter. The fruit or apple has an agreeable sub-acid flavour, with some degree of refringency. Some of these are of a yellow, and others of a red, colour, owing probably to some difference in the soil or culture. The juice expressed from the fruit, and fermented, yields a pleasant wine; and, distilled, a spirit is drawn from it, far exceeding arrack or rum; making an admirable punch, and powerfully promoting urine. Some planters in the West Indies roast the ripe fruit, or slice one or two into a bowl of punch, to give it a pleasant flavour. The refringency of the juice has recommended it as a very signal remedy in dropical habits.

The nut springs from one end of the apple. It is of the size and shape of a hare's kidney, but is much larger at the end next the fruit than at the other. The outer shell is of an ash-colour, and very smooth; under this is another which covers the kernel; between these there is a thick inflammable oil, which is very caustic; this will raise blisters on the skin, and has often been very troublesome to those who have incautiously put the nuts into their mouths to break the shell. This oil has been used with great success in eating off ring-worms, cancerous ulcers, and corns; but it ought to be applied with caution. It is also esteemed an excellent cosmetic with the West-India young ladies, but they must certainly suffer a great deal of pain in its application; and, as fond as our British females are of a beautiful face, it is highly probable they would never submit to be stayed alive to obtain one. When any of the former fancy themselves too much tanned by the scorching rays of the sun, they gently scrape off the thin outside of the stone, and then rub their faces all over with the stone. Their faces immediately swell and grow black; and the skin, being poisoned by the caustic oil above-mentioned, will, in the space of five or six days, come entirely off in large flakes, so that they cannot appear in public in less than a fortnight; by which time the new skin looks as fair as that of a new-born child. The kernel, when fresh, has a most delicious taste, and abounds with a sweet milky juice. It is an ingredient in puddings, &c. When older it is generally roasted; and in this state is not so proper for costive habits. Ground with cacao it makes an excellent chocolate. When kept too long, it becomes shrivelled, and loses its flavour and best qualities. The thick oil of the shell tinges linen of a rusty iron-colour, which can hardly be got out; and, if any wood be smeared with the oil, it prevents the wood from decaying. It would therefore be an excellent preservative to house-timbers, and ships' bottoms. From the body of the tree is procured, by tapping or incision, a milky juice, which will stain linen of a deep black, that cannot be washed out again. This tree also annually transudes from five to ten or twelve pounds weight of a fine semi-transparent gum, similar to gum arabic, and not inferior to it in virtue or quality, except that it has a slight astringency, which perhaps renders it, in some respects, more valuable. It is a native of both Indies, and was cultivated in 1699, by the duchs of Beaufort.

Propagation and Culture. The cashew-tree is easily raised

fed in its native country from the nut. It is there of very quick growth, bearing fruit in two years after it is planted. But in England the plants are with great difficulty preserved; though, by their first shoots from the seeds, they appear so strong and vigorous, as to promise a much greater progress than they are ever seen to make. They are easily raised from the nuts, which are annually brought from America in great plenty; each of these should be planted in a small pot filled with light sandy earth, and plunged into a good hot-bed of tanner's bark, being careful to prevent their having wet, till the plants come up, for the nuts frequently rot with moisture. If the nuts are fresh, the plants will come up in about a month after planting, and in two months more they will be four or five inches high, with large leaves; from this quick growth, many persons have been deceived by supposing them hardy, and that they would continue the like progress, whereas they seldom advance much farther the same year. The plants must be constantly kept in the stove, for they are too tender to live abroad in England, in the warmest season of the year, nor will they thrive in a common greenhouse in summer. As these plants abound with a milky acrid juice, they should have but little water, even in summer; and, in winter, if they are sparingly watered once in a fortnight, it will be sufficient, for their roots are tender and soon perish with moisture. When these plants are transplanted, it will be the best method to break the pots, for the roots do not put out many fibres to hold the earth about them, so that, in shaking them out of the pots, most of the earth will fall away from their roots, and when this happens the plants seldom survive it, therefore, in breaking the pots, the same caution must be had not to disturb the earth more than can be avoided; then the plant, with the ball of earth to its roots, should be put into a pot one size larger than that in which it had before grown, filling up the pot with light sandy earth, and plunge the pots again into the hot-bed. These plants should not be removed oftener than once a year, nor should they be put into large pots; for, unless their roots are confined, they will not thrive.

ANACARDIUM, *f.* in botany. See AVICENNIA.

ANACARDIUM OFFICINARUM, *f.* in botany. See SEMECARPUS.

ANACATHARTIC, *f.* [ανακαθαρσις, Gr. of ανα, above, and καθαιρω, to purge.] A medicine that purges upwards; sometimes employed for emetics; sometimes to promote or increase the salivary discharge; but most commonly implying, agreeable to the sense made use of by Hippocrates, *expectorants*, or medicines promoting the discharge of matter, whether mucous or purulent, from the lungs.

ANACEPHALÆOSIS, *f.* [ανακεφαλαιωσις, Gr. of ανα, again, and κεφαλαιον, a summing up the heads of things:] Recapitulation, or summary of the principal heads of a discourse.

ANACES, a name given to Castor and Pollux, from their clemency to the conquered, when they made war against the Athenians, to recover their sister Helen, whom Theseus had carried away. Their festivals were called Anacea.

ANACHARSIS, a famous Scythian philosopher, who conversed with Solon, and lived an austere life. Upon his return from his travels through Greece, he attempted to change the ancient customs of Scythia, and to establish those of Greece; which proved fatal to him. The king shot him dead in a wood with an arrow. A great many statues were erected to him after his death. He is said to have invented tinder, the anchor, and the potter's wheel; but the latter is mentioned by Homer, who lived long before him. Anacharsis flourished in the time of Cræsus.

ANACHORET. See ANCHORET.

ANACHREMP'SIS, *f.* [ανω, upwards, and χρεπτομαι, Gr. to hawk.] The hawking up any thing from the lungs.

ANACHRONISM, *f.* [αναχρονισμος, Gr. of ανα and

χρονισμος, of χρονος, time.] In chronology, an error in computation of time, by which an event is placed earlier than it really happened. Such is that of Virgil, who makes Dido to reign at Carthage in the time of Æneas, though, in reality, she did not arrive in Africa till 300 years after the taking of Troy. An error on the other side, by which a fact is placed later, or lower than it should be, is called a *parachronism*. But, in common use, this distinction, though proper, is not attended to; and the word anachronism is used indifferently for the mistake on both sides.

ANACLASTIC GLASSES, *f.* a kind of sonorous phials or glasses, chiefly made in Germany, which have the property of being flexible; and emitting a vehement noise by the human breath. They are also called *veixing glasses* by the Germans (*veixier gläser*), on account of the fright and disturbance they occasion by their resiliency. The anaclastic glasses are a low kind of phials with flat bellies, resembling inverted funnels, whose bottoms are very thin, scarcely surpassing the thickness of an onion-peel: this bottom is not quite flat, but a little convex. But upon applying the mouth to the orifice, and gently inspiring, or as it were sucking out the air, the bottom gives way with a prodigious crack, and of convex becomes concave. On the contrary, upon expiring or breathing gently into the orifice of the same glass, the bottom with no less noise bounds back to its former place, and becomes gibbous as before. The anaclastic glasses first taken notice of were in the castle of Goldbach; where one of the academists *Naturæ Curiosorum*, having seen and made experiments on them, published a piece expressing on their history and phenomena.

ANACK, a sort of bread made of oatmeal.

ANACLASTICS, *f.* [ανα and κλαω, Gr.] An ancient name for that part of optics which considers refracted light; being the same as what is usually called *dioptrics*.

ANACLASTIC CURVE, a name given by M. de Mairau to certain apparent curves formed at the bottom of a vessel full of water, to an eye placed in the air; or the vault of the heavens, seen by refraction through the atmosphere.

ANACLETE'RIA, *f.* [of ανα and καλεω, Gr. to call.] In antiquity, a solemn festival celebrated by the ancients when their kings or princes came of age, and assumed the reins of government. It is so called, because, proclamation being made of this event to the people, they went to salute their prince during the anacletaria, and to congratulate him upon his new dignity.

ANACLETICUM, *f.* in the ancient art of war, a particular sound of the trumpet, whereby the fearful and flying soldiers were rallied, and recalled to the combat.

ANACLINO'PALE, *f.* [ανακλινοπαλε, Gr.] In antiquity, a kind of wrestling, wherein the champions threw themselves voluntarily on the ground, and continued the combat by pinching, biting, scratching, and other methods of offence. The anaclinopale was contradistinguished from the *orthopale*, wherein the champions stood erect.

ANACLINTERIA, *f.* in antiquity, a kind of pillows on the dining bed, whereon the guests used to lean. The ancient tricliniary beds had four pillows, one at the head, another at the feet, a third at the back, and a fourth at the breast. That on which the head lay, was properly called by the Greeks *ανακλιντησιον*, or *ανακλιντηρον*; by the Romans *fulcrum*, sometimes *pluteus*.

ANACOE'NOSIS, in rhetoric, a figure whereby we seem to deliberate, and argue the case with others upon any matter of moment.

ANACOLLE'MATA, *f.* [ανακολλω, Gr. to glue together.] Medicines applied to the forehead or nostrils to stop bleeding; also medicines that will breed flesh, and conglutinate the parts.

ANACOE'LUTHON, or ANACOE'LUTHUS, *f.* [ανακολεθω, Gr. of α priv. and κολουω, consequent; i. e. an in-consequence in discourse.] A figure in rhetoric, when a word that is to answer another is not expressed.

ANACON'DO,

ANACON'DO, *f.* in natural history, is a name given in the island of Ceylon to a very large and terrible rattlesnake, which often devours the unfortunate traveller alive, and is itself accounted excellent and delicious food.

ANA'CREON, a Greek poet, born at Teos, a city of Ionia, flourished about 532 years before the Christian æra. Polycrates, tyrant of Samos, invited him to his court, and made him share with him in his business and his pleasures. He had a delicate wit, as may be judged from the inexpressible beauties and graces that shine in his works: but he was fond of pleasure, was of an anorous disposition, and addicted to inebriety; yet, notwithstanding his irregularities, he lived to the age of eighty-five; when, we are told, he was choked by a grape-stone which stuck in his throat as he was regaling on some new wine.

There is but a small part of Anacreon's works that remain; for, besides his odes and epigrams, he composed elegies, hymns, and iambics. His poems which are extant were rescued from oblivion by Henry Stephens, and are universally admired. The verses of Anacreon are sweeter, says Sealiger, than Indian sugar. His beauty and chief excellence, says Madam Dacier, lay in imitating nature, and in following reason; so that he presented to the mind no images but what were noble and natural. The odes of Anacreon, says Rapin, are flowers, beauties, and perpetual graces; it is familiar to him to write what is natural and to the life, with an air so delicate, so easy, and graceful, that among all the ancients there is nothing comparable to the method he took, nor to that kind of writing he produced. None has given a juster character of his writings than Mr. Cowley, in the speech of Cupid:

All thy verse is softer far
Than the downy feathers are
Of my wings, or of my arrows,
Of my mother's doves and sparrows:
Graceful, cleanly, smooth, or round,
All with Venus' girdle bound.

ANACREON'TIC VERSE, *f.* in ancient poetry, a kind of verse, so called from its being much used by the poet Anacreon. It consists of three feet and a half, usually spondees and iambuses, and sometimes anapests. Such is that of Horace, *Lydia, dic per omnes*.

ANACRISIS, among the ancient Greeks, was a kind of trial or examination, which the archons, or chief magistrates of Athens, were to undergo before their admission into that office. The anacrisis stands distinguished from the *docimasia*, which was a second examination, in the forum.

ANACRISIS, among civilians, was an investigation of truth, interrogation of witnesses, and enquiry made into any fact, especially by torture.

ANACROSIS, *f.* in antiquity, denotes a part of the Pythian song, wherein the combat of Apollo and Python are described. The anacrosis was the first part, and contained the preparation to the fight.

ANACY'CLUS, *f.* [*ανακυκλον*, to encircle.] In botany, a genus of the syngenesia polygamia superflua class, ranking in the natural order of compositæ discoidæ. The generic characters are—Calyx: common, hemispherical, imbricate: with many ovate, flat, sharp scales. Corolla: compound, radiate; with numerous hermaphrodite corollas in the disk; from five to ten females in the ray, scarcely higher than the disk; hermaphrodites funnel-shaped, with a quinquesid spreading border; females with a flattened tube, and an ovate entire border. Stamina: in the hermaphrodites; filaments five, capillary, very short; antheræ cylindric. Pistillum: germ flattened, stigma bifid, in the hermaphrodites; with a membrane on each side; style filiform, the length of the corolla; and two slender reflex stigmas in the floscules. Pericarpium: none; calyx unchanged. Seed: in the hermaphrodites, solitary, oblong, compressed, naked, or without down; in the females with a very broad membranaceous wing on each side, and emarginate at top, but without down. Recep-

taulum: chaffy; chaffs obtuse, with a point.—*Essential Character.* Receptacle chaffy; down emarginate. Seeds in the ray membranaceous.

Species. 1. *Anacyclus creticus*, or trailing anacyclus: leaves decompound, linear; divisions subdivided, flat. 2. *Anacyclus orientalis*, or eastern anacyclus: leaves compound, bristly, acute, straight. The two first sorts grow naturally in the islands of the Archipelago, from whence Tournefort sent their seeds to the royal garden at Paris. They are low plants, whose branches trail on the ground. The first sort has fine-cut leaves, like those of chamomile; the flowers are small, white, and grow single, with their heads declining; these are like those of the common May-weed. The second has leaves like those of the ox-eye; the flowers are white, like those of chamomile.

3. *Anacyclus aureus*, or golden-flowered anacyclus: leaves bipinnate, roundish, hoary, hollow-dotted. Native of the south of Europe, and the Levant. Cultivated here in 1570.

4. *Anacyclus valentinus*, or fine-leaved anacyclus: leaves decompound, linear; divisions subdivided, roundish, acute; flowers flosculose. Grows a foot and a half high, sending out many side branches; the leaves are finely divided like those of chamomile, and are hairy; the flowers grow single at the extremity of the branches, and are of a bright yellow colour, with a silvery scaly calyx. These are as large as those of the ox-eye. A native of Spain and Italy. Cultivated in 1656, by Tradescant. It flowers in June and July.

Propagation and Culture. All these plants are annual; the seeds should be sown early in the spring in a border of light earth, where they are designed to remain, and require no other care but to keep them clean from weeds, and to thin the plants where they are too close. As they have no great beauty, a few plants only may be left for the sake of variety. They flower in July and August, and their seeds ripen in September.

ANADAVADÆ'A, *f.* in ornithology, a barbarous name for a species of birds. See ALAUDA.

ANADE'MA, *f.* among the ancients, denotes an ornament for the head, wherewith victors at the sacred games had their temples bound.

ANADIPLO'SIS, *f.* [*αναδιπλωσις*, of *αναδιπλω*, Gr. to redouble.] Reduplication; a figure in rhetoric, in which the last word of a foregoing member of a period becomes the first of the following; as, *He retained his virtues amidst all his misfortunes, misfortunes which only his virtues brought upon him.*

ANADROMOUS, *f.* among ichthyologists, a name given to such fishes as go from the sea to the fresh waters at stated seasons, and return back again; such as the salmon, &c.

ANADUOMENE VENUS, in the Grecian mythology, answered to the Sea Venus in the Roman, and was the appellation given to one of the chief deities of the sea. The most celebrated picture in all antiquity was that of this goddess by Apelles; and the famous Venus of Medici is a Sea Venus.

ANADYOMENE, a name of Venus, who is said to have emerged from the waters of the sea.

ANÆDEI'A, *f.* in antiquity, a denomination given to a silver stool placed in the Areopagus, on which the defendant, or person accused, was seated for examination. The word is Greek, *αναδεια*, which imports imprudence; but, according to Junius's correction, it should rather be *αναδεια*, q. d. innocence. The plaintiff, or accuser, was placed on an opposite stool, called *hybris*, or injury; here he proposed three questions to the party accused, to which positive answers were to be given. The first, Are you guilty of this fact? The second, How did you commit the fact? The third, Who were your accomplices?

ANÆSTHESIA, *f.* [from *α*, non, and *αισθησις*, *sensio*, Gr.] Insensibility, or loss of feeling by the touch. A resolution of the nerves, occasioning a loss of feeling: the same

fame as flupor. Dr. Cullen ranks this genus of difeafes in clafs locales and the order dyſæſthefie.

ANÆTIS, or ANATIS, a furname of the moon, given to it by the Perfians; who, as Strabo informs us, had feveral temples dedicated to this deity. They confecrated the flaves to her, as well men as women; but what is more ſtrange, they prostituted their daughters publicly to her honour; which, however, did not hinder their marriage.

ANAGALLIDASTRUM, *f.* in botany. See CENTUNCULUS.

ANAGALLIS, *f.* [*αναγλαω*, Gr. to laugh; becauſe, by curing the ſpleen, it diſpoſes perſons to be chearful.] In botany, a genus of the pentandria monogynia clafs, ranking in the natural order of rotaceæ. The generic characters are—Calyx: perianthium five-parted, ſharp, permanent; diviſions keeled. Corolla: wheel-shaped, border five-parted; diviſions ovate-orbiculate, with the claws connected. Stamina: filaments erect, ſhorter than the corolla, ſhaggy below; antheræ ſimple. Piſtillum: germ globoſe; ſtyle filiform, ſlightly bending; ſtigma capitate. Pericarpium: a globoſe one-celled capſule, opening tranſverſely. Seeds: very many, angular. Receptaculum: globoſe, very large.—*Eſſential Character.* Corolla rotate; capſule opening horizontally.

Species. 1. *Anagallis arvenſis*, or common pimpernel: in this genus the leaves are oppoſite, ſeſile, ſmooth, underneath dotted with brown. Gærtner obſerves, that he could never ſee the hemiſpherical hollow ſeeds which Haller deſcribes. Dr. Withering obſerves, that the leaves, when magnified, appear froſted over with very minute ſhining glands. It is an annual plant, and flowers from May to Auguſt, in ploughed grounds and gardens, particularly in ſandy ſoils. The bloſſoms open about eight in the morning, and cloſe in the afternoon; hence its name of ſhepherd's or poor man's weather-glaſs. But, if rain fall, or there be much moiſture in the air, the flowers either do not open, or cloſe up again. Small birds are very fond of the ſeeds. Schreber ſays, that ſheep eat it readily; by the experiments in *Aman. acad.* it appears, that kine and goats feed on it, but that ſheep reſuſe it. It was formerly celebrated for its medical qualities, and given in maniacal caſes, and even in the hydrophobia, but is now fallen into diſuſe. It appears, however, ſays Lewis, that it has ſome claim to the reſolvent and detergent virtues, aſcribed to it by ſome writers. Plukenet mentions a variety with larger leaves, four together placed croſſ-wiſe; and Ray ſays, he has found it among corn in England. Bobart found it with a white flower in Cowley-field. There is another variety, with a fleſh-coloured flower; but none of theſe are conſtant. There is alſo another, with a worn-out purple flower, which has ſeveral years continued the ſame in the Chelſea garden; but there is little difference in the leaves of this and the common ſort.

2. *Elore cœruleo*, or blue-flowered pimpernel: leaves undivided; ſtem procumbent; corolla finely notched. This is ſuppoſed to be only a variety, but we can affirm it never alters; and the plants before they ſhew their flowers are ſo different, as to be eaſily diſtinguiſhed. There is a variety of this with the flower of a deeper blue, the ſeeds of which came from Nice; and this retained its colour for many years in the Chelſea garden. Ray, Linæus, and others, take the blue pimpernel to be only a variety of the red. Haller, following Blair and Boehmer, and followed by Allioni, inclines to think it a diſtinct ſpecies; and ſays, that it is a taller plant, with ſmaller leaves and larger flowers; that the capſule is more ovate; but eſpecially that the diviſions of the calyx are narrower, and the petals ferrate about the edge. In the wild plants the flowers were rather ſmaller than in the common ſort; and the petals of this are finely notched about the edge, as well as of that. Haller mentions finding the blue ſort with three and four leaves together. Blue pimpernel grows wild in Sweden, Germany, and Switzerland; with us between Stockwell and Camberwell, and near Mitcham

in Surry; near Hiſton in Cambridgſhire; and Bredon-hill in Worceſterſhire.

3. *Anagallis monelli*, or upright pimpernel: leaves undivided; ſtem erect. A very beautiful ſmall plant, producing great numbers of fine blue flowers in April and May. Native of Verona. Cultivated in 1648, in the Oxford garden.

4. *Anagallis latifolia*, or broad-leaved pimpernel: leaves heart-shaped, ſtem-claſping; ſtem compressed. Very nearly allied to the firſt ſpecies; but diſtinguiſhed by its large broad leaves and compressed ſtem. A trailing annual plant.

5. *Anagallis linifolia*, or flax-leaved pimpernel: leaves linear; ſtem erect. Grows wild in Spain and Portugal.

6. *Anagallis tenella*, or bog pimpernel, purple looſeſtrife, or money-wort: leaves ovate, ſharpish; ſtem creeping. Not uncommon on bogs; flowering from June to Auguſt.

7. *Anagallis verticillata*, or verticillèd pimpernel: ſtem-leaves verticillèd; ſtem erect; ſtem a foot high, quadrangular, branching; leaves in fours or fives; on the branches only in pairs.

8. *Anagallis pumilla*, or dwarf pimpernel: ſtem erect, leaves roundiſh acute ſeſile. Native of Jamaica. Annual.

Propagation and Culture. The four firſt ſorts, being annual, are propagated from ſeeds, which ſhould be ſown ſoon after they are ripe. The firſt, though a beautiful little plant, being a common weed, is never cultivated, except in botanic gardens. The ſecond, third, and fourth, require to be ſheltered from extreme cold. The fifth, being a bog plant, cannot be cultivated in gardens, without a ſituation proper for it; though it will flouriſh well enough in pots of bog-earth plunged in water. The ſixth, if it be a diſtinct ſpecies, has not yet been cultivated with us. See CENTUNCULUS, EVOLVULUS, LYSIMACHIA, and PÆDEROTA.

ANAGALLIS AQUATICA. See GRATIOLA, MONTIA, PEPLIS, SAMOLUS, and VERONICA.

ANAGALLIS COERULEA. See GRATIOLA.

ANAGLYPHICE, or ANAGLYPHIC ART, *f.* [*αναγλυφικη*, Gr.] The art of carving, chaſing, engraving, or imboſſing, plate.

ANAGNI, a town of Latium, capital of the Hernici; which, after a faint reſiſtance, ſubmitting to the Romans, was admitted to the freedom of a city. It was afterwards a colony of Drufus Cæſar, and walled round, and its territory aſſigned to the veterans. Here Antony married Cleopatra, and divorced Octavia. It is thirty-fix miles to the eaſt of Rome. Lat. 42. 48. lon. 13. 45.

ANAGNOSTA, or ANAGNOSTES, *f.* in antiquity, a kind of literary ſervant, retained in the families of perſons of diſtinction, whoſe chief buſineſs was to read to them during meals, or at any other time when they were at leiſure. Cornelius Nepos relates of Atticus, that he had always an anagnoſtes at his meals.

ANAGOGE, *f.* [*αναγωγή*, of *ανα*, again, and *αγω*, to lead, Gr.] An elevation of the mind to ſearch after the hidden meaning of a paſſage, but more eſpecially the myſtical ſenſe of the Holy Scriptures.

ANAGOGETICAL, *adj.* That which contributes or relates to ſpiritual elevation, or religious raptures; myſterious; elevated above humanity.

ANAGO'GICAL, *adj.* [*anagogique*, Fr.] Myſterious; elevated; religiously exalted.

ANAGO'GICALLY, *adv.* [from *anagogical*.] Myſteriously; with religious elevation.

A'NAGRAM, *f.* [from *ανα*, backwards, and *γραμμα*, letter, Gr.] In literature, a tranſpoſition of the letters of ſome name, whereby a new word is formed, either to the advantage or diſadvantage of the perſon or thing to which the name belongs. Thus, the anagram of Galenus is *angelus*; that of Logica, *caligo*; that of Alſtedius, *ſedulitas*, &c. Calvin, in the title of his *Inſtitutions*, calls himſelf *Alcuinus*, which is the anagram of Calvinus, and the name of an eminently learned perſon in the time of Charlemagne. Thoſe who adhere ſtrictly to the definition of an anagram, take

take no other liberty than that of omitting or retaining the letter H, at pleasure; whereas others make no scruple to use ϵ for π , ν for w , s for z , and c for k ; and *vice versa*. But, besides anagrams formed as above, we meet with another kind in ancient writers, made by dividing a single word into several; thus, *fus tinea mus*, are formed out of the word *Justinianus*. Anagrams are sometimes also made out of several words: such is that on the question put by Pilate to our Saviour, *Quid est veritas?* whereof we have this admirable anagram, viz. *Est vir qui adest*. The Cabballists among the Jews are professed anagrammatists; the third part of their art, which they call *themuru*, that is, "changing," being nothing but the art of making anagrams, or of finding hidden and mystical meanings in names; which they do by changing, transposing, and differently combining, the letters of those names. Thus, of נח the letters of Noah's name, they make הן grace; of משיח the Messiah, they make ישעיה he shall rejoice.

ANAGRAMMATISM, *f.* The act or practice of making anagrams.—The only quintessence that hitherto the alchymy of wit could draw out of names, is *anagrammatism*, or *metagrammatism*, which is a dissolution of a name truly written into his letters, as his elements, and a new connexion of it by artificial transposition, without addition, subtraction, or change of any letter into different words, making some perfect sense applicable to the person named. *Camden*.

ANAGRAMMATIST, *f.* [from *anagram*.] A maker or composer of anagrams. Thomas Billon, a provincial, was a celebrated anagrammatist, and retained by Louis XIII. with a pension of 1200 livres, in quality of anagrammatist to the king.

TO ANAGRAMMATIZE, *v.n.* [*anagrammatizer*, Fr.] To make anagrams.

ANAGRAPHE, *f.* [of *αναγραφή*, of *ανα*, and *γραφω*, to write.] A description, a registering or recording of acts; an inventory, a breviate.

ANAGROS, *f.* in commerce, a measure for grain, used in some cities of Spain, particularly at Seville; forty-six anagros make about $10\frac{1}{4}$ quarters of London.

ANAGYRIS, *f.* [*ανagyris*, Gr. from the name of a town in Attica.] In botany, a genus of the decandria monogynia class, ranking in the natural order of papilionaceæ or leguminosæ. The generic characters are—Calyx: perianthium bell-shaped; mouth five-toothed, the upper pair of teeth more deeply divided. Corolla: papilionaceous; standard obcordate, straight, emarginate, broader than the other petals, twice as long as the calyx; wings ovate-oblong, flat, longer than the standard; keel straight, very long. Stamina: filaments parallel, distinct, rising; antheræ simple. Pistillum: germ oblong; style simple, rising; stigma villose. Pericarpium: an oblong, large, roundish, obtuse legume, a little reflex. Seeds: six, or more, kidney-form.—*Essential Character*. Standard and wings shorter than the keel in a papilionaceous corolla. Fruit, a legume.

Species. 1. *Anagyris fœtida*, or stinking bean trefoil: leaves ovate, flowers axillary. This grows wild in the south of France, in Spain, Italy, and Sicily; also about Smyrna. It is a shrub which usually rises to the height of eight or ten feet, and produces its flowers in April and May, which are of a bright yellow colour, growing in spikes somewhat like those of the laburnum. The seeds are never perfected in this country, which is the reason of its present scarcity in England.

2. *Anagyris cretica*: leaves oblong, racemes longer. A native of Candia, and some of the islands of the Archipelago, and is at present very rare in the English gardens. This sort has longer leaves than the former, and flowers later in the summer, so that it never produces seeds. It is probably only a variety.

3. *Anagyris inodora*: leaves pinnate; calyxes inflated, coloured; legumes compressed, straight; racemes terminating, oblong. Native of the woods of Cochinchina.

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Propagation and Culture. These may be propagated by laying down their tender branches in the spring, observing to tongue them in the same manner as the layers of carnations, being careful in dry weather to supply them with water; which, if duly performed, the layers will have taken root by the following spring, when they should be cut off from the old plants, a little time before they begin to put out their leaves, and planted in a warm situation; for, if they are too much exposed to cold winds, they will be in danger of being destroyed in a hard winter. This method of propagating these plants, is to supply their defect in not producing ripe seeds in this country; for the plants which are produced from seeds will be much handsomer, and will rise to a much greater height. If you propagate these plants from seeds, you should sow them on a moderate hot-bed the beginning of March; or in a border of good rich earth, in a well-sheltered place, sifting over them about half an inch of fine mould, and covering them with a common frame, to protect them in case of severe weather. If the seeds are good, the plants will appear in a month after the seeds are sown; when they should be inured by degrees to the open air, into which they should be removed towards the end of May, placing them in a sheltered situation; for this purpose the seeds may be sown in pots, and plunged into a hot-bed, because the plants do not bear transplanting well till the spring following: and, as they are impatient of cold while young, the two first winters it will be proper to shelter them under a common frame, where the glasses may be drawn off every day in mild weather, that the plants may enjoy the open air, which will prepare them for planting abroad when they have acquired proper strength; it will be very proper to keep these plants in pots three years, in which time they will have advanced to be in proper condition for planting them into the places where they are intended to remain; the best time for this is about the beginning of April, just before the plants begin to put out new leaves: at which time they should be turned out of the pots, preserving good balls of earth to their roots, planting some of them against warm aspected walls, where they will not be in danger of suffering by frost; and the others may be planted in warm situations, where, if they are protected in severe winters by covering the surface of the ground about their roots with tanner's bark, and screening their heads with mats, they may be preserved several years. The fourth year from sowing, these plants will begin to produce their flowers, will continue flowering every year after, and will be very proper to intermix with other flowering shrubs of the same growth in warm situations. See *CYTISUS LABURNUM*.

ANAGYRIS, or **ANAGYRUS**, the name of a place in Attica, of the tribe Erechtheis, where a fetid plant, called *Anagyris*, probably the same with the foregoing, grew in great plenty.

ANAITIS, a surname of Venus among the Armenians; where the virgins consecrated to her service esteemed themselves more dignified by public prostitution. Diana was also worshipped under this name by the Lydians.

ANAK, [אנאק Heb. i. c. a collar.] The father of the Anakims, was the son of Arba, who gave his name to Kirjath-arba, or Hebron, Josh. xiv. 15. Anak had three sons, Shefhai, Ahiman, and Talmi, chap. xv. 14. and Numb. xiii. 22. who, as well as their father, were giants; and who, with their posterity, all terrible for their fierceness and extraordinary stature, were called *Anakims*; in comparison of whom the Hebrews, who were sent to view the land of Canaan, reported that they were but as grasshoppers, Numb. xiii. ult. Caleb, assisted by the tribe of Judah, took Kirjath-arba, and destroyed the Anakims, Judg. i. 20. and Josh. xv. 14. in the year of the world 2559.

ANALCES, *f.* [from *a neg.* and *αλην*, strength, Gr.] Weak, effeminate. Hippocrates uses this word as an epithet for the Asiatic nations.

ANALECTA, *f.* [of *αναλεκτα*, of *ανα*, and *λεγομαι*, to

to gather, Gr.] Fragments, or crumbs gathered up from the table. Collections, or scraps collected out of authors.

ANALEMMA, *f.* A planisphere, or projection of the sphere, orthographically made on the plane of the meridian, by perpendiculars from every point of that plane, the eye supposed to be at an infinite distance, and in the east or west point of the horizon. In this projection, the solstitial colure, and all its parallels, are projected into concentric circles, equal to the real circles in the sphere; and all circles whose planes pass through the eye, as the horizon and its parallels, are projected into right lines equal to their diameters; but all oblique circles are projected into ellipses, having the diameter of the circle for the transverse axis. This instrument, having the furniture drawn on a plate of wood or brass, with an horizon fitted to it, is used for resolving many astronomical problems; as, the time of the sun's rising and setting, the length and hour of the day, &c. It is also useful in dialling, for laying down the signs of the zodiac, with the lengths of days, and other matters of furniture upon dials. The oldest treatise we have on the analemma, was written by Ptolemy, which was printed at Rome in 1562, with a commentary by F. Commandine. Pappus also treated of the same. Since that time, many other authors have treated very well of the analemma; as, Aguilonius, Taquet, Dechaies, Witty, &c.

ANALEPSIA, *f.* That species of epilepsy which proceeds from the stomach being disordered. It is by some put synonymously with epilepsy in general.

ANALEPTICS, *f.* [*αναλεπτικα*, Gr.] To recover and regain vigour after sickness. Restorative or nourishing medicines, particularly such as exhilarate the spirits, and promote flesh and strength. Dr. Cullen says, they are medicines suited to restore the force of the body when lost, and sometimes employed with respect to stimulus; but more commonly with respect to those substances which supply a deficient nourishment. Besides the nutritious quality of restoratives, they have a sweet, fragrant, subtil, oleous, principle, which immediately affects the nerves, and gives a kind of friendly motion to the fluids. In diseases, the speediest way to restore strength, is to remove the cause occasioning the debility; but this is not to be done merely by the force of medicines, which increase the vital heat; for, in convulsions and fevers, the motions are very strong, and yet the natural strength is languid: whence it is concluded, that true strength depends upon congruous aliments, turned into laudable blood and juices, yielding plenty of animal heat, the true and only source of firmness and vigour. Cordial flowers and herbs, musk, ambergris, oil of cinnamon made into olea sacchara, chocolate, shell-fish, &c. are *analeptic*.

ANALGESIA, *f.* [*α neg.* and *αλγος*, Gr. pain, or grief.] Indolence, or absence of pain and grief. A state of ease.

ANALOGAL, *adj.* Analogous; having relation.—When I see many *analogal* motions in animals, though I cannot call them voluntary, yet I see them spontaneous, I have reason to conclude, that these in their principle are not simply mechanical. *Hale*.

ANALOGICAL, *adj.* Used by way of analogy. It seems properly distinguished from *analogous*, as words from things; *analogous* signifies having relation, and *analogical* having the quality of representing relation.—It is looked on only as the image of the true God, and that not as a proper likeness, but by *analogical* representation. *Stillington*.—When a word, which originally signifies any particular idea or object, is attributed to several other objects, not by way of resemblance, but on the account of some evident reference to the original idea, this is peculiarly called an *analogical* word; so a sound or healthy pulse, a sound digestion, sound sleep, are so called, with reference to a sound and healthy constitution; but, if you speak of sound doctrine, or sound speech, this is by way of resemblance to health, and the words are metaphorical. *Watts*.

Analogous; having resemblance or relation.—There is placed the minerals between the inanimate and vegetable province; participating something *analogical* to either. *Hale*.

ANALOGICALLY, *adv.* In an analogical manner; in an analogous manner.—I am convinced, from the simplicity and uniformity of the Divine Nature, and of all his works, that there is some one universal principle, running through the whole system of creatures *analogically*, and congruous to their relative natures. *Chayne*.

ANALOGICALNESS, *f.* The quality of being analogical; fitness to be applied for the illustration of some analogy.

ANALOGISM, *f.* [*αναλογισμος*, Gr.] An argument from the cause to the effect.

To **ANALOGIZE**, *v. a.* To explain by way of analogy; to form some resemblance between different things; to consider something with regard to its analogy with something else.—We have systems of material bodies, diversely figured and situated, if separately considered; they represent the object of the desire, which is *analogized* by attraction or gravitation. *Chayne*.

ANALOGOUS, *adj.* [*ανα* and *λογος*, Gr.] Having analogy; bearing some resemblance or proportion; having something parallel.—Exercise makes things easy, that would be otherwise very hard; as, in labour, warchings, heats, and colds; and then there is something *analogous* in the exercise of the mind to that of the body. It is folly and infirmity that makes us delicate and froward. *L'Estrange*.—It has the word *to* before the thing to which the resemblance is noted.—This incorporeal substance may have some sort of existence, *analogous* to corporeal extension: though we have no adequate conception hereof. *Locke*.

ANALOGY, *f.* [from *ανα*, *per*, by, and *λογος*, *ratio*, reason.] Resemblance between things with regard to some circumstances or effects; as *learning* is said to *enlighten* the mind; that is, it is to the mind what light is to the eye, by enabling it to discover that which was hidden before.—From God it hath proceeded, that the church hath evermore held a prescript form of common prayer, although not in all things every where the same, yet, for the most part, retaining the same *analogy*. *Hooker*.—When the thing to which the analogy is supposed, happens to be mentioned, *analogy* has after it the particles *to* or *with*; when both the things are mentioned after *analogy*, the particle *between* or *betwixt* is used.—If the body politic have any *analogy* to the natural, an act of oblivion were necessary in a hot disordered state. *Dryden*.—By *analogy* with all other liquors and concretions, the form of the chaos, whether liquid or concrete, could not be the same with that of the present earth. *Burnet*.—If we make Juvenal express the customs of our country, rather than of Rome, it is when there was some *analogy* *betwixt* the customs. *Dryden*.—By grammarians, it is used to signify the agreement of several words in one common mode; as, from *love* is formed *loved*; from *hate*, *hated*; from *grieve*, *grieved*, &c.

ANALYSIS, *f.* [*analyse*, Fr. *αναλυσις*, Gr. of *ανα* and *λυσις*, a solution.] A separation of a compound body into the several parts of which it consists.—There is an account of dew falling in the form of butter, or grease, which grows extremely fetid; so that the *analysis* of the dew of any place, may, perhaps, be the best method of finding such contents of the soil as are within the reach of the fun. *Arbutnot*.—A consideration of any thing in parts, so as that one particular is first considered, then another.—*Analysis* consists in making experiments and observations, and in drawing general conclusions from them by induction, and admitting of no objections but such as are taken from experiments, or other certain truths. *Newton*.—A solution of any thing, whether corporeal or mental, to its first elements; as, of a sentence to the single words; of a compound word, to the particles and words which form it; of a tune, to single notes; of an argument to simple propositions.—We cannot know any thing of nature, but by an *analysis* of its true initial causes; till we know the first springs

springs of natural motions, we are still but ignorants. *Glanville.*

ANALYSIS, in mathematics, is properly the method of resolving problems by means of algebraical equations; whence we often find that these two words, *analysis* and *algebra*, are used as synonymous.

Mathematical analysis may be distinguished into the *ancient* and the *modern*. The ancient analysis, as described by Pappus, is the method of proceeding from the thing sought as *taken* for granted, through its consequences, to something that is *really* granted or known; in which sense it is the reverse of synthesis or composition, in which we lay that down *first* which was the *last* step of the analysis, and tracing the steps of the analysis back, making that antecedent here which was consequent there, till we arrive at the thing sought, which was taken or assumed as granted in the first step of the analysis. This chiefly respected geometrical enquiries. The principal authors on the ancient analysis, as recounted by Pappus, in the 7th book of his Mathematical Collection, are—*Euclid*, in his *Data*, *Porismata*, & *de Locis ad Superficem*; *Apollonius* de *Sectione Rationis*, de *Sectione Spatii*, de *Tactionibus*, de *Inclinationibus*, de *Locis Planis*, & de *Sectionibus Conicis*; *Ariflaus*, de *Locis Solidis*; and *Eratosthenes*, de *Mediis Proportionalibus*; from which Pappus gives many examples in the same book. To these authors we may add Pappus himself. The same sort of analysis has also been well cultivated by many of the moderns; as *Fermat*, *Viviani*, *Getaldus*, *Snellius*, *Huygens*, *Simpson*, *Stewart*, *Lawson*, &c. and more especially *Hugo d'Omerique*, in his *Analysis Geometrica*, in which he has endeavoured to restore the analysis of the ancients. And, on this head, *Dr. Pemberton* tells us, that *Sir Isaac Newton* used to censure himself for not following the ancients more closely than he did; and spoke with regret of his mistake, at the beginning of his mathematical studies, in applying himself to the works of *Descartes*, and other algebraical writers, before he had considered the *Elements* of *Euclid* with that attention so excellent a writer deserves: that he highly approved the laudable attempt of *Hugo d'Omerique* to restore the ancient analysis.

In the application of the ancient analysis in geometrical problems, every thing cannot be brought within strict rules; nor any invariable directions given, by which we may succeed in all cases; but some previous preparation is necessary, a kind of mental contrivance and construction, to form a connexion between the *data* and *quæsitæ*, which must be left to every one's fancy to find out; being various, according to the various nature of the problems proposed. Right lines must be drawn in particular directions, or of particular magnitudes; bisecting perhaps a given angle, or perpendicular to a given line; or perhaps tangents must be drawn to a given curve, from a given point; or circles described from a given centre, with a given radius, or touching given lines, or other given circles; or such-like other operations. Whoever is conversant with the works of *Archimedes*, *Apollonius*, or *Pappus*, well knows that they founded their analysis upon some such previous operations; and the great skill of the analyst consists in discovering the most proper affections on which to found his analysis: for the same problem may often be effected in many different ways: of which it may be proper to give here an example or two. Let there be taken, for instance, this problem, which is the 155th prop. of the 7th book of Pappus.

From the extremities of the base *A, B*, of a given segment of a circle, it is required to draw two lines *AC, BC*, meeting at a point *C* in the circumference, so that they shall have a given ratio to each other, suppose that of *F* to *G*. The solution of this problem, as given by Pappus, is thus:

ANALYSIS.

Suppose the thing done, and that the point *C* is found: then suppose *CD* is drawn a tangent to the circle at *C*, and meeting the line *AB* produced in the point *D*. Now by

the hypothesis $AC : BC :: F : G$, and also $AC^2 : BC^2 :: DA : DB$, as may be thus proved:

Since *DC* touches the circle, and *BC* cuts it, the angle *BCD* is equal to *BAC* by *Euc. iii. 32*; also the angle *D* is common to both the triangles *DCA, DCB*; these are therefore similar, and so, by *vi. 4*, $DA : DC :: DC : DB$, and hence $DA^2 : DC^2 :: DA : DB$, by *cor. vi. 20*. But also, by *vi. 4*, $DA : AC :: DC : CB$, and by permutation $DA : DC :: AC : BC$, or $DA^2 : DC^2 :: AC^2 : BC^2$; and hence, by equality, $AC^2 : BC^2 :: DA : DB$. But the ratio of AC^2 to BC^2 is given by *Prop. LVII.* of *Simpson's* edition of the *Data*, because the ratio of *AC* to *BC* is given, and consequently that of *DA* to *DB* is given. Now since the ratio of *DA* to *DB* is given, therefore also by *Data vi.* that of *DA* to *AB*, and hence by *Data ii.* *DA* is given in magnitude. And here the analysis properly ends. For it having been shewn that *DA* is given, or that a point *D* may be found in *AB* produced, such, that, a tangent being drawn from it to the circumference, the point of contact will be the point sought; we may now begin the composition or synthetical demonstration; which must be done by finding the point *D*, or laying down the line *AD*, which, it was affirmed, was given in the last step of the analysis.

SYNTHESIS.

Construction. Make as $F^2 : G^2 :: AD : DB$, (which may be done, since *AB* is given, by making it as $F^2 - G^2 : G^2 :: AB : DB$, and then by composition it will be as $F^2 : G^2 :: AD : DB$); and then from the point *D*, thus found, draw a tangent to the circle, and from the point of contact *C* drawing *CA* and *CB*, the thing is done.

Demonstration. Since, by the constr. $F^2 : G^2 :: AB : DB$, and also $AD : DB :: AC^2 : BC^2$, which has been already demonstrated in the analysis, and might be here proved in the same manner. Therefore $F^2 : G^2 :: AC^2 : BC^2$, and consequently $F : G :: AC : BC$. *Q. E. D.*

Here we see an instance of the method of *resolution* and *composition*, as it was practised by the ancients, the solution given being that of Pappus himself. But as the method of referring and reducing every thing to the *Data*, and constantly quoting the same, may appear now to be tedious and troublesome: and indeed it is unnecessary to those who have already made themselves masters of the substance of that valuable book of *Euclid*, and have by practice and experience acquired a facility of reasoning in such matters; therefore it remains only to shew how we may abate something of the rigour and strict form of the ancient method of solution, without diminishing any part of its admirable elegance and perspicuity. And this may be done by the instance of another solution, of the many more which might be given, of the same problem, as follows.

ANALYSIS.

Let us again suppose that the thing is done, viz. $AC : BC :: F : G$, and let there be drawn *BH*, making the angle *ABH* equal to the angle *ACB*, and meeting *AC* produced in *H*. Then, the angle *A* being also common, the two triangles *ABC* and *ABH* are equiangular, and therefore, by *vi. 4* $AC : BC :: AB : BH$, in a given ratio; and, *AB* being given, therefore *BH* is given in position and magnitude.

SYNTHESIS.

Construction. Draw *BH* making the angle *ABH* equal to that which may be contained in the given segment, and take *AB* to *BH* in the given ratio of *F* to *G*. Draw *ACH*, and *BC*.

Demonstration. The triangles *ABC, ABH*, are equiangular,

gular, therefore, vi 4, $AC : CB :: AB : BH$, which is the given ratio by construction.

Modern analysis consists chiefly of algebra, arithmetic of infinites, infinite series, increments, fluxions, &c. These form a kind of arithmetical and symbolical analysis, depending partly on modes of arithmetical computation, and partly on rules peculiar to the symbols made use of, and partly on rules drawn from the nature and species of the quantities they represent, or from the modes of their existence or generation. The modern analysis is a general instrument by which the finest inventions and the greatest improvements have been made in mathematics and philosophy, for near two centuries past. It furnishes the most perfect examples of the manner in which the art of reasoning should be employed; it gives to the mind a wonderful skill for discovering things unknown, by means of a small number that are given; and, by employing short and easy symbols for expressing ideas, it presents to the understanding things which otherwise would seem to lie above its sphere. By this means geometrical demonstrations may be greatly abridged: a long train of arguments, in which the mind cannot, without the greatest effort of attention, discover the connection of ideas, is converted into visible symbols; and the various operations which they require are simply effected by the combination of those symbols. And, what is still more extraordinary, by this artifice, a great number of truths are often expressed in one line only: instead of which, by following the ordinary way of explanation and demonstration, the same truths would occupy whole pages or volumes. And thus, by the bare contemplation of one line of calculation, we may understand in a short time whole sciences, which otherwise could hardly be comprehended in several years.

It is true, that Newton, who best knew all the advantages of analysis in geometry and other sciences, laments, in several parts of his works, that the study of the ancient geometry is abandoned or neglected. And indeed the method employed by the ancients in their geometrical writings, is commonly regarded as more rigorous than that of the modern analysis: and though it be greatly inferior to that of the moderns, in point of dispatch and facility of invention; it is nevertheless highly useful in strengthening the mind, improving the reasoning faculties, and in accustoming the young mathematician to a pure, clear, and accurate, mode of investigation and demonstration, though by a long and laboured process, which he would with difficulty have submitted to if his taste had before been vitiated, as it were, by the more piquant sweets of the modern analysis. And it is principally on this that the complaints of Newton are founded, who feared lest, by the too early and frequent use of the modern analysis, the science of geometry should lose that rigour and purity which characterise its investigations, and the mind become debilitated by the facility of our analysis. This great man was therefore well founded in recommending, to a certain extent, the study of the ancient geometricians: for, their demonstrations, being more difficult, give more exercise to the mind, accustom it to a closer application, give it a greater scope, and habituate it to patience and resolution, so necessary for making discoveries. But this is the only or principal advantage from it; for, if we should look no farther than the method of the ancients, it is probable that, even with the best genius, we should have made but few or small discoveries, in comparison of those obtained by means of the modern analysis. And even with regard to the advantage given to investigations made in the manner of the ancients, namely, of being more rigorous, it may perhaps be doubted whether this pretension be well founded. For to instance in those of Newton himself, although his demonstrations be managed in the manner of the ancients; yet at the same time it is evident that he investigates his theorems by a method different from that employed in the demonstrations, which are commonly analytical calculations, disguised by substituting the name of lines for their algebraical value: and, though it be true

that his demonstrations are rigorous, it is no less so that they would be the same when translated and delivered in algebraic language; and what difference can it make in this respect, whether we call the line AB , or denote it by the algebraic character a ? Indeed this last designation has this peculiarity, that, when all the lines are denoted by algebraic characters, many operations can be performed upon them, without thinking of the lines or the figure. And this circumstance proves of no small advantage: the mind is relieved, and spared as much as possible, that its whole force may be employed in overcoming the natural difficulty of the problem alone. Upon the whole therefore the state of the comparison seems to be this: That the method of the ancients is fittest to begin our studies with, to form the mind and to establish proper habits; and that of the moderns to succeed, by extending our views beyond the present limits, and enabling us to make new discoveries and improvements.

Analysis is divided, with respect to its object, into that of *finites* and that of *infinites*. Analysis of finite quantities is what is otherwise called *algebra*, or *specious arithmetic*. Analysis of infinites, called also the *new analysis*, is that which is concerned in calculating the relations of quantities which are considered as infinite, or infinitely little; one of its chief branches being the *method of fluxions*, or the *differential calculus*. And the great advantage of the modern mathematicians over the ancients, arises chiefly from the use of this modern analysis.

ANALYSIS of POWERS, is the same as resolving them into their roots, and is otherwise called *evolution*. *Analysis of Curve Lines*, shews their constitution, nature, and properties, their points of inflexion, station, retrogradation, variation, &c.

ANALYSIS, in chemistry, is the term used for decomposing any mixed body, and reducing it into its constituent parts; and this indeed is the chief object of the art of chemistry. The chemists make use of two modes of analyzation. 1. By fire. 2. By menstrua. Indeed the modes of decomposing bodies, are all founded on the difference of the properties belonging to the different principles of which the body to be analyzed is composed. Suppose, for instance, a body be composed of several principles, possessed of different degrees of volatility, and of some which are fixed, the volatile parts will rise in proportion to the degrees of volatility which they possess; the most volatile first, on the application of gradual heat; then the next in degree, whilst the fixed, capable of resisting the action of the fire, will remain at the bottom of the vessel. This is called *analysis by fire*. But when a body is compounded of several substances; one of which for instance is soluble only by spirits of wine; a second is soluble only by water; and a third is soluble only by æther; these substances may be very easily separated from each other, by submitting successively the compound body to the action of these menstrua, each of which dissolves that particular substance to which it has an affinity, and from which it may afterwards be readily separated. This is called the *analysis by menstrua*. In anatomy, the dissection of the human body is also called *analysis*.

ANALYSIS, in rhetoric, is that which examines the connections, tropes, figures, and the like, inquiring into the proposition, division, passions, arguments, and other apparatus of rhetoric. Several authors, as Fregius and others, have given analyses of Cicero's Orations, wherein they reduce them to their grammatical and logical principles; strip them of all the ornaments and additions of rhetoric which otherwise disguise their true form, and conceal the connection between one part and another. The design of these authors is to have those admired harangues just such as the judgment disposed them, without the help of imagination; so that here we may coolly view the force of each proof, and admire the use Cicero made of rhetorical figures to conceal the weak part of a cause. A collection has been made of the analyses formed by the most celebrated authors of the 16th century, in 3 vols. folio.

ANALYSIS is also used for a kind of syllabus, or table, of the principal heads or articles of a continued discourse, disposed in their natural order and dependency. Analyses are more scientific than alphabetical indexes; but they are less used, as being more intricate.

ANALYSIS is likewise used for a brief, but methodical, illustration of the principles of a science; in which sense it is nearly synonymous with what we otherwise call a *Synopsis*.

ANALYTICAL, *adj.* That which resolves any thing into first principles; that which separates any compound. That which proceeds by analysis, or by taking the parts of a compound into distinct and particular consideration.—Descartes hath here infinitely outdone all the philosophers that went before him, in giving a particular and *analytical* account of the universal fabric: yet he intends his principles but for hypotheses. *Glanville*.

ANALYTICALLY, *adv.* In such a manner as separates compounds into simples.

ANALYTIC, *adj.* [*ανλυτικος*, Gr.] The manner of resolving compounds into the simple constituent or component parts; applied chiefly to mental operations.—*Analytic* method takes the whole compound as it finds it, whether it be a species or an individual, and leads us into the knowledge of it, by resolving into its first principles, or parts, its generic nature and its special properties; and therefore it is called the method of resolution. *Watts*.

To **ANALYZE**, *v. a.* [of *ανα* and *λυω*, Gr. to loosen.] To resolve a compound into its first principles.—Chemistry enabling us to deposite bodies, and, in some measure, to *analyze* them, and take asunder their heterogeneous parts, in many chemical experiments, we may, better than in others, know what manner of bodies we employ; art having made them more simple or uncompounded, than nature alone is wont to present them to us. *Boyle*.—To *analyze* the immorality of any action into its last principles; if it be enquired, why such an action is to be avoided, the immediate answer is, because it is sin. *Norris*.—When the sentence is distinguished into subject and predicate, proposition, argument, act, object, cause, effect, adjunct, opposite, &c. then it is *analyzed* analogically and metaphysically. This last is what is chiefly meant in the theological schools, when they speak of *analyzing* a text of scripture. *Watts*.

ANALYZER, *f.* That which has the power of analyzing.—Particular reasons incline me to doubt, whether the fire be the true and universal *analyzer* of mixt bodies. *Boyle*.

ANAMABO'A, a populous town of the kingdom of Fantin, in Guinea. The country at Anamaboa is full of hills, beginning at a good distance from the town, and affording a very pleasant prospect. Indian corn and palm-wine are in great plenty. They have a green fruit called *papas*, as big as a small melon, and which has a taste like cauliflower. Anamaboa is much frequented by the English ships for corn and slaves, which last are sometimes to be had in great numbers. The English fort is a large edifice, flanked by two towers, and fortified towards the sea with two bastions. It is mounted with twelve pieces of cannon and twelve patereroes, and defended by a garrison under the command of the chief factor. The natives sometimes treat the garrison of this fort with great insolence. In 1701, they declared war against the English; and, having assembled in a tumultuous manner before the fort, they set fire to the exterior buildings, and went on with their outrages, till they were dispersed by a discharge of the cannon from the batteries. The night following the English took their revenge, by setting fire to the town of Anamaboa; and thus hostilities continued for twenty days, till at last the natives were obliged to sue for peace. This fort was abandoned in 1733; but has been resumed by the English, who have maintained it ever since.

ANA'MELECH, an idol of the Sepharvites, who are said in Scripture to have burned their children in honour of Adramelech and Anamelech. These idols probably signified the sun and moon. Some of the rabbins represent

Anamelech under the figure of a mule, others under that of a quail or pheasant.

ANA'MIM, the second son of Mizraim (Gen. x. 13). Ananim, if we may credit the paraphrast Jonathan the son of Uzziel, peopled the Marcotis; or the Pentapolis of Cyrene, according to the paraphrast of Jerusalem. Bochart is of opinion, that these Ananimus were the people that dwelt in the parts adjacent to the temple of Jupiter Ammon, and in the Nafamonitis. Calmet thinks the Amnians and Garamantes to be descended from Ananim.

ANAMNES'TICA, *f.* [*ανα*, and *μνησται*, Gr. *recordor*, to remember.] Medicines which are said to improve the memory, or restore it when lost. This is a general title, and seems, like many others, to have no foundation at all, but confounds the practice of physic; for, as this defect of memory may depend upon different causes, and such as may require different, nay opposite, remedies, students cannot be properly instructed, unless remedies are pointed out as suited to the particular cause and peculiar circumstances of the disease; and this observation will hold good in a variety of other instances.

ANAMOR'PHOSIS, *f.* [of *ανα* and *μορφωσις*, of *μορφη*, Gr. form or shape.] In perspective drawings, is a deformed or distorted portrait or figure, generally confused and unintelligible to the common unassisted view; but when seen to a certain distance and height, or as reflected from a plain or curved mirror, will appear regular and in right proportion.

ANANAS, *f.* in botany. See BROMELIA.

ANANC'TIS, *f.* in antiquity, a kind of figured stone, otherwise called *synochitic*, celebrated for its magical virtue of raising the shadows of the infernal gods.

ANAN'DRIA, *f.* in botany. See TUSSELLAGO.

ANANI'AH, [עֲנַיִה, Heb. of עָנָה a cloud or answer, and ה' the Lord, i. e. the cloud or divination of the Lord.] A proper name of a man.

ANANI'AS, a Sadducee, high-priest of the Jews, who put to death St. James the brother of our Lord, and was deposed by Agrippa.

ANANISAB'TA, or **ANANISAP'TA**, *f.* a magical word frequently found inscribed on coins and other amulets, supposed to have a virtue of preserving the wearer from the plague.

ANANTHOCY'CLUS, *f.* in botany. See COTULA.

ANAPÆST, *f.* [*αναπαυστος*, Gr. of *ανα* again, and *παυω*, to strike.] In ancient poetry, a foot consisting of two short syllables and one long. Such is the word "scôpûlôs." It is just the reverse of the dactyl.

ANAPÆSTIC VERSES, those consisting wholly or chiefly of anapæsts.

ANA'PHE, an island which spontaneously emerged out of the Cretan sea, near Thera; now called *Nanfio*. Its name is from the sudden appearance of the new moon to the Argonauts in a storm.

ANAPHONE'SIS, *f.* [from *ανα*, and *φωνη*, vox.] A species of exercise which consisted in vociferation. It exercises the breast and organs of speech, increases the natural heat, improves the complexion, and is useful for the phlegmatic. It is commended to those who have the heart-burn, bad digestion, and want of appetite, the cachectic, &c. but singing is yet a gentler exercise. See Hieron Mercurialis de Arte Gymnastica.

ANA'PHORA, *f.* [*αναφορα*, Gr. of *ανα*, and *φερω*, to bear.] A figure, when several clauses of a sentence are begun with the same word or sound; as, "Where is the wife? Where is the scribe? Where is the dispenser of this world?"

ANAPHORA, in astrology, the second house, or that part of the heavens which is thirty degrees from the horizon. The term *anaphora* is also sometimes applied promiscuously to some of the succeeding houses, as the fifth, the eighth, and the eleventh. In this sense *anaphora* is the same as *epanaphora*, and stands opposed to *cataphora*.

ANAPHORA, among physicians, the throwing off purulent matter by the mouth.

ANAPHRODISIA, *f.* [from *α neg.* and *αφροδισια*, Gr. ventry; called also *agenesia*, *atchnia*.] Impotence with respect to venereal commerce. This inability and sterility arises from various causes, either from an abolition of all passionate desires, appetite, or power of action, necessary for the propagation of our species, from a defect in erection, emission, or want of fertile semen. Sauvages has given us five species, which Dr. Cullen thus divides. The *true species* are the paralytic and gonorrhoeic; the *spurious species*, or where impediments occur to prevent the act, from piles, or some fault in the urethra; what is called *false* or *fictional*, that is, supposed to arise from magic. See Sauvages Nosologia Methodica, vol. i. 770. The cure of this disease depends upon the removal of its separate causes; when it arises from paralysis, such medicines as are necessary for the conquering that complaint must be had recourse to, particularly eating stimulants. Sauvages gives us an account of a man being cured by immersing the penis often in the day in a strong decoction of mustard-seed. If it is occasioned by simple gonorrhoea, such aids are to be called in as are calculated to invigorate the system, tonics and corroborants are to be made use of, particularly cold bathing, avoiding high-seasoned foods and cordial stimulants. If from the piles, or faults in the urethra, such means must be used as the nature and particular circumstances of the case demand.

ANAPLASIS, *f.* [from *αναπλασσω*, Gr. to restore to the original form.] Hippocrates uses this word for the replacing a fractured bone, and for a restoration of flesh.

ANAPLERO'SIS, *f.* [from *αναπληρω*, Gr. to fill up.] The restitution of any wasted part. Incarnatives are called *anaplerotica*.

ANAPLEU'SIS, *f.* [from *αναπλευ*, Gr. to fluctuate or float upon, or wash out.] Hippocrates used this word to express when faulty humours rot the bone, so that it falls out of its joint, as happens to the jaw sometimes. Vogel expresses by this word, the scaling or separation of the carious parts of a bone.

ANAPODOPHYLLUM, *f.* in botany. See **PODOPHYLLUM**.

A'NARCH, *f.* [*αναρχος*, Gr. of *α priv.* and *αρχη*, government.] An author of confusion:

Him thus the *anarch* old,
With fault'ring speech, and visage compos'd,
Answer'd.

Milton.

ANAR'CHI, *f.* [*αναρχος*, Gr.] In antiquity, a name given by the Athenians to four supernumerary days in their year, during which they had no magistrates. The Attic year was divided into ten parts, according to the number of tribes, to whom the presidency of the senate fell by turns. Each division consisted of thirty-five days; what remained after the expiration of these, to make the lunar year complete, which according to their computation consisted of 354 days, were employed in the creation of magistrates, and called *αναρχοι ημεραι*, and *αρχαιρεσιν*.

ANAR'CHICAL, *adj.* Confused; without rule or government.—In this *anarchical* and rebellious state of human nature, the faculties belonging to the material world presume to determine the nature of subjects belonging to the supreme Spirit. *Chayne*.

A'NARCHY, *f.* [*αναρχια*, Gr.] Want of government; a state in which every man is unaccountable; a state without magistracy:

Where eldest Night
And Chaos, ancestors of nature, hold
Eternal *anarchy*, amidst the noise
Of endless wars, and by confusion stand.

Milton.

Arbitrary power is but the first natural step from *anarchy*, or the savage life; the adjusting power and freedom being an effect and consequence of maturer thinking. *Swift*.

ANARCHY is also applied to certain troublesome and disorderly periods, even in governments otherwise regular.

In England, the period between the death of Cromwell and king Charles's restoration is commonly represented as an *anarchy*. Every month produced a new scheme or form of government. Enthusiasts talked of nothing but annulling all the laws, abolishing all writings, records, and registers, and bringing all men to a primitive level. The Jewish history presents numerous instances of anarchies in that state, usually denoted by this phrase, that "in those days there was no king in Israel, but every man did that which was right in his own eyes;" which is a just picture of an anarchy.

ANARE'TA, *f.* with astrologers, a name given to the fatal planet in the nativity, which threatens death.

ANAR'RHICAS, *f.* in ichthyology, a genus of fishes of the order of apodes. There is but one species of this genus, viz. the *annarrhicas lupus*, or sea-wolf; which seems to be confined to the northern parts of the globe. We find it in the seas of Greenland; in those of Iceland and Norway; on the coasts of Scotland and of Yorkshire; and lastly, in that part of the German ocean which washes the shores of Holland, the most southern of its haunts that we can with any certainty mention. It is a most ravenous and fierce fish, and, when taken, fastens on any thing within its reach: the fishermen, dreading its bite, endeavour as soon as possible to beat out its fore-teeth, and then kill it by striking it behind the head. Schonevelde relates, that its bite is so hard, that it will seize on any anchor, and leave the marks of its teeth in it; and the Danish and German names of *steenbider* and *steinbeisser*, express the sense of its great strength, as if it were capable of crushing even stones with its jaws. It feeds almost entirely on crustaceous animals and shell-fish, such as crabs, lobsters, prawns, muscles, scollops, large whelks, &c. these it grinds to pieces with its teeth, and swallows with the smaller shells. It does not appear they are dissolved in the stomach, but are voided with the feces; for which purpose the aperture of the anus is wider than in other fish of the same size. It is full of roe in February, March, and April, and spawns in May and June; but it has so disagreeable and horrid an appearance, that nobody at Scarborough except the fishermen will eat it, and they prefer it to holibut. They always before dressing take off the head and skin.

The sea-wolf grows to a large size: those on the Yorkshire coast are sometimes found of the length of four feet; according to Dr. Gronovius, they have been taken near Shetland seven feet long, and even more. The head is a little flattened on the top; the nose blunt; the nostrils very small; the eyes small, and placed near the end of the nose. The teeth are very remarkable, and finely adapted to its way of life. The fore-teeth are strong, conical, diverging a little from each other, stand far out of the jaws, and are commonly six above and the same below, though sometimes there are only five in each jaw: these are supported within-side by a row of smaller teeth, which makes the number in the upper jaw seventeen or eighteen, in the lower eleven or twelve. The sides of the under jaw are convex inwards, which greatly adds to their strength, and at the same time allows room for the large muscles with which the head of this fish is furnished. In the centre are two rows of flat strong teeth, fixed on an oblong basis upon the bones of the palate and nose. The teeth of the *annarrhicas* are often found fossil; and in that state are called *busonites*, or *load-stones*: these were formerly much esteemed for their imaginary virtues, and were set in gold, and worn as rings.

The body of this fish is long, and a little compressed sideways; the skin smooth and slippery: it wants the lateral line. The pectoral fins consist of eighteen rays. The dorsal fin extends from the hind part of the head almost to the tail; the rays in the fresh fish are not visible. The anal fin extends as far as the dorsal fin. The tail is round at its end, and consists of thirteen rays. The sides, back, and fins, are of a livid lead colour; the two first marked downwards with irregular obscure dusky lines: these in different fish have different appearances. The young are

of a greenish cast, resembling the sea-wrack, amongst which they reside for some time after their birth.

ANARRHOE'A, *f.* [from *ανω*, upward, and *ρηνω*, to flow.] A flux of humours from below upwards.

ANAR'THROI, *f.* [from *α* neg. and *αρθρον*, a joint.] Fat, even to be bloated, so that the joints are obliterated.

ANAS, in ornithology, a genus of birds belonging to the order of anseres; the distinguishing characters of which are; bill lamellar and toothed, convex, obtuse; tongue ciliate, obtuse. This very extensive genus includes the swans, the geese, the ducks, the sheldrakes, the shouclers, the wigsons, the garganeys, and the teals, forming in all one hundred and twenty-four species; of which the following are the most remarkable and curious.

1. The *cygnus-ferus* or wild swan, and the *cygnus-manfuetus* or tame swan, constitute the most elegant of this genus; and have, on this account, been celebrated by the most distinguished poets and ornithologists, in all ages of the world. It has shewn, that the lion and the tiger on the earth, the eagle and vulture in the air, assume their reign amid the horrors of war, and extend their dominion by cruelty and rapine, while the stately swan upholds his empire on the water in gentleness and peace. Endowed with strength and vigour, but restrained by a sense of moderation and justice, he knows to fight and conquer, yet never urges an attack. Pacific king of the water-fowls, he braves the tyrants of the air: he awaits the eagle, without provoking and without fearing the encounter. He repels his assaults, and opposes to his talons the attack of rapid strokes of a vigorous wing, which serves him as a shield; and often does victory crown his exertions. This is his only formidable enemy; all the other ravenous birds respect him; and he is at peace with all nature. Indeed the swan is the only bird we know of that dares contend with the eagle. He lives rather the friend than the monarch amidst the numerous tribes of aquatic birds, which submit to his law. He is only the chief, the principal inhabitant, of a peaceful republic; nor have his citizens aught to fear from a ruler who exacts no more than he grants, and whose sole wish is to enjoy tranquility and freedom.

The graces of figure, and the beauty of shape, correspond in the swan to the mildness of his disposition: he pleases every eye; he decorates every place that he frequents; he is beloved and admired; and no species more deserves our applause. On none has nature diffused so many of those noble and gentle graces, which recal the image of her most charming productions: elegant fashion of body; roundness of form; softness of outline; whiteness resplendent and pure; motions full of flexibility and expression; attitudes, sometimes animated, sometimes gently languishing: all the features and actions of the swan breathe the voluptuousness, the enchantment which wrap our soul at the sight of grace and beauty; all declare and paint it the bird of love; all justify the ingenious and sprightly fable, that made this delightful bird the father of the most beautiful of women.

The noble ease and freedom of its motions on the water bespeak it not only the first of the winged sailors, but the finest model presented by nature for the art of navigation. Its raised neck and its round swelling breast exhibit the prow of a ship cleaving the waves; its broad stomach represents the keel; its body, pressed down before, rises behind into the stern; the tail is a genuine rudder; its feet are broad oars; and its wings, half opened to the wind, and gently inflated, are the sails which impel the animated machine. Thus she is finely described by our poet Milton:

The swan, with arched neck
Between her white wings mantling proudly, rows
Her state with oary feet.

Proudly of its superiority, and emulous of distinction, the swan seems forward to unveil its beauties; seeks to charm the spectators, and to command their applause. And the sight indeed captivates the eye, whether we behold the

winged fleet at a distance gliding through the water, or view one, invited by signals, approach the shore and display its elegance and grace by a thousand pleasing undulating motions. To these endowments bestowed by nature, the swan joins the possession of liberty. He is none of those slaves which we can constrain or imprison. Even on our artificial lakes, he retains so much of the spirit of independence as to exclude every idea of servitude and captivity. He roves at will on the water, lands on the shore, wanders to a distance, or shelters himself under the brink; lurks among the rushes, or retires to the remotest inlets: then, leaving solitude, he returns to society and to the enjoyment which he receives by approaching man; provided we are hospitable and friendly, not harsh and tyrannical. Among our ancestors, too simple, or too wise, to fill their gardens with the frigid beauties of art, instead of the lively beauties of nature, the swans formed the ornament of almost every piece of water. They cheered the gloomy ditches round castles, they decorated most of the rivers, and even that of the capital, the stately-rolling Thames, which even to this day affords an anniversary to some of its magistrates, to survey and protect their swannery. The swan swims so fast, that a man, walking with hasty strides along the banks, can hardly keep pace with it. What Albin says of this bird "that it swims well, walks ill, and flies indifferently," is true only of the flight of the swan degraded by domestication; for when free, and especially when wild, it flies very loftily and vigorously. Hesiod gives it the epithet of *αεγιπτιος*, or bird that soars above the clouds; Homer classes it with the great migratory birds, the cranes and the geese; and Plutarch attributes to two swans what Pindar sung of two eagles, that Jupiter dispatched them from the opposite extremities of the world, to discover the middle by their meeting. The swan, superior in every respect to the goose, which lives only on herbs and grain, procures itself a rarer and more delicate food. It continually practises wiles to ensnare and catch fish; it assumes a thousand different attitudes, and draws every possible advantage from its dexterity and strength. It evades and resists its enemies: an old swan fears not in the water the strongest dog: a stroke of its wing has been known to break a man's leg; and they will easily beat down and trample upon youths of thirteen or fourteen years of age. Nor does the swan dread the ambush of any foe; for its courage equals its address and its force.

The wild swans fly in great flocks, and the tame swans walk and swim in company. Every thing marks their social instinct; and that instinct, the most agreeable in nature, bespeaks innocent manners, peaceful habits, and that delicate and sensible disposition which seems to bestow on the actions that flow from it, the merit of moral qualities. The swan also prolongs its placid existence to extreme old age. All observers ascribe to it prodigious longevity: some represent it as even passing the term of three centuries; which must certainly be an exaggeration. But Willoughby saw a goose, which was proved to have lived an hundred years; and he concludes from analogy that the period of the swan must extend farther; both because it is larger, and because its eggs require longer time to hatch: for incubation in birds corresponds to gestation in quadrupeds, and bears some relation, perhaps, to the body's growth, which is proportional to the duration of life. The swan requires two years to attain its full size, which is a very considerable time; since, in birds, the development is much quicker than in quadrupeds. The female swan sits six weeks at least; she begins to lay in the month of February; and, as with the goose, there is a day's interval between the dropping of each egg. She lays from five to eight, but most commonly six or seven; they are white and oblong, covered with a thick shell, and are of a very considerable size. The nest is placed sometimes on a bed of dry herbs on the bank; sometimes on a heap of broken reeds, heaped and even floating on the water. The amorous pair lavish the sweetest caresses, and seem in their pleasures

tures to seek all the gradations of voluptuousness. They begin by entwining their necks; and thus breathe the intoxication of a long embrace; they communicate the fire which kindles in their veins; and after the male has fully indulged his appetite, the female still burns; she pursues, and even excites him anew; and then leaves him, with regret, to wash in the water, and quench her remaining ardour. The fruits of these embraces are tenderly cherished and fostered. The mother gathers, night and day, the young under her wings, and the father is ready to defend them with intrepidity against every assailant. But his courage, on such occasions, bears no comparison to the fury with which he attacks a rival that intrudes on the possession of his beloved object. He then forgets his mildness, becomes ferocious, and fights with obstinate rancour; and a whole day is often insufficient to terminate the quarrel. They begin with striking violently their wings, then join close, and persist till commonly one of them is killed; for they strive to stifle each other by locking the neck, and forcibly holding the head under water. It was probably these combats that made the ancients imagine that the swans devoured one another. Nothing is wider of the truth; only in this, as in other cases, furious passions originate from a passion the most delicious; and it is love that begets war. At every other time, their habits are peaceful, and all their sentiments are attuned to love. As attentive to neatness as they are addicted to pleasure, they are assiduous each day in the care of their person: they arrange their plumage, they clean and smooth it; they take water in their bill, and sprinkle it on their back and wings with an attention that implies the desire of pleasing, and which can only be repaid by the consciousness of being loved. The only time when the female neglects her attire, is that of incubation; her maternal solicitude then entirely occupies her thoughts, and hardly does she spare a few moments for the relief and support of nature.

The cygnets are hatched very ugly, and covered only with a grey or yellowish down like goslings. Their feathers do not sprout till a few weeks after, and are still of the same colour. This unsightly plumage changes after the first moult, in the month of September: they assume many white feathers, and others rather flaxen than grey, especially on the breast and the back. This laced plumage drops at the second moult, and it is not till eighteen months, or even two years, that these birds are invested with their robe of pure and spotless white; nor before that age can they have young. The cygnets follow their mother the first summer, but they are compelled to leave her in the month of November, being chased away by the adult males, who wish to enjoy entirely the company of the females. These young birds, thus exiled from their family, unite in one body, and never separate till they pair.

As the swan often eats marsh-plants, and particularly the algæ, it prefers rivers of a smooth and winding course, whose banks are well clothed with herbage. The ancients have cited the Meander, the Mincio, the Strymon, the Cayster, as streams covered with swans. Paphos, the loved isle of Venus, was filled with them. Strabo speaks of the swans of Spain; and according to Ælian they were seen, at times, on the sea of Africa. From this and other accounts, we may conclude, that the species penetrates into the regions of the south: yet the north seems the true country of the swan, where it breeds and multiplies. With us wild swans are scarcely ever seen, but in the hardest winters. Gesner says, that in Switzerland, a long and severe winter is expected, when many swans arrive on the lakes. In the same cold season, they appear on the coasts of France and of England, and on the Thames. Many of our tame swans would then join the wild ones, did we not clip the great feathers of their wings. Yet some swans nestle and pass the summer in the northern parts of Germany, in Prussia, and Poland; and on nearly the same parallel of latitude, they are found on the rivers about Azof and Astracan; in Siberia, among the Jacutes; in Seleginskki, and as far as Kamtschatka. During the

breeding season, they are found in immense numbers on the streams and lakes of Lapland: there they feed on the larvæ of the gnat, which cover the surface of the water. The Laplanders see them arrive in the spring from the German Ocean: part stop in Sweden, and especially in Scania. Horrebow affirms, that they continue the whole year in Iceland, and inhabit the sea when the fresh waters are frozen. But, if a few do remain, the bulk of them follow the common law of migration, and fly from a winter, which, as the shoals of ice are driven from Greenland, is attended with greater rigour in Iceland than in Lapland. In August they lose their feathers, and are not able to fly, when the natives of Iceland and Kamtschatka hunt them with dogs, which catch them by the neck, and easily secure them in this defenceless state. The eggs are accounted good food, and the flesh is much esteemed by the inhabitants. These birds are as numerous in the northern parts of America as in those of Europe. They inhabit Hudson's Bay, and are likewise very numerous in Canada, from whence they appear to migrate for winter quarters into Virginia and Louisiana.

The differences which subsist between the wild or whistling swan, and the tame or mute swan, which is bred in England, have led to the opinion that they form two distinct and separate species. The whistling swan carries its neck quite erect, the other swims with it arched. It is also far inferior in size, and has twelve ribs on a side, the mute only eleven. But the most remarkable is the strange figure of the windpipe; which falls into the chest, then turns back like a trumpet, and afterwards makes a second bend to join the lungs. Thus it is enabled to utter a loud and shrill note. The mute swan, on the contrary, is the most silent of birds: it can do little more than hiss, which it does on receiving any provocation. The vocal kind emits its loud notes only when flying or calling. Its sound is very loud and shrill, but not disagreeable when heard far above one's head and modulated by the winds. The natives of Iceland compare it to the notes of a violin. In fact, they hear it, says Mr. Pennant, at the end of their long and gloomy winter, when the return of the swans announces the return of summer; every note must be therefore melodious which prefaces the speedy thaw, and the release from their tedious confinement. The tame swan is, however, regarded as a breed derived anciently and originally from the wild species. Klein, Frisch, and Linnaeus, have formed this opinion; though Willoughby and Ray pretend the contrary. The figure of the wild swan given in the annexed plate, may be depended upon as an exact copy of nature. The drawing was made from the real bird by the ingenious Mr. Edwards, and placed in his valuable and elegant collection of subjects in natural history.

Belon reckons the swan to be the largest of the aquatic birds; which is true, excepting, however, that the pelican has a much greater alar extent, that the albatross is as bulky, and that the flamingo is taller on its legs. The tame swans are invariably thicker and larger than the wild: some of them weigh twenty-five pounds, and measure, from the bill to the tail, four feet and an half; the breadth of the wings eight feet. The female is, in every dimension, rather smaller than the male. The bill usually exceeds two inches in length, and, in the tame kind, has above its base a fleshy tubercle, inflated and prominent, which gives a sort of expression: this tubercle is covered with a black skin; and the sides of the face, under the eyes, are covered with a skin of the same colour. In cygnets of the domestic breed, the bill is of a leaden cast, and afterwards becomes yellow or white, with the point black. In the wild kind, the bill is entirely black, with a yellow membrane on the front; its form seems to be copied in the two most numerous families of the palmipede birds, the geese and ducks. In all of these the bill is flat, thick, indented on the edges, rounded into a blunt tip, and terminated on the upper mandible by a nail of horny substance.

Swans, almost mute, like ours in the domestic state, could

ANAS.

Plate I.

The Teal or Whistling Swan.

could not be those melodious birds which poets and orators have celebrated and extolled. But the wild swan appears to have better preserved its prerogatives; and, with the sentiment of entire liberty, it has also the tones. The bursts of its voice form a sort of modulated song; yet the shrill and scarcely diversified notes of its loud clarion sounds, differ widely from the tender melody, the sweet and brilliant variety, of our singing birds. But it was not enough that the swan sung admirably; the ancients ascribed to it a prophetic spirit. It alone, of all animated beings, chanted in the moment of its agony, and, with harmonious sounds, prepared to breathe the last sigh. When about to expire, they said, and to bid a sad and tender adieu to life, the swan poured forth those accents so sweet, so affecting, and which, like a gentle and doleful murmur, with a voice low, plaintive, and melancholy, formed its funeral song. This fearful music was heard at the dawn of day, or when the winds and the waves were still: and they have been seen expiring with the notes of their dying hymn. No fiction of natural history, no fable of antiquity, was ever more celebrated, oftener repeated, or better received. It occupied the soft and lively imagination of the Greeks: even philosophers and historians adopted it as a truth too pleasing to be doubted. And well may we excuse such fables; they were amiable and affecting; they were worth many dull insipid truths; they were pleasing emblems to feeling minds. The swan, doubtless, chants not its approaching end; but, in speaking of the last flight, the expiring effort of a fine genius, we shall ever, with tender melancholy, recal the classical and pathetic expression, *It is the song of the swan!*

In former times, swans were served up at every great feast, when the elegance of the table was measured by the size and quantity of the good cheer. Cygnets are to this day fattened at Norwich about Christmas, and are sold for a guinea a-piece. Indeed swans were formerly held in such great esteem in England, that by an act of Edward IV. c. 6. "no one that possessed a freehold of less clear yearly value than five marks, was permitted to keep any, other than the son of our sovereign lord the king." And by the eleventh of Henry VII. c. 17. the punishment for taking their eggs was imprisonment for a year and a day, and a fine at the king's will. We shall now notice the other most remarkable species belonging to this genus.

2. The cygnoides, with a semicylindrical bill, gibbous wax, and tumid eye-brows, is the swan-geese of Ray, from Guinea. There is likewise a variety of this species, of a less size, called the *goose of Muscovy*. They are found wild about the Lake Baikal in the east of Siberia, and in Kamtschatka. They are also kept tame in most parts of the Russian empire. These birds likewise inhabit China, and are common at the Cape of Good Hope. This is no doubt the species mentioned by Kolben, called *crop-geese*; who says, that the sailors make tobacco-pouches and purses of the membrane which hangs beneath the throat, as it is sufficiently tough for such purposes, and will hold two pounds of tobacco. They are sufficiently common in Britain, and readily mix with the common goose; the breeds uniting as freely, and continuing to produce as certainly, as if no such mixture had taken place. They are much more noisy than the common tame geese, taking alarm at the least noise; and even without disturbance will emit their harsh and disagreeable scream the whole day through. They walk very erect, with the neck much elevated; and, as they bear a middle line between that of the swan and goose, they have not improperly been called *swan-geese*.

3. The tadorna, or sheldrake, has a flat bill, a compressed forehead, a greenish black head, and the body is variegated with white. This species is found as far as Iceland to the north. It visits Sweden and the Orkneys in the winter, and returns in spring. It is found in Asia about the Caspian Sea, and all the salt lakes of the Tartarian and Siberian deserts, as well as in Kamtschatka. Our voyagers, if right in the species, have also met with

it at Falkland Isles and Van Diemen's Land. It breeds in deserted rabbit holes, or occupies them in the absence of the owners, who, rather than make an attempt at dislodging the intruders, form others; though, in defect of ready-made quarters, these birds will frequently dig holes for themselves. They lay fifteen or sixteen roundish white eggs. These are placed at the farther end of the hole, covered with down supplied from the breast of the female, who sits about thirty days. She is very careful of her young, and will often carry them from place to place in her bill: "this we are certain of," says Mr. Latham, "from a young one having been dropt at the foot of an intelligent friend unhurt, by the mother flying over his head." When a person attempts to take their young, the old birds show great address in diverting his attention from the brood: they will fly along the ground as if wounded, till the former are got into a place of security, and then return and collect them together. From this instinctive cunning, Turner, with good reason, imagines them to be the *chenalopex*, or *fox-geese* of the ancients. The natives of the Orkneys to this day call them the *fly-geese*, from an attribute of that quadruped. The young, as soon as hatched, take to the water, and swim rapidly; but do not come to their full plumage till the second year. This species, Mr. Latham informs us, may be hatched under a tame duck, and the young readily brought up; but are apt, after a few years, to attempt the mastery over the rest of the poultry. In a state of nature, the food seems chiefly to be small fish, marine insects, and shells; herbage has likewise been found in their stomachs. In a tame state they will eat bread, grain, and greens. Their great beauty would tempt us to endeavour at domesticating the race; but it will not thrive completely, except in the neighbourhood of salt-water, which seems almost essential to its well-being. The flesh is rather unfavourable, though the eggs have at all times been thought very good.

4. The *spectabilis*, has a compressed bill gibbous at the base, a black feathery carina, and a hoary head. It is the grey-headed duck of Edwards, and the king-duck of Pennant. This beautiful species is found at Hudson's Bay, at Churchill River, and at York Fort; in winter it is met with as far south as New York. It is pretty frequent in the north of Siberia and Kamtschatka; it is found also on the coast of Norway, and has been killed in the Orkneys. It is common in Greenland; where the flesh is accounted excellent, and the crude gibbous part of the bill a great delicacy. It produces a down equally valuable as the eider. The skins are sewed together, and make warm garments. The natives kill them with darts, and use the following method to succeed: A number of men in canoes, falling in with a flock while swimming, on a sudden set up a shouting, making as much noise as they can; on which, the birds being too much frightened to fly away, dive under the water; but, as the place at which they are to rise again is known by the bubbling of the water above, the hunters follow them up as close as possible; and, after acting this three or four times over, the birds become so fatigued as to be easily killed. This species builds on the sides of ponds and rivers, making its nest of sticks and moss, and lining it with feathers from the breast. It lays four or five whitish eggs, as large as those of the goose. The young fly in July. The food consists chiefly of worms and grubs.

5. The *fusca*, or velvet duck, is of a blackish colour, has a white spot behind the eyes, and a white line on the wings. The male of this species is distinguished by a gibbosity at the base of the bill. It is the black duck of Ray, and is in length about twenty inches. This species frequents Hudson's Bay in summer, where it breeds. The nest is composed of grubs; in which it lays from four to six white eggs, and hatches in July. It feeds on grubs, and is known by the name of *cus cusi qua tum*. It retires south in winter, when it is frequently seen as far as New York. Our late navigators met with it at Aconalashka. It is now and then seen on the coasts of England, but it

is not common. It is more frequent on the continent, inhabiting Denmark and Russia. In some parts of Siberia it is very common; and it enters the list of those found at Kamtschatka. In breeding-time, it goes far inland to lay its eggs; which are eight or ten in number, and white. After the season is over, the males are said to depart; the females staying behind till the young are able to fly, when the two last go likewise off, but to what part is not certain. It is found in great plenty at Ochotska, especially about the equinox. Fifty or more of the natives go in boats and surround the whole flock, driving them in the flood up the river Ochotska; and, as soon as it ebbs, the whole company fall on them at once with clubs, and often knock so many of them on the head, that each man has twenty or thirty for his share.

6. The *nigra*, or scoter, is totally black, and has a gibbosity at the base of the bill; the tail resembles a wedge; the female is brownish. It is the lesser black diver of Ray, and measures in length twenty-two inches. These birds are found on the northern coasts of England and those of Scotland in the winter season; but no where so common as on the French coasts, where they are seen in prodigious numbers from November to March, especially if the wind be to the north or north-west. Their chief food is a glossy bivalve shell, near an inch long, called by the French *vaimeaux*. These they are perpetually diving after, frequently to the depth of some fathoms; and an usual method of catching them is, by placing nets under the water in such places as the shells are most numerous; by which means thirty or forty dozen of them have been taken in one tide. The day seems to be spent by these birds between diving and flying to small distances over the water, which it does so low as frequently to dip the legs therein. It swallows the food whole, and soon digests the shells, which are found quite crumbled to powder among the excrements. It has been kept tame for some time, and will feed on soaked bread. The flesh tastes fishy to an extreme; on which account it is allowed by the Roman Catholics to be eaten on fast-days and in lent; and indeed must be a sufficient mortification. These birds abound in all the northern parts of the continent, Lapland, Sweden, Norway, and Russia; and are found in great plenty on the great lakes and rivers of the north and east of Siberia, as well as on the sea-shores. It likewise inhabits North America, being met with at New York; and, in all probability, much more to the north on that continent and that of Asia, Osbeck having met with them in thirty and thirty-four degrees south latitude, between the island of Java and St. Paul, in the month of June.

7. The *anser*, *ferus et mansuetus*; or grey lag, and tame goose. The *grey lag*, or *wild goose*, is two feet nine inches in length, and five feet in extent. The bill is large and elevated; of a flesh-colour, tinged with yellow; the head and neck cinereous; breast and belly whitish, clouded with grey or ash colour; back, grey; the legs of a flesh-colour. This species resides in the fens the whole year; breeds there, and hatches about eight or nine young, which are often taken, easily tamed, and esteemed most excellent meat, superior to the domestic goose. Towards winter they collect in great flocks, but in all seasons live and feed in the fens. On the continent they are migratory, changing place in large flocks often 500 or more; in this case, the flock is triangular in shape, with one point foremost; and, as the goose which is first is tired soonest, it has been seen to drop behind, and another to take his place. In very small flocks, however, they are sometimes seen to follow one another in a direct line. Geese seem to be general inhabitants of the globe. The *mansuetus*, is the grey lag in a state of domestication, and from which it varies in colour, though much less so than either the mallard or cock, being ever more or less verging to grey; though, in all cases, the whiteness of the vent, and upper tail coverts, is manifest. It is frequently found quite white, especially the males; and doubts have arisen, which of the two colours should have the preference in point of

eating. Tame geese are kept in great multitudes in the fens of Lincolnshire; a single person will have one thousand old geese, each of which will rear seven; so that, towards the end of the season, he will become possessed of eight thousand. During the breeding season, these birds are lodged in the same houses with the inhabitants, and even in their very bed-chambers: in every apartment are three rows of coarse wicker pens, placed one above another; each bird has its separate lodge divided from the other, which it keeps possession of during the time of sitting. A person called a *gozzard*, i. e. *goose-herd*, attends the flock, and twice a day drives the whole to water; then brings them back to their habitations, helping those that live in the upper stories to their nests, without ever misplacing a single bird. The geese are plucked five times in the year: the first plucking is at Lady-day, for feathers and quills; and the same is renewed, for feathers only, four times more between that and Michaelmas. The old geese submit quietly to the operation, but the young ones are very noisy and unruly. If the season proves cold, numbers of them die by this barbarous custom. Vast numbers of geese are driven annually to London, to supply the markets; among them, all the superannuated geese and ganders, which, by a long course of plucking, prove uncommonly tough and dry. The goose in general breeds only once in a year; but will frequently have two hatches in a season, if well kept. The time of sitting is about thirty days. They will also produce eggs sufficient for three broods, if they are taken away in succession. It is said to be very long-lived, as we have authority for their arriving at no less than 100 years. The common price of geese, in many counties, is regulated by that of mutton, both being the same by the pound, without the feathers. The usual weight of a fine goose is fifteen or sixteen pounds; but it is scarcely credible how far this may be increased, by cramming them with bean-meal, and other fattening diet. The victims destined for this furfeit, are by some nailed to the floor by the webs of the feet, which causes no pain, and is meant to prevent the least possibility of action: to which, we are told, the French add the refinement of putting out their eyes; but what end this last part of barbarity is meant to answer, is hard to conjecture. To what weight they arrive in France, is not said; but we have been well informed, that twenty-eight or even thirty pounds, is no uncommon thing in England.

8. The *bean-geese* is two feet seven inches in length; in extent four feet eleven. The bill, which is the chief distinction between this and the former, is small, much compressed near the end, whitish, and sometimes pale red in the middle, and black at the base and nail: the head and neck are cinereous brown, tinged with ferruginous; breast and belly dirty white, clouded with cinereous; the back of a plain ash colour; feet and legs of a saffron colour; claws, black. This species arrives in Lincolnshire in autumn, and is called the *bean-geese*, from the likeness of the nail of the bill to a horse-bean. They always light on corn-fields, and feed much on the green wheat. They never breed in the fens, but all disappear in May. They retreat to the sequestered wilds of the north of Europe; in their migration they fly to a great height, cackling as they go. They preserve a great regularity in their motions; sometimes forming a straight line; at others, assuming the shape of a wedge, which facilitates their progress through the air.

9. The *erythropus*, or laughing-geese of Edwards, is a native of Europe and America. The length of this species is about two feet four inches, the extent four feet six; the bill is elevated, of a pale yellow colour, with a white ring at the base; the forehead is white; the breast and belly are of a dirty white, marked with great spots of black; and the legs yellow. These visit the fens, and other parts of England, during winter, in small flocks; they keep always in marshy places, and never frequent the corn-lands. They disappear in the earliest spring, and none are seen after the middle of March. Linnæus makes

The Egyptian Goose and Cider Duck.

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J. Page sculp.

this goose the female of the *bernacle*; but Mr. Pennant thinks this opinion not well-founded. The *bernacle* is two feet one inch in length, the breadth four feet five inches; the bill is black; the forehead and cheeks are white; from the bill to the eyes there is a black line; the hind part of the head, the whole neck, and upper part of the breast and back, are of a deep black; the tail is black, the legs are of the same colour, and small. These birds appear in vast flocks during winter, on the north-west coasts of this kingdom: they are very shy and wild; but, on being taken, grow in a few days as familiar as our tame geese. In February they quit our shores, and retire as far as Lapland, Greenland, and even Spitzbergen, to breed. They live to a great age: the Rev. Dr. Buckworth, of Spalding, had one which was kept in the family above thirty-two years, but was blind during the two last; what its age was when first taken, was unknown. These are the birds that about 200 years ago were believed to be generated out of wood, or rather a species of shell that is often found sticking to the bottoms of ships, or fragments of them, and were called *tree-geese*. These were also thought by some writers to have been the *chenalopeces* of Pliny; they should have said *chenerotes*, for those were the birds which that naturalist said were found in Britain; but, as he has scarcely left us any description of them, it is difficult to say which species he intended. Mr. Pennant imagines it to be the following; which is far inferior in size to the wild-geese, and very delicate food, in both respects suiting his description of the *cheneros*.

10. The race-horse, or loggerhead goose, is in length thirty-two inches, and weighs from twenty to thirty pounds. The bill is three inches long, and of an orange colour; the irides are orange, surrounded with black, and then with orange; the head, neck, and upper parts of the body, are of a deep ash-colour; the outer edge of the secondaries white, forming a band of the same on the wing; the under parts of the body dusky down the middle; over the thighs, cinereous blue; vent, white; quills and tail, black; the wings are very short, not reaching to the rump; on the bend of the wing is a yellow knob, half an inch in length; the legs are brownish orange, the webs dusky, and the claws black. These inhabit Falkland Islands, Staaten Land, &c. and were mostly seen in pairs, though sometimes they were observed in large flocks. From the shortness of the wings they were unable to fly; but they made considerable use of them when in the water, on which they seemed as it were to run, at least they swam, with the assistance of the wings used as oars, at an incredible rate, inasmuch that it was a most difficult thing to shoot them while on that element: to catch them, the sailors used to surround a flock with boats, and drive them on shore; where, unable to raise themselves from the ground, they ran very fast; but soon growing tired, and squatting down to rest, were easily overtaken, and knocked on the head. Their flesh was sometimes eaten by the sailors, in defect of that of the bustard goose; but it was not much relished, being rank and fishy, and thought more fit for the hogs, which ate it greedily; and fatted well upon it, boiled.

11. The snow-geese is in length two feet eight inches, and weighs between five and six pounds. The bill is somewhat ferrated at the edges; the upper mandible scarlet, the lower whitish: the general colour of the plumage is snow white, except the first ten quills, which are black, with white shafts; the legs are of a deep red. The young are of a blue colour, till they are a year old. These are very numerous at Hudson's Bay, and called by the natives *way-way*, and *wapa-whi-why*. They visit Severn River in May, and stay a fortnight; but go farther north to breed: they return to Severn Port the beginning of September, and stay till the middle of October, when they depart for the south, and are observed to be attended with their young, in flocks innumerable. At this time many thousands are killed by the inhabitants, who pluck them, and take out the entrails, and, putting the bodies into holes dug in the ground, cover them with earth, which, freezing

above them, keeps them perfectly sweet throughout the severe season; during which, there is no more to do than occasionally to open one of those storehouses, when they find them sweet and good. They seem to occupy also the western side of America. In the summer months, they are plenty on the arctic coast of Siberia, but never migrate beyond longitude 130. They are supposed to pass the winter in more moderate climes, as they have been seen flying at a great height over Silesia; probably on their passage to some other country, as it does not appear that they continue there. In like manner, those of America pass the winter in Carolina. Here they arrive in vast flocks; and feed on the roots of sage and grass. It used to be a common practice in that country, to burn a piece of a marsh, which enticed the geese to come there, as they could then more readily get at the roots, which gave the sportsman opportunity of killing as many as he pleased. This species is the most numerous and the most stupid of all the goose race. They seem to want the instinct of others, by their arriving at the mouths of the arctic Asiatic rivers before the season in which they can possibly subsist. They are annually guilty of the same mistake, and annually compelled to make a new migration to the south in quest of food, where they pass their time till the northern estuaries are freed from the bonds of ice. They have so little of the shyness of other geese, that they are taken in the easiest manner imaginable, about Yakut, and the other parts of Siberia, which they frequent. The inhabitants first place, near the banks of the rivers, a great net, in a straight line, or else form a hovel of skins sewed together. This done, one of the company dresses himself in the skin of a white rein-deer, advances towards the flock of geese, and then turns back towards the net or hovel; and his companions go behind the flock, and by making a noise drive them forward. The simple birds mistake the man in white for their leader, and follow him within reach of their net, which is suddenly pulled down and captivates the whole. When he chooses to conduct them to the hovel, they follow in the same manner; he creeps in at a hole left for that purpose, and out at another on the opposite side, which he closes up. The geese follow him through the first; and, as soon as they are got in, he passes round, and secures every one.

12. The great goose is of a very large size, weighing near twenty-five or thirty Russian pounds. The bill is black; base of it tawny; body, dusky; the under parts are white; the legs, scarlet. It is found in the east of Siberia, from the river Lena to Kamtschatka; and is taken in great numbers, together with the red-necked geese, in glades, as we do woodcocks here, but on a larger scale.

13. The ruficollis, or red-breasted goose, is in length twenty-one inches; weight about three pounds. The bill is small, and brown; the tail black; the irides are yellow brown; round the eyes fringed with brown; fore part of the head and crown black, passing backwards in a narrow stripe quite to the back; on the breast is a narrow band of white feathers with black ends, forming a band of white and another of black; the sides are striped with black; back and wings black, the last even with the tail; legs black. This most elegant of geese, is found to breed from the mouth of the Ob, along the coasts of the icy Sea, to that of the Lena. Its winter quarters are not certainly known. Small flocks are observed in the spring, flying from the Caspian Sea along the Volga northward; and are seen about Zarizyn, between the sixth and tenth of April. They rest a little time on the banks of the Sarpa, but soon resume their arctic course. Their winter retreat is probably in Persia. They are highly esteemed for the table, being quite free from any fishy taste.

14. The casarca, or ruddy goose, is larger than a mallard, and seems even larger than it really is, from the length of wing, and standing high on its legs. The bill is black; the irides yellowish brown; forehead, cheeks, and throat, yellowish; fore part of the neck ferruginous, encircled with a collar of black, inclining to deep rufous

on the throat; the breast and sides are pale rufous; the belly is obscure; the back is pale; the lower part is undulated, hoary, and brown, not very distinct; the rump and tail are greenish black; the legs long and black. This species is found in all the southern parts of Russia and Siberia, in plenty. In winter it migrates into India, and returns northward in the spring. It makes the nest in the craggy banks of the Wolga, and other rivers, or in the hollows of the deserted hillocks or marmots; making it after the manner of the sheldrake, and is said to form burrows for itself in the manner of that bird. It has been known also to lay in a hollow tree, lining the nest with its own feathers. It is monogamous: the male and female sit in turns. The eggs are like those of the common duck. When the young come forth, the mother will often carry them from the place of hatching to the water with her bill. They have been attempted to be domesticated, by rearing the young under tame ducks; but without success, as they are ever wild, effecting their escape the first opportunity; or, if the old ones are taken and confined, they lay their eggs in a dispersed manner, and never sit. The voice is not unlike the note of a clarinet, while flying; at other times they cry like a peacock, especially when kept tame; and now and then cluck like a hen. It is very choice of its mate; for, if the male be killed, the female will not leave the gunner till she has been two or three times shot at. The flesh is very good food.

15. The bernicle, is of a brown colour, with the head, neck, and breast, black, and a white collar. These birds, like the bernacles, frequent our coasts in winter; and are particularly plenty, at times, on those of Holland and Ireland, where they are taken in nets placed across the rivers. In some seasons they have resorted to the coasts of Picardy, in France, in such prodigious flocks, as to prove a pest to the inhabitants; especially in the winter of the year 1740, when these birds destroyed all the corn near the sea-coasts, by tearing it up by the roots. A general war was for this reason declared against them, and carried on in earnest, by knocking them on the head with clubs; but their numbers were so prodigious, that this availed but little: nor were the inhabitants relieved from this scourge till the north wind, which had brought them, ceased to blow, when they took leave. They easily become tame; and, being fatted, are thought to be a delicate food. They breed pretty far north, returning southward in autumn. They fly in the shape of a wedge, like the wild geese, with great clamour. They are called in Shetland, *Horra geese*, from being found in that sound. They are common also in America; breeding in the islands, and along the coast, and feed about high-water mark. Their food consists of plants, such as the small bistort, and black-berryed heath, sea-worms, berries, and the like. They are apt to have a fishy taste, but are in general thought good food. The same fable has been told of this bird as of the bernicle, in respect to its being bred from trees. It is called at Hudson's Bay, *Wetha may pa wew*.

16. The canadensis is brown; its neck and head are black, and the throat is white. It measures three feet and half in length. It is found during the summer in Hudson's Bay, and parts beyond; also in Greenland; and, in the summer months, in various parts of North America, as far as Carolina. Numbers breed at Hudson's Bay, and lay six or seven eggs; but the major part retire still farther north. Their first appearance in the Bay is from about the middle of April to about the middle of May, when the inhabitants wait for them with impatience, being one of the chief articles for food, and many years kill as many as three or four thousand, which are salted and barrelled. Their arrival is the harbinger of spring, and the month is named by the Indians the *goose moon*. The British send out their servants, as well as Indians, to shoot these birds on their passage. It is in vain to pursue them; they therefore form a row of huts made of boughs, at musket-shot distance from each other, and place them in a line across the vast marshes of the country. Each ho-

vel, or, as they are called, *fland*, is occupied by only a single person. These attend the flight of the birds, and on their approach mimic their cackle so well, that the geese will answer, and wheel, and come nearer the stand. The sportsman keeps motionless, and on his knees, with his gun cocked, the whole time; and never fires till he has seen the eyes of the geese. He fires as they are going from him, then picks up another gun that lies by, and discharges that. The geese which he has killed he sets upon sticks, as if alive, to decoy others; he also makes artificial birds for the same purpose. In a successful day a single Indian will kill 200. Notwithstanding every species of goose has a different call, yet the Indians are admirable in their imitation of every one. In this point, however, they must be very careful to secrete themselves; for the birds are very shy, and on the least motion fly off directly. On their return south, which is from the middle of August to the middle of October, much havoc is made among them; but these are preserved fresh for winter store, by putting them, feathers and all, into a large hole dug in the ground, and covering them with mould; and these, during the whole time of the frost's lasting, are found perfectly sweet and good. The Indians at Hudson's Bay call them *api/si/si/si*. This species is now pretty common, in a tame state, both on the continent and in England; on the great canal of Versailles, hundreds are seen mixing with the swans with the greatest cordiality; and the same at Chantilly. In England, likewise, they are thought a great ornament to the pieces of water in many gentlemen's seats, where they are very familiar, and breed freely. The flesh of the young birds is accounted good; and the feathers equal to those of other geese, inasmuch as to prove an article of commerce much in favour of those places where they are in sufficient numbers.

17. The mollissima, or eider-duck, is double the size of the common duck, has a cylindrical bill, and the wax is divided behind, and wrinkled. The feathers, which are very soft and valuable, fall off during incubation. The male is white above, but black below and behind; the female is greenish. This species is found in the Western Isles of Scotland, particularly on Oranfa, Barra, Rona, and Heisker, and on the Farn Isles; but in greater numbers in Norway, Iceland, and Greenland; from whence a vast quantity of the down, known by the name of *eider*, or *edder*, which these birds furnish, is annually imported. Its remarkably light, elastic, and warm, qualities, make it highly esteemed as a stuffing for coverlets. This down is produced from the breast of the birds in the breeding season. It lays its eggs among the stones or plants near the shore; and prepares a soft bed for them, by plucking the down from its own breast; the natives watch the opportunity, and take away both eggs and nest; the duck lays again, and repeats the plucking of its breast: if she is robbed after that, she will still lay; but the drakes must supply the down, as her stock is now exhausted: but, if her eggs are taken a third time, she wholly deserts the place. These birds are not numerous on the isles; and it is observed, that the drakes keep on those most remote from the sitting-places. The ducks continue on their nests till you come almost close to them; and, when they rise, are very slow fliers. The number of eggs in each nest are from three to five, warmly bedded in the down; of a pale olive colour; and very large, glossy, and smooth. They sometimes, however, lay as many as eight; for Van Troil informs us, that no less than sixteen have been found in one nest, with two females, who agree remarkably well together. In America, this bird is found as far south as New York, and breeds on the desert isles of New England; but most common every where to the north. They are said to be constant to the same breeding-places, and that a pair has been observed to occupy the same nest for twenty years together. They take their young on their backs instantly to sea; then dive, to shake them off, and teach them to shift for themselves. It is said, that the males are five years old before they come to their full colour;

colour; that they live to a great age, and will at length grow quite grey. Their food is shells, for which they dive to great depths. They are very numerous in the Esquimaux lands, where, and in Greenland, they are called *metteh*. The natives kill them on the water with darts, striking them the moment they appear after diving; and know the place, from their being preceded by the rising of bubbles. The flesh is said to be much valued.

18. The maula, or scaup-duck, is less than the common duck. The bill is broad, flat, and of a greyish blue colour; the head and neck are black, glossed with green; the breast is black; the back, the coverts of the wings, and the scapulars, are finely marked with numerous narrow transverse bars of black and grey; the legs are dusky. Mr. Willughby acquaints us, that these birds take their name from feeding on scaup, or broken shell-fish; they differ infinitely in colour, so that in a flock of forty or fifty there are not two alike.

19. The moschata, or Muscovy duck of Ray, has a naked papillous face, and is a native of India. It is bigger than the wild duck, being in length two feet. This species is pretty common in a domesticated state in almost every nation; and the breed ought to be encouraged, as there is more flesh on it than the common duck, and of a very fine flavour. The eggs are rounder than those of a duck, and, in young birds, frequently incline to green. They lay more eggs, and sit oftener, than other ducks. In an unconfined state, they make their nest on the stumps of old trees, and perch during the heat of the day on the branches of such as are well clothed with leaves. When kept tame, they are sufficiently docile; and the male will not unfrequently associate and produce a mongrel breed with the common ducks. The name of Muscovy duck was given them from their exhaling a musky odour, which proceeds from the gland placed on the rump in common with other birds.

20. The clypeata, or shoveler of Ray, has the end of its bill broad, rounded, and furnished with a small hook. It is in length twenty-one inches; the female a trifle smaller. Both sexes are apt to vary much in colour: the male likewise differs from the female inwardly, having, just above the divarication of the wind-pipe, where it passes into the lungs, an enlargement, or, as it is called by some, a *labyrinth*. This bird is now and then met with in England, though not in great numbers. It is said to come into France in February, and some of them to stay during the summer. It lays ten or twelve rufous-coloured eggs, placed on a bed of rushes, in the same manner as the summer-teal; and departs in September, at least the major part of them, for it is rare that one is seen in the winter. Their chief food is insects, for which it is continually muddling in the water with its bill. It also is said dexterously to catch flies which pass in its way over the water. Shrimps, among other things, have been found in its stomach on dissection. This species is also found in most parts of Germany; throughout the Russian dominions, as far as Kamtschatka; and in North America, in New York and Carolina, during the winter season. With us it is accounted pretty good food.

21. The strepera, or gad-wall, has the wings variegated with black, white, and red. It inhabits England in the winter months, and is also found at the same season in various parts of France and Italy. It migrates as far as Sweden, as summer advances, in order to breed; and is found throughout Russia and Siberia, except in the eastern part of the last, and Kamtschatka. Being a very quick diver, it is difficult to be shot. It feeds morning and evening only, being hid among the reeds and rushes during the day. The noise it makes is not unlike that of the mallard, but louder. The flesh is good.

22. The clangula, or golden-eye of Ray, is variegated with black and white, and the head is interspersed with blackish green feathers: it has a white spot near the mouth; and the eyes are of a shining gold colour. It is not unfrequent on our sea-coasts in winter, and appears in

small flocks; but passes to the north in spring, in order to breed. It inhabits Sweden and Norway during the summer. It is an excellent diver, and feeds on small shells. It is mostly seen in the water, as it is very awkward in walking. It has been attempted to be domesticated, but seems out of its element on land. With difficulty it can be brought to eat any thing but bread; and the feet soon grew injured, inasmuch as at last to hinder it from walking. The flesh is much esteemed, and the birds are often seen in the markets at the proper season. This species is found in America; in winter, as low as New York; in summer, at Hudson's Bay, where it frequents the fresh-water lakes, and makes in hollow trees a round nest of grass, lined with feathers from its breast; lays from seven to ten white eggs.

23. The meria, or Ural duck of Pallas, is somewhat bigger than the common teal. The bill is large, broad, very tumid above the nostrils, and bifid in the adult bird, the end marked with diverging striæ; colour blue; the head, and part of the neck, are white; on the crown is a large patch of black; the middle of the neck is black; the fore-parts of the body are a yellowish brown, undulated with black; the back is clouded with a cinereous and pale yellow, powdered with brown; the wings are small; the tail longish, wedge-shaped, and black; the legs are brown, on the fore-part bluish, and placed as far back as in the diver genus. This species is not unfrequent in the greater lakes of the Ural mountains, and the rivers Ob and Irtysh. It is not seen on the ground; for, from the situation of its legs, it is unable to walk; but it swims very well and quick; at which time the tail is immersed in the water as far as the rump, serving by way of rudder, contrary to the common method of a duck's swimming. The nest is formed of reeds, and floats, something like to that of the grebe.

24. The American wigeon, (*le canard jensen* of Buffon), is rather larger than our wigeon. The bill is of a lead-colour; the crown and forehead of a yellowish white; the hind-part of the head and neck is black and white, speckled; and behind the eye is a black mark, changing in some lights to green; the back and scapulars are of a pale rust-colour, waved with transverse black lines; in the middle of the wing-coverts there is a large bed of white; the quills and tail are deep brown; the legs dusky. It inhabits North America, from Carolina to Hudson's Bay; but is no where a common bird. It is called at New York the *pheasant duck*. It is more plenty at St. Domingo and Cayenne, where it is called *vingeon* or *gingeon*. At Martinico, great flocks of them often take short flights, from one rice-plantation to another, where they make much havoc, particularly during the rainy season. They are said to perch on trees. They feed in company; and have a centinel on the watch, like some other birds. They are seldom seen during the day, lying hid in places shaded from the sun; but, so soon as that luminary disappears, they come forth from their hiding-places to feed; and, during this, make a particular kind of noise, by which the sportsman is directed in his search after them; at other times, their note is a soft kind of whistle, which is often imitated in order to decoy them within reach of the gun. They sit in January, and in March the young are seen running about. They lay many eggs. Sometimes they are hatched under hens; in which case they are, while young, familiar, though, when grown up, exceedingly quarrelsome with other ducks: their flesh is most excellent, especially such as are brought up tame. They appear upon the coast of Hudson's Bay in May, as soon as the thaws come on, chiefly in pairs: they lay there only from six to eight eggs; and feed on flies and worms in the swamps. They depart in flocks in autumn. They are known by the name of *atheikimo asheep*.

25. The acuta, pin-tail, or sea-pheasant of Ray, has a long acuminate tail, black below, with a white line on each side of the back part of the head. It is a native of Europe. Mr. Hartlib, in the appendix to his *Legacy*,

tells us, that these birds are found in great abundance in Connaught, in Ireland, in the month of February only; and that they are much esteemed for their delicacy.

26. The glacialis, or long-tailed duck, is inferior in size to the former. The bill is short, black at the tip and base, orange-coloured in the middle; the cheeks are of a pale brown; the hind part of the head, and the neck both before and behind, are white; the breast and back are of a deep chocolate colour; the four middle feathers of the tail are black, and two of them near four inches longer than the others, which are white; the legs dusky. These birds breed in the most northern parts of the world, and only visit our coasts in the severest winters. It breeds in Hudson's Bay and Greenland, among the stones and grafs, making its nest, like the eider, with the down of its own breast, which is equal in value to that of the eider, if it could be got in equal quantity; but the species is scarcer. It lays five eggs; swims and dives admirably, and feeds on shell-fish, which it gets in very deep water. It flies irregularly, sometimes showing its back, sometimes its belly. It continues in Greenland the whole year, in unfrozen places; but there are seasons so very severe, as at times to force them towards the south. Those which breed between Lapland and the polar circle, are often driven into Sweden and the neighbourhood of Petersburg; those from the coast of the Icy Sea, as low as latitude 55: but, on the setting-in of frost, they retire still farther south, unless where some open spots remain in the rivers. They visit the fresh-water lakes in the Orkneys in October, and continue there till April. At sun-set they are seen in great flocks, returning to and from the bays, where they frequently pass the night, and make such a noise as to be heard some miles in frosty weather.

27. The ferina, pochard, or red-headed wigeon of Ray, has a lead-coloured bill: the head and neck are of a bright gay colour: the breast and part of the back where it joins the neck, are black: the coverts of the wings, the scapulars, back, and sides under the wings, are of a pale grey, elegantly marked with narrow lines of black: the tail consists of twelve short feathers, of a deep grey colour: the legs are lead-coloured; and the irides of a bright yellow, tinged with red. The head of the female is of a pale reddish brown. With us, these birds frequent the fens in the winter season, and are brought up to the London markets sometimes in considerable numbers, where they are known by the name of *dun birds*, and are esteemed excellent eating. In winter, they pass pretty far to the south, being found in Egypt, about Cairo. They come into France the end of October in small flocks, from twenty to forty; and are found in Carolina in winter. They feed on small fish and shells. Their flight is rapid and strong; but the flocks form no particular shape in flying.

28. The querquedula, gargeny, or first teal of Aldrovandus, has a green spot on the wings, and a white line above the eyes. It frequents the fresh waters of Europe. In many places it is called the *summer teal*.

29. The creca, or common teal, has a green spot on the wings, and a white line both above and below the eyes. It is of a small size, only fourteen inches in length. The teal is frequent in the London markets along with the wild-duck. It is met with in Duddington-loch, a fresh-water lake, within a mile of Edinburgh. In France it stays throughout the year, and makes a nest in April among the rushes, on the edges of ponds; it is composed of the tenderest stalks of them, with the addition of the pith, and a quantity of feathers. The nest is of a large size, and placed in the water, so as to rise and fall with it. The eggs are the size of those of a pigeon, of a dirty white, marked with small hazel spots. It is said to feed on the grafs and weeds which grows on the edges of the ponds which it frequents, as well as the seeds of the rushes; it will also eat small fish. The flesh is accounted excellent. It is found to the north as high as Iceland; and is mentioned as inhabiting the Caspian Sea to the south.

30. The histrionica, or dusky spotted duck of Edwards,

is of a brown colour, variegated with white and blue; it has a double line on the ears and temples; the collar is white, and there is a white streak on the neck. It inhabits from Carolina to Greenland: in the last it frequents, during summer, the rapid rivers, and the most shady parts; nestling on the banks, among the low shrubs. It swims and dives admirably. In winter it seeks the open sea, flies high and swiftly, and is very clamorous. It feeds on shell-fish, spawn, and the larvæ of gnats. Is found in Iceland, and as low as Sondmor. It is common from the lake Baikal to Kamtschatka; and breeds there, as well as every where else, about the most rocky and rapid torrents.

31. The minuta, or little white and brown duck of Edwards, is of a greyish colour, with white ears, and the prime feathers of the wings blackish. This and the former, according to Latham, are found both on the old and new continents. On the first, it is seen as far south as the lake Baikal, and from thence to Kamtschatka, particularly up the river Ochotka; also in Iceland, and as low as Sondmor. In America, it is found from Carolina to Newfoundland, and Hudson's Bay; also in Greenland, where it frequents, during summer, bays and rivers, especially near their mouths; and is a very noisy species. It is fond of shady places, and makes the nest on the shore among the shrubs. Its food is small shells, eggs of fishes, and particularly the larvæ of gnats. It swims well, even in the most rapid streams; and dives to admiration: it likewise flies swift, and to a great height: from which circumstances it is not easily taken. Our late navigators met with it at Aoonalashka. It is pretty frequent in the small rivulets of Hudson's Bay, about ninety miles inland; seldom in large rivers. It lays ten or more white eggs, like those of the pigeon, on the grafs; and the young brood are specked in a very pretty manner. It migrates south in autumn.

32. The boschas, common wild-duck of Ray, or mallard; the intermediate tail-feathers of the drake are turned backward, and the bill is strait. It frequents the lakes of different countries, and feeds upon frogs and several sorts of insects. The wild-ducks pair in the spring; build their nests among rushes near the water, and lay from ten to sixteen eggs. The female is a very artful bird; and does not always make the nest close to the water, but frequently at a good distance from it; in which case the duck will take the young in its beak or between its legs. It is known sometimes to lay the eggs in a high tree, in a deserted magpie's or crow's nest. At moulting-time, when they cannot fly, they are caught in great numbers. They abound particularly in Lincolnshire, the great magazine of wild-fowl in this kingdom; where prodigious numbers are taken annually in the decoys. Birds with flat bills, that find their food by groping, have three pair of nerves that extend to the end of their bills: these nerves are remarkably conspicuous in the head and bill of the wild-duck, and are larger than those of a goose or any other bird yet known: this is the reason they grope for food more than any other bird whatever. The common tame species of ducks take their origin from this, and may be traced to it by unerring characters. The drakes, howsoever they vary in colours, always retain the curled feathers of the tail, and both sexes the form of the bill, of the wild kind. Nature sports in the colours of all domestic animals; and for a wise and useful end, That mankind may the more readily distinguish and claim their respective property. In France this species is not often seen, except in winter; appearing in October, and going north in spring. They are caught in various manners; among the reeds, in decoys, as in England; the chief place for which is Picardy, where prodigious numbers are taken, particularly on the river Somme. It is also customary there to wait for the flocks passing over certain known places, and the sportsman having a wicker cage, containing a quantity of tame birds, lets out one at a time, at a convenient season, which enticing the passengers within gun-shot, five or six are often killed at once by an expert marksman. They are now and then taken also by a hook

ANAS.

Edwards del.

Russ engr.

The Chinese Teal.

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a hook baited with a piece of sheep's lights, which swimming on the water, the bird swallows the bait, and with it the hook. Various other means of catching ducks and geese are peculiar to certain nations; of which one seems worth mentioning from its singularity: the person wishing to take these wades into the water up to the chin, and, having his head covered with an empty calabash, approaches the place where the ducks are; when they, not regarding an object of this sort, suffer the man freely to mix with the flock; after which he has only to pull them by the legs under the water, one after another, till he is satisfied, returning as unsuspected by the remainder as when he first came among them. This method is frequently put in practice on the river Ganges, using the earthen vessels of the Gentoos instead of the calabashes: these vessels are what the Gentoos boil their rice in, and are called *kutchiaree* pots: after these are once used, they look upon them as defiled, and throw them into the river as useless; and the duck-takers find them convenient for their purpose, as the ducks, from constantly seeing these vessels float down the stream, look upon them as objects of full as little regard as a calabash. The above, or some such method, is also practised in China as well as in India. The Chinese, however, though they make great use of ducks, do not prefer the wild sort, being in general extremely fond of tame ones; the major part of which are hatched by artificial heat; the eggs, being laid in boxes of sand, are placed on a brick hearth, to which is given a proper heat during the time required for hatching. The ducklings are fed with little crawfishes and crabs, boiled and cut small, and afterwards mixed with boiled rice; and in about a fortnight flit for themselves, when the Chinese provide them an old step-mother, who leads them where they are to find provender for themselves; being first put on-board a sampane or boat, which is destined for their habitation, and from which the whole flock, often to the amount of three or four hundred, go out to feed, and return at command. This method is used nine months out of twelve, for in the colder months it does not succeed; and is so far from a novelty, that it may be every where seen; but more especially about the time of cutting the rice and gleaming the crop, when the masters of the duck sampans row up and down the river according to the opportunity of procuring food, which is found in plenty, at the tide of ebb, on the rich plantations, as they are overflowed at high water. It is curious to see how the ducks obey their master; for some thousands, belonging to different boats, will feed at large on the same spot, and on a signal given will follow their leader to their respective sampans, without a stranger being found among them. This is still more extraordinary, if we consider the number of inhabited sampans on the Tigris, supposed to be no less than 40,000, which are moored in rows close to each other, with a narrow passage at intervals for boats to pass up and down the river. The Tigris, at Canton, is somewhat wider than the Thames at London, and the whole river is there covered in this manner for the extent of at least a mile.

33. The sponia, or summer-duck of Catesby, is a most elegant species. It has a depending green crest, variegated with blue and white; the back is also variegated with blue and white; the breast is grey, and spotted with white; and the throat is white. It inhabits Mexico, and some of the West-India-isles, migrating in the summer season as far north as forty degrees, or a little beyond. It appears at New York early in the spring, and breeds there; making its nest in the decayed hollows of trees, or such as have been made by woodpeckers; and often between the forks of the branches; and, when the young are hatched, the mother takes them on her back to the water. The flesh is much esteemed by the Americans. This is the species, the neck of which the natives of Louisiana use to ornament their pipes or calumets of peace; and at the last-named place it is found throughout the year. These birds are often kept tame in our menageries, and will breed there.

34. The arborea, or black-billed whistling duck of Ed-

wards, is of a reddish brown colour, with a sort of crest on the head; the belly is spotted with black and white. It is a native of America. Sloane informs us, that this duck perches on trees; that it is about twenty inches long from the end of the bill to the point of the tail; and that it makes a kind of whistling noise, from which circumstance it has received its name.

35. The fuligula, or tufted duck of Ray, has a hanging crest, a black body, and the wings and belly spotted with white. This species is found in Europe as far as Norway. In the winter-months it is not unfrequent in England; being met with in the markets in that season, and is much esteemed. It is common also throughout Russia, going northward to breed. Is frequent in Kamtschatka. The male disappears during the incubation of the female.

36. The *galericulata*, or Chinese teal of Edwards, has a hanging crest; and, on the hinder part of the back, on both sides, there is a crooked, flat, elevated, feather; the crest is green and red; and the back is brown, and spotted with blue; and erect feathers on the back are red and blunt; one edge of the inmost wing-feather, when the wings are shut, is raised over the back, and is red, and like a sickle before. This most singular and elegant species is a native of China and Japan, where it is kept by the inhabitants for the sake of its beauty. It is not so common in China as many other kinds, or perhaps they are politically held dear to the European purchasers: they are frequently exposed to sale at Canton in cages, and the common price is from six to ten dollars per pair. They are not unfrequently brought into England alive; but require care, as they seem more tender than our species. Attempts have been made to breed them in this country, but without success, though they are familiar enough. The bird is known in Japan by the name of *himmodsi*. The English in China give it the name of *mandarin duck*. As it is a singularly curious and elegant species, we have given Mr. Edwards's representation of it, which was copied from the living bird, at Sir Mat. Decker's, at Richmond, Surrey.

ANASAR'CHA, *f.* [from *ana*, through, and *σαρξ*, Gr. flesh.] A species of dropsy. See MEDICINE.

ANASCHOUA'DI, *f.* in botany. See ELEPHANTOPUS.

ANAS'CIS, the son of Castor and Phoebe, had a statue at Corinth, erected in the temple, built in honour of his father.

ANAS'SA, *f.* in botany. See BROMELIA.

ANAS'SUS, or ANAX'US; a river in the territory of Venice; now the *Piave*, which, rising from the mountains of Tyrol, not far from the borders of Carinthia, runs from north to south, through the territories of Cadorina, Belluno, Feltre, and, after running from west to east, through Treviso, falls into the Adriatic, thirteen miles to the south-east of Venice.

ANASTA'SIS, *adv.* [from *αναστημι*, Gr. to cause to rise.] A term among ancient physicians, for a rising up to go to stool. It also signifies the passage of any humour, when expelled from one part, and obliged to remove to another.

ANASTA'SIUS I. emperor of the east, succeeded Zeno in the year 491. The Manicheans and Arians were greatly in hopes of being supported by the new emperor; the former because his mother was their friend; and favoured their sect; the latter because the emperor's uncle was of their opinion: but, if Anastasius did not persecute them (as we do not find he ever did), yet it does not appear that he supported either of these sects. But, in order to maintain the peace of the church, he declared, that such bishops or other clergymen who should disturb the public tranquillity, by maintaining with too much heat either side of the question for or against the council of Chalcedon, should be deprived of their benefices. Accordingly, the disputes concerning Eutychianism running to a very great height, and Euphemius being deeply concerned in them, the emperor expelled him from his see, and chose Macedonius in his stead. The hatred which the different parties entertained against one another occasioned often such

tumults and seditions at Constantinople as threatened the life of the emperor himself; who, to keep the people in awe, ordered that the governor of the city should be present at all church-assemblies and public processions. This was so much the more necessary, because these tumults were chiefly occasioned by a kind of doxology or short hymn which used to be sung at divine service. This doxology consisted only of the following words, Ἄγιος ὁ Θεός, ἅγιος ἰσχυρός, ἅγιος ἀθάνατος, that is, "Holy God, holy the powerful, holy the immortal;" for which reason it was called τριῳαγιος, *trisagius*, "three times holy;" because the word *holy* was therein three times repeated. The orthodox used to sing that hymn without any addition, or by adding only to it, Ἄγια Τριάς, ἐλεησον η̅μ̅ας, i. e. "Holy Trinity have mercy upon us." But Peter the Fuller, bishop of Antioch, pretended to add these words to it, viz. ὁ σωπῶν δι' η̅μ̅ας, i. e. "who hast been crucified for us;" and it was supposed that the first holy related to the Father, the second to the Son, the third to the Holy Ghost, the adding these words, *who hast been crucified for us*, seemed to insinuate that the whole consubstantial Trinity had suffered; for which reason the orthodox were resolved not to admit this addition. Anastasius, desiring to have those fatal words added to that hymn whenever it should be sung at Constantinople, occasioned a terrible sedition in the city, as though the very fundamentals of Christianity had been overthrown. Macedonius and his clergy are said to have raised that sedition, which came to such a height, that the emperor himself was obliged to come, without his crown on his head, and in a most humble manner, to the Circus, where he declared to the people that he was very willing to quit the imperial throne; but he told them at the same time, that they could not all enjoy the sovereign power, which does not admit of a partnership; and that one person still must govern them if he resigned the crown. This discourse had such a power over the raging multitude, that, as if they had been divinely inspired, they immediately requested the emperor to take up his crown, promising that they would be quiet and obedient for the future. As to the civil government of Anastasius, it is confessed that at the beginning of his reign he shewed himself a very good prince; he eased the people of a very heavy tax called *chrysargyrum*, under which they had groaned for a long time; he prohibited the fighting of wild beasts; he raised several buildings; and he avoided war. He reigned twenty-seven years; and died July 10, 518, in the eighty-eighth year of his age.

ANASTASIUS, surnamed *Bibliothecarius*, a Roman abbott, library-keeper of the Vatican, and one of the most learned men of the ninth century, assisted in 869 at the fourth general council, the acts and canons of which he translated from the Greek into Latin. He also composed the lives of several popes, and other works; the best edition of which is that of the Vatican.

ANASTA'TICA, *f.* [ἀναστατικός, Gr. from its quality of reviving in water.] In botany, a genus of the tetradynamia filiculosa class, ranking in the natural order of siliquosæ or cruciformes. The generic characters are—Calyx: perianthium four-leaved, deciduous; leaflets ovate-oblong, concave, erect, deciduous. Corolla: tetrapetalous, cruciform; petals roundish, flat, spreading; with claws nearly the length of the calyx, but more spreading. Stamina: filaments six, subulate, the length of the calyx, form erect spreading; antheræ roundish. Pistillum: germ bifid, very small; style subulate, the length of the stamens, permanent; stigma capitate. Pericarpium: a very short silicle; partition ending in a subulate point, oblique, and longer than the silicle itself; the valves parallel, making a cell of the lower half, but standing out from the upper, rounded, concave, gaping, oblique, hence having the form of a sheep's hoof. Seeds: solitary, roundish.—*Essential Character.* Silicle retuse, crowned at the edge with valves, twice as long as the partition; style intermediate, pointed, oblique; cells one-seeded.

Species. 1. *Anastatica hierochuntica*, or common *anastatica* or rose of Jericho: leaves obtuse; spikes axillary, very short; filicles hooped, thorny. This plant grows naturally on the coasts of the Red Sea; in Palestine and near Cairo, in sandy places. The stalks are ligneous, though the plant is annual; it rises five or six inches high, dividing in many irregular branches. The flowers, which are small and white, are disposed in short spikes at the wings of the stalks, and have little beauty; these are succeeded by short prickly pods, having two cells, in each of which are two seeds. It is preserved in botanic gardens for the variety, and in some curious gardens for the oddness, of the plant, which, if taken up before it is withered, and kept entire in a dry room, may be long preserved; and, after being many years in this situation, if the root is placed in a glass of water a few hours, the buds of flowers will swell open, and appear as if newly taken out of the ground.

2. *Anastatica Syriaca*, or Syrian *anastatica*: leaves acute, spikes longer than the leaf, filicles ovate, beaked. It is a native of Austria, Stiria, Carniola, Syria, and Sumatra; and was introduced in 1788 by M. Thouin. Flowers in May and June.

Propagation and Culture. These plants being annual can only be propagated by seeds, which rarely ripen in England, unless they be sown on a hot-bed in the spring, and the plants afterward put into pots, which should be plunged into another hot-bed to bring them forward; for, although the seeds will come up in the full ground where the soil is dry, yet the plants rarely rise to any size, nor do they perfect seeds unless the summer is very hot and dry: but, if the plants are kept in a frame, giving them free air in warm weather, they will flower in June, and the seeds will ripen in September.

ANASTOICHEIOSIS, *f.* [from ἀνείησις, Gr. a principle, or element, of which bodies are composed.] A wasting of the solids or fluids of the body.

ANASTOMOSIS, *adv.* [from ἀναστομω, Gr. or ἀνα, *per*, and στομα, a mouth, also *exanastomosis inosculatio*.] To relax or open the mouths of the vessels. The opening of the mouths of the vessels to discharge their contained fluids. Anatomists use the word to express the inosculatio of the arteries and veins, or their running into one another. The menes, &c. discharged, are said to be discharged per *anastomosis*, i. e. by opening the mouths of the vessels. The blood transuding through the sides of the vessels, the discharge is said to be per *diapedesis*, transudation. If the vessels are corroded by acrid humours, the discharge is by *diabrosis*, erosion.

ANASTOMATICS, *f.* Medicines supposed to have the power of opening the mouths of the vessels, and promoting the circulation; such as deobstruent, cathartic, and sudorific, medicines.

ANASTROPHE, *f.* [ἀνατροπή, Gr. of ἀνα and τρεφω, to turn.] In rhetoric and grammar, denotes the inversion of the natural order of the words: such is, *saxa per et scopulos*, for *per saxa et scopulos*.

ANASTROUS SIGNS, *f.* in astronomy, a name given to the *duodecatemoria*, or the twelve portions of the ecliptic, which the signs possessed anciently, but have since deserted by the precession of the equinox.

ANASUS, or ANISUS, now the *Ens*, a river of Germany; which, rising on the borders of the territory of Salzburg, then separating Upper Stiria from Upper Austria, and washing the town of Ens, falls, at the distance of a mile below it, into the Danube, in a course from south to north.

ANATHEMA, *f.* [anatheme, Fr. of ἀνάθημα, of ἀνατίθημι, Gr. to renounce or give up to.] Among ecclesiastical writers, it imports whatever is set apart, separated, or divided; but is most usually meant to express the cutting off a person from the privileges of society and communion with the faithful. The anathema differs from excommunication in the circumstances of being attended with curses and execrations. It was practised in the primitive

motive church against notorious offenders; and the form of that pronounced by Senecius against Andronicus is as follows: "Let no church of God be open to Andronicus, but let every sanctuary be shut against him. I admonish both private men and magistrates to receive him neither under their roof nor to their table; and priests more especially, that they neither converse with him living, nor attend his funeral when dead." Several councils have also pronounced anathemas against such as they thought corrupted the purity of the faith; and their decisions have been conceived in the following form: *Si quis dixerit, &c. anathema sit.* There are two kinds of anathemas, the one judiciary and the other abjuratory. The former can only be denounced by a council, a pope, or a bishop; the latter makes a part of the ceremony of abjuration, the convert being obliged to anathematize the heresy he abjures.

ANATHEMA, in heathen antiquity, was an offering or present made to some deity, and hung up in the temple. Whenever a person left off his employment, it was usual to dedicate the tools to the patron deity of the trade. Persons too who had escaped from imminent danger, as shipwreck and the like, or had met with any other remarkable instance of good fortune, seldom failed to testify their gratitude by some present of this kind.

ANATHEMA'TICAL, *adj.* That which has the properties of an anathema; that which relates to an anathema.

ANATHEMA'TICALLY, *adv.* In an anathematical manner.

To ANATHEMATIZE, *v. a.* To pronounce accursed by ecclesiastical authority; to excommunicate.—They were therefore to be *anathematized*, and, with detestation, branded and banished out of the church. *Hammond.*

ANA'THOTH, a village of Palestine, very near Jerusalem, about three miles and a half to the north; the ruins of which are still to be seen. It was the birth-place of the prophet Jeremiah, and one of the Levitical towns in the tribe of Benjamin.

ANATIFERA CON'CHA, *f.* the trivial name of a species of the *lepas*, a testaceous animal. See *LEPAS*.

ANATIFEROUS, *adj.* [from *anas* and *fero*, Lat.] Producing ducks. Not in use.—If there be *anatiferos* trees, whose corruption breaks forth into barnacles; yet, if they corrupt, they degenerate into maggots, which produce not them again. *Brown.*

ANA'TOCISM, *f.* [*anatocismus*, Lat. of *ανατοκισμος*, Gr. of *ανα* and *τοκος*, usury.] An usurious contract, wherein the interests arising from the principal sum are added to the principal itself, and interest exacted upon the whole. *Anatocisin* is what we properly call *interest upon interest*, or *compound interest*. This is the worst kind of usury, and has been severely condemned by the Roman law, as well as by the common laws of most other nations.

ANATO'MICAL, *adj.* Relating or belonging to anatomy.—When we are taught by logic to view a thing completely in all its parts, by the help of division, it has the use of an *anatomical* knife, which dissects an animal body, and separates the veins, arteries, nerves, muscles, membranes, &c. and shews us the several parts which go to the composition of a complete animal. *Watts.*—Proceeding upon principles taught in anatomy; considered as the object of anatomy.—There is a natural involuntary distortion of the muscles, which is the *anatomical* cause of laughter; but there is another cause of laughter, which decency requires. *Swift.*—Anatomized; dissected; separated.—The continuation of solidity is apt to be confounded with, and, if we will look into the minute *anatomical* parts of matter, is little different from, hardness. *Locke.*

ANATO'MICALLY, *adv.* In an anatomical manner; in the sense of an anatomist; according to the doctrine of anatomy.—While some affirmed it had no gall, intending only thereby no evidence of anger or fury, others have construed *anatomically*, and denied that part at all. *Brown.*

ANA'TOMIST, *f.* [*anatomiste*, Fr. *anatomicus*, Lat. of *ανατομικος*, Gr.] He that studies the structure of animal bodies, by means of dissection; he that divides the bodies of animals, to discover the various parts.—*Anatomists* adjudged, that if nature had been suffered to run her own course, without this fatal interruption, he might have doubled his age. *Howel.*

To ANA'TOMIZE, *v. a.* [of *ανατεμνω*, Gr. to cut up; *anatomiser*, Fr.] To dissect an animal; to divide the body into its component or constituent parts.—Our industry must even *anatomize* every particle of that body, which we are to uphold. *Hooker.*—To lay any thing open distinctly, and by minute parts.—I speak but brotherly of him, but should I *anatomize* him to thee as he is, I must blush and weep, and then must look pale and wonder. *Shakespeare.*

Then dark distinctions reason's light disguis'd,
And into atoms truth *anatomiz'd*. *Denham.*

ANATOMY.

ANATOMY, *f.* [from *ανατομη*, Gr. of *ανα*, through, *περνω*, to cut.] The art of dissecting an animal, especially the human body, in order to demonstrate the matter, shape, structure, connection, and situation, of the parts; this, though it does not teach to cure, hath a tendency to make the cure proceed both more safely and agreeably. In short, whatever perfection the art of healing might have risen to, by the aid of practical experiments and observation, it cannot be denied that its greatest lights were received from anatomy and physiology. To know the peculiar structure of each part, its use, what functions it performs, what connection it hath with other parts, and influence on them, whether near or remote, are advantages too obvious to be denied. The greatest geniuses have found that their enquiry cannot be too minute in this branch of physic; and the most eminent professors and practitioners have in consequence become more laudably emulous to encrease their knowledge and acquaintance therein.

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The human body is composed of firm and liquid parts, commonly called *solids* and *fluids*. The solid parts are the chief subject of anatomy properly so called; by which term we understand not only an artful decomposition of the parts of the body, but also a methodical demonstration and description of the several parts when dissected. The history of the fluid parts comes into a system of anatomy only occasionally; because it properly belongs to what is called *physiology*, or the *animal economy*.

Anatomists ordinarily reduce all the solid parts under certain general classes, expressed by the common or general names of *bone*, *cartilage*, *ligament*, *fibre*, *membrane*, *vessel*, *artery*, *vein*, *nerve*, *muscle*, *gland*, *fat*, *viscus*, *organ*, &c. These terms are anatomical words, which express several parts that have nearly the same structure to outward appearance; and, as they are often mentioned, we shall here give a brief explanation of them.

A *bone* is that hard, solid, and most inflexible, part of the body, which assists in forming the great frame-work

of the human machine. All bones are covered by a membrane, named on that account *periosteum*; and except where muscles, cartilages, or ligaments, are inserted into the periosteum, its external surface is connected to the surrounding parts by thin cellular membranes, which can easily be stretched considerably, but shorten themselves whenever the stretching force is removed. When these membranes are cut off or broken, they collapse into such a small space, that the surface of the periosteum seems smooth and equal.

The *internal periosteum* is an extremely fine membrane lining the inside of the bone. It hath processes entering into the transverse pores of the bones, where probably they are continued to form the intermediate canals for the marrow distributed through the substance of the bones; and along with them vessels are sent, as from the external periosteum, into the bone. These processes being of a very delicate texture, the adhesion of this membrane to the bone is so small, that it separates commonly more easily from the bone than from the marrow which it contains: wherefore one might call it the common membrane of the marrow, rather than by the name it now has. But whether the one or the other designation ought to be given it, is not worthy a dispute.

The *marrow* is the oily part of the blood, separated by small arteries, and deposited in these cells. Its colour and consistence may therefore vary according to the state of the vessels, and their distribution on the membranes of the cells. The marrow is bloody in children, oily and balmy in middle age, and thin and watery in old people. By experiments made on the marrow when bones of living animals are opened or cut through, and from the racking pain with which suppurations within bones are frequently attended, we have sufficient proof that the membranes here are sensible, and consequently have nerves distributed to them. Hippocrates might therefore say justly, that a wound penetrating into the cavity of a bone may produce a delirium.

Cartilages are solid, smooth, white, elastic, substances, between the hardness of bones and ligaments, and covered with a membrane, named *perichondrium*; which is of the same structure and use to them, as the periosteum is to the bones. While cartilages are in a natural state, it is to be remarked, 1st, That they have no cavity in their middle for marrow. 2dly, That their outer surface is softest, which renders them more flexible. 3dly, That they do not appear to change their texture near so much by acids, as bones do. And, lastly, That as the specific gravity of cartilages is near a third less than that of bones; so the cohesion of their several plates is not so strong as in bones; whence cartilages, laid bare in wounds or ulcers, are not only more liable to corrupt, but exfoliate much sooner than bones do.

Ligaments are white flexible bodies, thicker and firmer than membranes, and not so hard or firm as cartilages, without any remarkable cavity in their substance, difficultly stretched, and with little elasticity; serving to connect one part to another, or to prevent the parts to which they are fixed from being removed out of that situation which is useful and safe. Authors generally say that ligaments are insensible; and consequently it may be inferred, that they have no nerves bestowed on them. But the violent racking pain felt on the least motion of a joint labouring under a rheumatism, the seat of which disease seems often to be in the ligaments, and the insufferable torture occasioned by incisions of ligaments, and by a collection of acrid matter in a joint, or by tophi in the gout, persuade us that they are abundantly supplied with nerves. Part of the capsular ligaments is composed of the periosteum, continued from one bone to another, and their internal layer is continued on the parts of the bone or cartilage which the ligament includes. Besides these common capsular ligaments of the joints, there are particular ones in several places, either for the firmer connection of the articulated bones, or for restraining and confining the mo-

tion to some one side; such are the *cross* and *lateral* ligaments of the knee, the *round* one of the thigh, &c.

Synovia is the liquor which principally serves to moisten the ligaments and cartilages of the articulations, and is supplied by glands, which are commonly situated in the joint, after such a manner as to be gently pressed, but not destroyed by its motion. By this means, when there is the greatest necessity for this liquor, that is, when the most frequent motions are performed, the greatest quantity of it must be separated. These glands are soft and pappy, but not friable: in some of the large joints they are of the conglomerate kind, or a great number of small glandules are wrapt up in one common membrane. Their excretory ducts are long, and hang loose, like so many fringes, within the articulation; which, by its motion and pressure, prevents obstructions in the body of the gland or its excretories, and promotes the return of this liquor, when fit to be taken up by the absorbent vessels, which must be in the joints, as well as in the other cavities of the body; and, at the same time, the pressure on the excretory ducts hinders a superfluous unnecessary secretion, while the fimbriated disposition of these excretories does not allow any of the secreted liquor to be pushed back again by these canals towards the glands. Very often these fountains of slimy liquor appear only as a net-work of vessels. Frequently they are almost concealed by cellular membranes containing the fat; and sometimes small simple mucous folliculi may be seen. The different joints have these organs in different numbers and sizes: the conglomerate ones do not vary much, especially as to situation, in the similar joints of different bodies; but the others are more uncertain.

The name of *fibre* is given to small filaments, which appear to be the most simple parts of the body, and which, by their different disposition and connections, compose all the other parts. The fibres differ in substance, being either membranous, fleshy, tendinous, or bony; in direction, being either straight, oblique, longitudinal, transverse, circular, or spiral; and in size, being either large, small, long, or short.

By *membrane*, we understand a pliable texture of fibres interwoven or disposed together in the same plane. They differ in thickness, according to the smallness of their fibres and number of their planes. These particular planes are termed *laminae*, and are distinguished into external, internal, middle, &c. The difference of membranes in general depends on that of the fibres, of which they are composed. Small portions of membranes, especially when they are very thin, are called *pelliculae*; and some membranous laminae are united together by the intervention of a particular substance, composed of this sort of pellicles, and called the *cellular* or *spongy substance*.

By *vessels* are meant tubes, ducts, or canals, more or less flexible, composed of different membranes, the frata of which are generally termed *tunica* or *coats*. Some of them are divided into branches, and these again into rami and ramifications, which gradually diminish, but still remain hollow. The general design of the vessels is to contain fluids; from the diversity of which they are distinguished into blood-vessels, vasa lactea, lymphatica, &c. The last and smallest extremities of all sorts of vessels are generally termed *capillaries*. The *blood-vessels* are of two kinds; one of which receives the blood from the heart, and distributes it to all the parts of the body, and are named *arteries*; the other brings the blood back again from all parts to the heart, and are called *veins*; and some of these have the name of *sinuses*. The arteries are thicker than the veins, and may be distinguished by this mark in dissected dead bodies; and in living bodies they are known by a certain beating called the *pulse*. The trunks of the veins lie nearer the surface of the body than the arteries, and are furnished with valves, that is, with small membranous sacculi, fixed at different distances to the sides of their cavities. The openings of these valves are broad, and turned toward the heart; but their bottoms are turned the contrary

contrary way. In some places these valves are single, in others double, triple, &c.

By *nerves*, anatomists mean the white ropes which proceed from the cerebrum, cerebellum, and spinal marrow, and are spread over all the parts of the body by filaments and ramifications. Each nervous rope may be considered as a membranous vessel, the cavity of which is filled by a great number of membranous longitudinal septa, and by medullary filaments which lie between the septa.

Muscles are bundles of fibres, called by anatomists *fibræ motrices*, of a reddish colour, and of different lengths. The middle portion of the moving fibres is the principal, and differs from the extremities in being red, thick, soft, and capable of contraction. This middle portion of each moving fibre is said to be fleshy, and forms what is properly called *flesh*. The extremities are called *tendinous*, and the substance formed by them *tendons*.

Glands are clusters or molecule, distinguishable from all the other parts of the body by their form, consistence, texture, and connection. They are, in general, composed of arteries, veins, nerves, and other particular vessels, and of a substance which unites all these together in their different folds, contortions, and intertextures, all invested by a membranous covering. The office of glands is to separate from the mass of blood, by means of certain secretory vessels, fluids, which they discharge, either immediately or by other vessels termed *excretory*; and these fluids are either accumulated in particular reservoirs, collected in the common cavities, or forced out of the body.

Fat and *marrow* are equivocal terms. By the first we generally understand an oily, soft, white, or yellowish, substance, of different consistences, collected between the skin and the muscles, in the interstices of the muscles about the viscera, &c. and composed partly of a cellulous or spongy substance, purely membranous, and partly of an oily matter of different thickness. This oily matter is called *fat*, especially when separated from the cellulous substance, and likewise *corpus adiposum* by anatomists. Marrow differs from fat only in the fineness of the membranous texture, in the subtility of the oily matter, and its situation within the bones.

By *viscera*, we commonly understand parts contained in a great cavity, without being connected to it through their whole extent or circumference. Such are the stomach, intestines, &c. in the abdomen; and the lungs in the thorax. *Organ* or *instrument* is a term given to every part capable of any function, whether it be simple or complex; and in this sense we say, organ of sight, respiration, &c.

The *HUMAN BODY* is commonly divided into the *head*, *trunk*, and *extremities*. The trunk is again subdivided into the *neck*, *thorax*, and *abdomen*; and the extremities into *superior*, called the *arms*, and *inferior*, called the *legs*. The ancients divided the body into the three great cavities, which they termed *venters*, and into four extremities. They called the head the *upper venter*, the thorax the *middle venter*, and the abdomen the *lower venter*. The neck was by some joined to the head; by others, to the thorax. But the most natural and plainest division of the body, is into the head, neck, thorax, abdomen, arms, and legs; each of which portions may afterwards be subdivided. Each portion is to be examined not only with regard to its surface or external conformation, but also with regard to its internal structure or composition, and to the viscera or organs which it contains or supports. This is what gave occasion to the antients to divide the body into parts containing and parts contained; and to subdivide the containing parts into common and proper. The common containing parts have been named *integuments*, by which they meant chiefly the skin and fat.

The *head*, viewed on the outside, is divided into the *hairy scalp* and *face*. The inner parts of the head are surrounded by the bones of the cranium. The *hairy scalp* covers the upper part of the os frontis, the ossa parietalia, the os occipitis, and the upper and lower portions of the ossa temporum. The uppermost part of the hairy scalp is

termed the *vertex* or *fontanella*; the back part *occiput*; the lateral parts the *temples*. The vertex is known from the occiput by contorted hair, and from the temples by the ears.

The *face* comprehends all that portion of the surface of the head which lies between the hairy scalp and the neck, viz. the forehead, eyebrows, palpebræ, eyes, nose, mouth, chin, cheeks, and ears. The external parts of the *eye* are: the anterior portion of the globe of the eye, the membrana conjunctiva, the cornea lucida, caruncula lachrymalis, angles of the palpebræ, and the cilia, or hairs of each palpebra. The internal parts are: the globe of the eye, the iris and pupil, the tunica sclerotica or cornea opaca, the choroides, arachnoides, crystalline, vitreous humour, aqueous humour, the anterior and posterior chambers, the muscles, and the optic nerve. The external parts of the *ear* are: the great concha, the convex side of this concha or hinder part of the ear, the great border, the fold or helix, the concavity, the broad eminence or antihelix, the small anterior eminence or tragus, the small posterior eminence or antitragus, the lobe or lower extremity of the ear, and the meatus. The external parts of the *nose* are: the upper extremity or root of the nose, the arch or back, the sides of that arch, the tip of the nose, the alæ, the nares, and the septum narium. The internal parts are, the cavity and bottom of the nares, the convolutions, the maxillary, sphenoidal, frontal, and ethmoidal, sinuses. The external parts of the *mouth* are: the lips, one upper, the other lower, the angles or commissures of the lips, the border or edge of each lip, the fossula which runs from the septum narium to the edge of the upper lip, and the transverse fold which separates the upper lip from the chin. The internal parts of the *mouth* are, the palate, the septum palati, the uvula; the amygdalæ, gums, fræna of the lips, the tongue, its apex, roots, sides, and frænum. The other internal parts of the mouth, eye, nose, and ear, such as the glands, membranes, muscles, nerves, veins, &c. must be referred to the particular descriptions of these parts. The *cheeks* are the lateral parts of the face, reaching downward from the eyes and temples, between the nose and ears. The upper prominent part of the cheek is commonly termed *mala*. The *chin* is the anterior protuberance, by which the lower part of the face is terminated, from whence it runs all the way to the neck. The under part of the chin is termed the *basis*; and it is distinguished from the throat by a transverse fold, which reaches from ear to ear. In the middle of the chin there is sometimes a fossula or depression.

The *cranium* comprehends all that portion of the head which reaches from the upper part of the orbit to the upper and back part of the neck; at the sides it extends as low as the passages into the ears. It is lined internally by the dura mater, and divided by a process of that membrane into a large upper cavity and a small under one. The upper cavity contains the cerebrum, the under one contains the cerebellum and the medulla oblongata.

The *neck*, in general, is divided into the anterior part or throat, and posterior part or nape. The throat begins by an eminence, and terminates by a fossula. The nape begins by a fossula, which, as it descends, is gradually lost. The neck contains the larynx, a part of the trachea arteria, the pharynx, a part of the œsophagus, and a portion of the medulla spinalis.

By the *thorax* we commonly understand all that part of the body which answers to the extent of the sternum, ribs, and vertebræ of the back, both outwardly and inwardly. The thorax is divided into the anterior part, called commonly the *breast*; the posterior part, called the *back*; and the lateral parts, called the *right* and *left sides*. The external parts of the thorax, besides the skin and membrana adiposa, are principally the mammae, and the muscles which cover the ribs and fill the spaces between them. In the mammae we see the papillæ or nipples, and a small coloured circle which surrounds them. The internal parts of the thorax are contained in the large cavity of that portion of the trunk which the ancients called the *middle venter*;

but

but the moderns name it simply the *cavity of the breast*. The cavity is lined by a membrane named *pleura*, and divided into two lateral cavities by a membranous septum named *mediastinum*, which is a production or duplicature of the *pleura*. These parts are the heart, pericardium, trunk of the aorta, beginning of the carotid and subclavian arteries, the superior portion of the descending aorta, the intercostal arteries, the vena cava superior, vena azygos, termination of the subclavian veins, a portion of the *aspera arteria*, and of the *œsophagus*; the *ductus lacteus* or *thoracicus*, the lungs, pulmonary artery, pulmonary veins, &c. The cavity of the thorax is terminated downward by the diaphragm, which parts it from the abdomen.

The *abdomen* begins immediately under the thorax, and terminates at the bottom of the pelvis of the *ossa innominata*. Its circumference or outer surface is divided into regions; of which there are three anterior, viz. the epigastric or superior region, the umbilical or middle region, and the hypogastric or lower region. There is but one posterior region, named *regio lumbaris*. The *epigastric region* begins immediately under the appendix *eniformis* at a small superficial depression called the *pit of the stomach*, and in adult subjects ends above the navel at a transverse line supposed to be drawn between the last false ribs on each side. This region is sub-divided into three parts, *epigastrium*, already named; and two lateral regions, termed *hypochondria*. The epigastrium takes in all that space which lies between the false ribs of both sides, and the hypochondria are the places covered by the false ribs. The *umbilical region* begins in adults above the navel, at the transverse line already mentioned; and ends below the navel at another transverse line, supposed to be drawn parallel to the former, between the two *cristæ* of the *os ilium*. This region is likewise divided into three parts; one middle, which is properly the *regio umbilicalis*; and two lateral, called *ilia* or the *flanks*; and they comprehend the space between the false ribs and upper part of the *os ilium* on each side. The *hypogastric region* is extended downward from the inferior limit of the umbilical region, and is divided into three parts; one middle, called *pubis*; and two lateral, called *inguina* or the *groins*. The *lumbal region* is the posterior part of the abdomen, and comprehends all that space which reaches from the lowest ribs on each side, and the last vertebra of the back, to the *os sacrum* and neighbouring parts of the *os ilium*. The lateral parts of this region are termed the *loins*, but the middle part has no proper name in men. Lastly, the bottom of the abdomen, which answers to the pelvis of the skeleton, is terminated anteriorly by the *pudenda* or parts of generation; and posteriorly by the *clunes* or buttocks, and anus. The buttocks are separated by a fossa, which leads to the anus, and each buttock is terminated downward by a large fold which distinguishes it from the rest of the thigh. The space between the anus and parts of generation is called *perinaum*; and is divided into two equal lateral parts by a very distinct line, which is longer in males than in females. The cavity of the abdomen, formed by the parts already mentioned, and covered by the skin and *membrana adiposa*, is lined on the inside by a particular membrane, called *peritoneum*. It is separated from the cavity of the thorax by the diaphragm, and terminated below by the *musculi levatores ani*. This cavity contains the stomach and the intestines; which are commonly divided into three final portions, named *duodenum*, *jejunum*, and *ileum*; and three large, called *cæcum*, *colon*, and *rectum*. It contains likewise the mesentery, mesocolon, omentum, liver, gall-bladder, spleen, pancreas, glands of the mesentery, *vasa lactea*, *receptaculum chyli*, kidneys, renal glands, ureters, bladder, and the internal parts of generation in both sexes.

The whole *arm* is divided, as in the skeleton, into the shoulder, the arm properly so called, the fore-arm, and the hand. To these we must add the shoulder, the axilla or arm-pit, the elbow, the fold of the arm, and the hollow of the hand. What is called the shoulder, is formed by

the fleshy belly of the *musculus deltoideus*; and the axilla, by the corresponding edges of the *pectoralis major* and *latissimus dorsi*. The elbow answers to the *olecranon*; the fold of the arm is on the fore-side of the articulation of the *os humeri*, with the bones of the fore-arm, and the hollow of the hand is in the middle of the palm.

The *lower extremities* of the whole body are divided into the thigh, leg, and foot. The *thigh* begins anteriorly on one side of the fold of the groin; and posteriorly, a little above the lower half of the buttock. It terminates anteriorly at the patella on the knee, and posteriorly at the poples or ham. It is formed chiefly by the muscles which surround the *os femoris*. The *leg* has but very few muscles on the fore-part, but a great many large ones behind; where the *gastrocnemii* and *soleus* form a kind of belly, called the *calf of the leg*. The leg begins anteriorly at the knee below the patella, and posteriorly at the poples; and it terminates below at the ancles. The convex part of the foot, near its articulation with the leg, is termed the *neck of the foot*; and the under part, which is the basis of the whole lower extremity, the *sole of the foot*. The fleshy parts are more considerable on the foot than on the hand.

Thus the human system is made up of a variety of parts formed of matter apparently under very different kinds of modification; and these constitute a whole, the different parts of which are susceptible of various degrees of impressions from powers, to the action of which they are subjected. This entirely arises from the mode of their organization. The bones, from the nature of their fabric, are perhaps less susceptible of the action of powers applied to them, than any other part of the system; they appear designed to form the basis of the body; they support the soft parts; they defend and contain the more delicate and noble organs. Though liable to disease, they are not subject to injury like the other parts; and even after death, that rapid and spontaneous decomposition does not take place in them which we perceive in the rest of the system. They may be exposed for ages, without losing their original form; and they seem to bear a considerable analogy to inorganised matter.

Anatomical research, however, fully proves, that bone is as truly organised matter as any other part of the body. This indeed is a conclusion which we might have drawn *a priori*, from the consideration, that inorganised matter could not possibly form a part of an animated system. The anatomist proves the truth of the assertion. He shews that the bones are supplied with blood-vessels, as well as the fleshy parts. He exhibits their structure, and points out their periods of growth and decay, which can only be effected by the action of depositing and absorbing vessels; and in short, fully proves, that they are as truly organised matter as the rest of the body. But their organisation is so constituted, as to be exactly fitted for the purpose they are destined to serve. In fact, we observe, that bones are formed of a system of vessels, in the interstices of which, a seemingly earthy matter, mixed with mucus, is deposited. This earthy matter, which gives hardness and strength to the bones, is in reality inorganised and dead matter, a true phosphate of lime, liable to no alteration when separated from the body, excepting by the operation of the laws of chemical attraction. The bones are also supplied with nerves. They may be observed, in small threads, entering into the substance of the bones. Small nerves may also be seen entering into each bone, along with its nutritious vessels; and in some cases we observe them passing through large holes in bones, as the nerves which go into the jaws to supply the teeth. But, notwithstanding that anatomists can demonstrate the existence of nerves in the bones, yet the fact has been doubted, because the bones seem insensible to pain. It is true, the periosteum may be scraped from a bone, a bone may be cut through, as in amputation, or in the operation of trepanning, or caustics may be applied to bone; and the patient, in all these cases, scarcely feels pain. It must, however, be admitted, that bone, even in the

the healthy state, possesses a low degree of sensibility. The actual cautery, which, in former periods, was much employed by surgeons, is known to produce a sensation in the bone, though said to be rather pleasant than painful. This, however, is a sufficient proof, that the bones are not absolutely incapable of feeling. But the sensibility of bone is sufficiently obvious in the diseased state: injuries of various kinds will excite inflammation in it, as well as in the soft parts; and we observe the same phenomena produced in both. An increased determination of blood to the part swelling, a spongy looseness of texture, suppuration, and ulcer, take place in bone, in a manner precisely similar to what we observe in the soft parts. And, as in the latter the organization is destroyed, so also in the former we observe the bone eroded, and discharged by ulceration. During the progress of such a disease, the sensibility of the bone is astonishingly increased. Thus in the parts which possess the most acute feeling, we observe the sensibility increased by disease. In like manner the bones, ligaments, bursæ, and other parts, in which, during health, the feeling is scarcely perceptible, become, by disease, extremely sensible, so as to give the most exquisite pain in many cases, superior to what is experienced in a similar disease of the soft parts.

In every view that we can take of the subject, bone appears to be as perfectly organized matter as any other part of the body. It receives its share of the sanguiferous and absorbent vessels; it is supplied with nerves, and by all of them is immediately and intimately connected with the system at large. It is produced by the animalizing process; it is liable to disease and death; it is susceptible of impressions from stimuli; and by their operation is excited to action. Thus the bones are constructed upon a plan admirably calculated for the purpose they are intended to serve in the body. In order to give them hardness and inflexibility, they are chiefly composed of an earthy salt. This salt is deposited by circulating vessels, which enter their substance; and when it has remained for a certain period, it is absorbed and carried out of the system by vessels destined for that purpose. Thus a continual deposition and absorption is going on in the bones, as well as in any other part of the body. The nerves with which bone is supplied, are doubtless intended to supply the vessels which are ramified through its substance; as we cannot suppose that they have any use with respect to the inorganic earthy salt, of which bone is chiefly formed. Upon the whole, then, it appears, that bone must be less capable of sensation, and less liable to be acted upon, than perhaps any other part of the body, as it is only the vessels and nerves which belong to it that are capable of sensation.

Cartilage possesses a degree of organization somewhat inferior to that of bone. This substance is interposed between bones, particularly at the joints, with the view of abating friction, and preventing those injuries which might be expected from the collision of the harder bony matter. Hence they are so constituted as to possess a degree of elasticity, by which they yield to the weight of the body, and are restored to their original size when that weight is removed. Cartilage was at one time supposed to be a mere concrete, having little or no connection with the other parts of the system, except by mechanical cohesion. But, in the original formation of bone, it appears that cartilage is organized matter, and as truly connected with the system as any other part of the animal. Thus we observe, that the bones are terminated at their articulations by a thin cartilage; and the periosteum is extended over the surface of the cartilage. The circulation in cartilage is indeed not very active, but sufficient to preserve it in the living state. Had the powers of life been considerable in cartilaginous matter, had its feelings been acute, it must have produced very considerable inconveniences to the animal: it would have been liable to frequent inflammation, and other disorders. But, having received a peculiar

mode of organization, in which the feeling is obscure, and the excitability dull, it is admirably fitted to perform all the motions of the body, and is subjected to the friction of the joints, without being liable to injury.

The cellular substance, like bone and cartilage, possesses a low degree of sensation, and its excitability is obscure. This matter, under various modifications, is employed to unite, cover, and defend, the other parts of the system. In all the forms in which it subsists in the body, it possesses little sensibility; and may, when compared with the muscular and nervous solids, be almost considered as inanimate matter: that is, when in the healthy state, like bone and cartilage, its excitability is in a very low degree. Both mechanical and chemical stimulants, when applied to it, give but little sense of pain.

First, the cellular substance is extended over the whole body, and interposed between all the parts. Formed into an infinite multitude of cells, which contain fat and a thinner fluid, it is happily constructed to allow the parts to glide and move easily. It penetrates into the muscles, and keeps their fibres at a proper distance, so that the action of each may be duly exerted. It appears also to support and lubricate the muscular fibre, inasmuch that the strength of the system in health, and its weakness in disease, have been supposed in some degree to depend upon the proper or improper state of the cellular matter. It has generally been admitted, that the thinner fluid contained in the cells is designed to render the play of the fibres easy and free; and that the fat is intended to support the fibres in their action, to lubricate them, and to give a plumpness to the body. It has also been suggested, that it may be reabsorbed for various uses in the system. It is probable; however, that the sebaceous matter, like the phosphate of lime in the bones, can only be applied to its proper uses in the system for a certain period. By degrees it becomes unfit for the purposes of the animal economy. It is secreted and deposited in the cells, and, when reabsorbed, is probably, with other excrementitious matter, thrown out of the system. Secondly, a modification of the cellular substance is employed as a covering to the bones. The periosteum appears to be a condensation of the cellular substance applied in successive layers, so as to produce a thick membrane, which conveys the blood-vessels, &c. to the bones. Thirdly, the tendons of the muscles are produced by a mere continuation of the periosteum, from which they are evidently derived, and not from the muscles, as the old anatomists imagined. Fourthly, the tendinous matter somewhat differently modified, so as to form a thin membranous sheet, is employed to cover the muscles forming the vagina or fascia of the muscles. The cellular substance which lies under the fascia, and which immediately surrounds the muscle, appears to be only more loosely attached laminae of the fascia. It is from the fascia that the cellular matter is derived which penetrates into the muscles. Fifthly, the periosteum, formed into a thicker membrane, and strengthened by the adhesion of surrounding parts, is employed for the capsules of the joints. Sixthly, the bursæ mucosæ derive their origin from the same substance. The bursæ are formed in those parts where a tendon plays over a bone. The upper surface of the bursa is formed by the tendon itself; the lower surface of the same bursa is produced from the periosteum of the bone; and the sides of the bursa are formed by the common cellular substance. The bursæ mucosæ and capsular ligaments do not materially differ in their nature. They contain precisely the same kind of liquor, and they frequently communicate with each other. Thus, under a variety of modifications, the cellular substance is applied to many useful purposes in the system. It joins the bones to each other, it unites the muscles to the bones, it gives security and firmness to their motions by the fluids which it contains, it lubricates the joints and muscular fibre, and it is further employed to give a plumpness and agreeable shape to the limbs. For all these purposes it appears

to be peculiarly fitted, by possessing a degree of sensibility much inferior to that of the more important parts of the system. Under all the modifications which we have now mentioned, cellular substance appears to have few blood-vessels, and no nerves; at least no nerves are visible. But we must conclude, that the few blood-vessels which convey nutrition to the cellular substance must be accompanied with nerves, however minute. And the feeling which can, by disease, be awakened in these parts, must lead us to infer, that they are in some degree supplied with nerves; as we cannot conceive that sensation can be produced, except by the agency of nerve. The paucity, however, of blood-vessels and nerves in the cellular substance, sufficiently evinces, that these parts can be little susceptible of the action of stimuli; and the fact which we thus discover from the structure of the parts, is strikingly evidenced by experiment. Under all its different modifications, cellular substance in the healthy state appears to be insensible to the action both of mechanical and chemical stimulants. The tendons of animals have been cut and pierced, they have been pinched and torn, the actual cautery, as well as the chemical, have been applied, without inducing the least indication of pain in the animal subjected to the experiment. The most violent chemical stimuli have been applied to the various parts of a joint, without producing any appearance of an uneasy sensation. In like manner, in surgical operations, the various modifications of the cellular substance may be operated upon without producing any degree of pain to the patient. Nay, it appears that little pain is induced by the accidental laceration of the ligaments and tendons. We cannot indeed say that these parts are entirely without feeling. Their sensibility is indeed dull. They receive the impressions of stimuli very slowly; but when, by disease, the organization of the part is deranged, the feeling is astonishingly increased, and the patient suffers a more acute pain than what we observe in almost any other part of the system. One thing, however, is obvious, the organ of sensation in these parts must be precisely the same as in the rest of the body. It is only to the nerves that we can ascribe this quality. They may, in the cellular substance, during the state of health, be peculiarly sheathed and defended from impressions to which they become exposed when the organization of the part is injured by disease.

In the muscular and nervous fibre, we perceive the powers of life exerted with much greater activity than in those parts which we have hitherto noticed; or, more properly speaking, muscular and nervous fibre are much more susceptible of the action of stimuli, than bone, cartilage, or cellular substance. It is by impressions upon these, by the operation of various agents, that every power of the body is awakened and called into action. The muscular and nervous systems appear to be so intimately connected, that some physiologists have imagined that muscular fibre is a mere continuation of the nervous matter. Anatomy instantly refutes this opinion: the nerves enter into the muscles in every possible direction; and we may trace their branches and ramifications perfectly distinct from the muscular fibre. We cannot indeed trace their course to their termination, because they become deprived of their external coats, mere medullary matter remains, and disappears among the muscular fibres. It is perhaps still more clear, that muscular fibre is not a continuation of nerve, because muscles in the limbs of animals do not diminish in magnitude, although the nerves entering these muscles have been cut through for a considerable period. Yet there certainly exists an intimate and universal connection between the muscular fibre and the nerves; because neither the one nor the other can be acted upon by any stimulus, without the whole body being affected in a greater or smaller degree, according to the nature of the part, and the powers of the stimulus applied. We find then that both muscular and nervous fibre are susceptible of impressions from stimuli: but it is also true, that the

effects produced on these two substances in some respects vary. These differences will appear from the short account which we shall here give, beginning with muscular fibre.

Every distinct muscle is formed of a congeries of longitudinal fibres, which are connected together, as we have already hinted, by the cellular substance. They are extended from bone to bone, and from part to part, so as to form an almost universal covering to the bones, and are at the same time the instruments by which all the motions of the bones are performed. Each congeries of muscular fibre appears distinct from the rest, being terminated at its origin and insertion by its proper tendons, which, as we have said, are a modification of the cellular substance. Those muscles which are not inserted into any of the bones, as the sphincters and muscular membranes of the viscera and vessels have commonly no tendons. Those, again, the origin and insertion of which are on different bones, and in the more moveable extremities, are generally supplied with long tendons, which pass round the joints and heads of the bones to be inserted in the more moveable part. But, however distinct the different muscles appear, there is an universal connection, which depends upon the universal distribution of the nerves; one or more of which enter into each muscle, and thus form an indivisible whole.

The muscles are also abundantly supplied with arteries and veins, which enter within the cellular coat that surrounds the muscular fibres, and, running in company with each other, are subdivided, and form a kind of reticular work. From the smaller of these vessels a vapour and sebaceous matter are secreted into the cellular substance, and which are again absorbed by lymphatics, the presence of which is also perfectly obvious, both on the surface and in the substance of the muscles. The ultimate fibres of the muscles appear to be small soft threads: when subjected to the microscope, they exhibit a kind of wave or zigzag appearance. This form has been attributed to the impressions made by the vessels, cellular substance, and nerves, upon the fibre. Dr. Monro has however demonstrated a similar appearance in the tendons and nerves; and he is of opinion, that these undulations are a kind of folds or joints, which serve to accommodate the parts to the different states of flexion and extension. In proof of this, he observes, that these appearances are only present when the parts are in a relaxed state, and that they entirely lose it when much stretched.

Many opinions have been entertained with respect to the structure of the muscular fibre: it has been supposed that they are solid; again it is said that they are hollow, being formed of a series of vessels or rhomboidal chains communicating with each other; and lastly, it has been alleged, that they are full of a kind of down or woolly substance. The fact cannot be determined by the eye or the microscope, and therefore we conceive it not worth while to engage in the dispute. Indeed, as far as we can discover, the muscular fibre, when washed from the blood contained in the vessels which accompany it, appears a white soft solid. These delicate fibres, formed into bundles of different magnitudes, and variously disposed, supplied with blood-vessels and absorbents, joined together, and supported by cellular substance, and united together, so as to form one grand system, by the distribution of nerves, are destined to perform the most important offices in the body. Every motion is produced by their operation. They possess a kind of contractile power, by which they are fitted to propel the blood from the heart, and direct its course through all the numberless channels in which it flows throughout the body. They produce the action of the lymphatics, by which absorption is carried on; by their energy, every secretion and excretion of the system is performed; the important function of respiration depends upon their exertion; and they effect the various motions of the body, which are of so much utility in the different avocations of life. To render them capable of producing these effects, they are in a high degree endowed with that

susceptibility of the action of stimuli, upon which the commencement and continuance of life depends.

The brain, or that mass which fills the cavity of the cranium, is at once the origin and point of union to the whole nervous system. This general mass is divided into three particular portions, the cerebrum, the cerebellum, and the medulla oblongata; and a continuation of the latter forms the medulla spinalis, which fills the cavity of the vertebrae. This organ, and the various branches derived from it, form one of the most important parts of the animal economy. It is essential to all the nobler species of animals; but its importance is more peculiarly evident in man than in any other. In the human race, it bears a much larger proportion to the size of the animal than in any of the inferior orders. The nerves, which form the various organs of sensation, and upon which ultimately the action of muscular fibre depends, are derived from the brain in the inferior animals, as well as in man; but, from the much larger size of this organ in the latter, it appears destined to perform some other and more important purposes in him than in the former. The whole of the nerves, it has been observed, bear but a small proportion to the mass of medullary substance contained in the brain, being at least an hundred times as large as the diameters of all the nerves of the head and spinal marrow. It does not appear that the large size of the brain gives to man more acute sensations, or a greater power to produce muscular motion, than other animals possess in which the brain is proportionally much less. Thus, the brain of a large ox has been found to weigh not more than one fourth part of the human brain, whilst the weight of the ox was probably six times greater than that of the man; or the brain of the man was, in proportion to his weight, twenty-four times heavier than that of the ox. At the same time, the nerves of the muscles of an ox are in their size proportioned to the bulk of the animal's muscles, and those of the organs of sensation, as the eye and nose, are proportioned to the extent of these organs. Thus the olfactory nerve of an ox is many times larger than that of a man. Again we observe, that three fourths of the nerves originate from the medulla spinalis; yet it is only a small part of the brain which is elongated, and passes down the vertebral canal. We have reason therefore to conclude, that to give origin to the nerves is not the sole use of the brain: it is the seat of intellect; the medium by which impressions made on the organs of sensation are conveyed to the mind.

The whole of the nerves, then, arise from one common source; and the brain must be considered as the central point, at which they all unite. Arising from this point they are transmitted to every part of the body, they are interwoven in every organ of sensation, every muscle, vessel, and bone, and thus unite the various parts so as to constitute an uniform system. Possessed of a peculiar organization, by which they are highly susceptible of impressions from various stimuli, they receive impressions on every part, which appear to be instantaneously transmitted to the central point, the sensorium commune. Hence it is, that the action of a stimulant upon a particular part does not affect that part only to which it is applied, but operates on a greater or smaller degree upon the whole system. Minute anatomy evidences, by an infinite variety of circumstances, the peculiar fitness of the brain and nervous system for producing these effects. We have already observed, that the brain is formed of three portions, the cerebrum, cerebellum, and medulla oblongata, to which a fourth may be added, the medulla spinalis. The whole of these are covered by their peculiar membranes, the pia mater and dura mater. These serve for their protection, and to convey blood-vessels for their nourishment and support. The brain is supplied with numerous blood-vessels from the carotid and vertebral arteries; and, by the many convolutions which they make before they pass through the dura mater, and the vast number of communicating branches into which they are divided in the pia mater,

and its processes, it appears, that the blood must move more slowly and equally in those vessels than in those of other parts. We may also add, that the arteries in other parts are in some degree acted upon by the labouring muscles, and the pressure of the atmosphere, by which the blood is propelled with additional force. But the arteries which supply the brain, after they enter the cranium, are not subjected to the operation of these powers. We observe then, in this distribution of the blood-vessels of the brain, a provision made against those injuries which must have infallibly taken place in so delicate an organ, if it had been possible for the blood to have been driven into it with great violence. A very considerable quantity of blood is transmitted to the brain; it is derived from trunks which arise near the heart; and, according to the opinion of Haller, a sixth part, or, as Dr. Monro supposes, not less than a tenth part, of the circulating mass, is transmitted to the brain. From the ample supply of this fluid which the brain receives, it appears that perpetual and important changes take place in the substance of the brain and nerves, as well as in other parts.

The cerebrum, cerebellum, and spinal marrow, are naturally divided into the external part, the cortex or cineritious substance, and the internal part, or medullary matter. The minute branches of the blood-vessels, by the assistance of injections and the microscope, are found to pass from the pia mater into the cortical part in vast numbers; in fact, it appears to be almost wholly formed of vessels; but into the medullary substance we only observe longitudinal vessels entering. The veins which return the blood from the brain are of a peculiar structure, evidently designed to facilitate that return. Their coats are of peculiar strength: they form innumerable anastomoses with one another; and, when collected so as to form considerable trunks, they are lodged in canals, which prevent them from being subjected to compression. A provision therefore is evidently made to prevent an injurious accumulation of the blood in this organ. It has been doubted, whether the brain is supplied with lymphatics? They may certainly be demonstrated upon the pia mater; and from analogy drawn from every other part of the body, we scarcely suppose that the brain is destitute of lymphatics. Indeed modern physiologists in general admit the existence of lymphatics in the brain.

From the blood-vessels, as we have already hinted, the cortical part of the brain receives its origin. Anatomical injections fully prove, that the greater part of it consists of vessels which are inserted from the small branches of the pia mater. These vessels, however, in the natural state, do not convey red blood, but a thinner fluid; although in some diseases, and in death by strangling, particularly in brutes and birds, the red blood is propelled into them. No anatomist has, indeed, succeeded in filling every portion of the cortex with injected matter; yet it is probable, that it is altogether vascular. We observe no dissimilarity of parts in it when in the entire or natural state, so that we cannot imagine that it is partly vascular and partly solid.

As the cortical substances originate from the vessels of the pia mater, so the white medullary matter is derived from the cortex. The continuity of the medulla with the cortex, is distinctly seen by the microscope, and may even be observed by the naked eye. Minute portions of the medulla may be observed proceeding from the cortex; and its gradual increase may be traced, becoming more broad and abundant till it makes up the whole oval section of the brain, and is bounded only by the convolutions of the cortex. The medulla is extremely soft, and of a fibrous texture. The fibres are visible in several parts of the human brain, and still more evidently in the brains of fishes, especially in their thalami optici. The fibres of the medullary substance are simply extended, so as to form the white fibrous cords which are distributed to every part of the body, and which are universally termed the nerves. That the fibres of the nerves are merely a continuation

of those of the medulla, is distinctly seen in the seventh, fourth, and fifth, pairs of nerves.

The nerves, then, are composed of many fibrous threads, lying parallel, or nearly so, to each other, as they shoot off from the medulla. At the origin of most of the nerves within the skull, this fibrous texture is perceptible; and, in the cauda equina of the spinal marrow, they may be divided into threads so exceedingly minute, that they are scarcely visible to the naked eye; yet even these fibres, when examined with a microscope, appear to be formed of a considerable number of fibrils, much more minute. It is perhaps not possible to estimate the size of the smallest of these fibres. Were the nerves, which are divided over the whole body, conjoined into a cord, the diameter would not be an inch; yet even the most minute part of the body is sensible: and this must depend on each particular point being supplied with nerve. We must therefore be convinced, that the nervous fibrils are astonishingly small. Nay, it has been demonstrated, from the extreme minute portions of matter which are visible to the sight, that each fibre in the retina of the eye cannot exceed in diameter the thirty-two thousand four hundredth part of a hair. The medullary matter, of which the nervous fibrils are formed, is exceedingly delicate and soft. They are therefore connected together by cellular substance, and protected from injury by coats formed of the dura and pia mater. These nervous cords are so liberally supplied with blood-vessels, that, when their arteries only are injected, the whole cord appears to be tinged with the colour of the injected liquor.

The nerves, after being given out by the brain or spinal marrow, are generally, like the blood-vessels, divided into branches: but they pass off, or separate, from each other, in acute angles, and often in a retrograde direction. The fibrils of the nerves, however, are not split at these divisions so as to form smaller threads; but the original fibres, continued from the brain itself, recede from each other by an opening of the cellular substance by which they are united: so that, after the nervous fibril has left the brain, it appears, in fact, to undergo no change till its ultimate termination. The nervous cords generally appear to grow softer during their course, till at length, at their termination, they seem to be lost in a mucus or pulp. Hence it has been supposed, that during their progress they deposit the coats which they had received from the pia and dura mater; and that, to be capable of sensation, or the other purposes which the nerve is to effect in the system, it is necessary that the medullary part should be laid perfectly bare at its termination. It is however alleged, that every filament of a nerve retains, at its termination, a covering of the pia mater, by the vessels of which it is nourished and preserved in that state, upon which the faculty of receiving impressions, and the power of action, depend.

In some instances we observe different nerves uniting so as to form one cord; this, in some measure, resembles the anastomoses which take place in the sanguiferous system. After such an union, we frequently find, particularly in those which are distributed to the bowels, a hard knot is formed, considerably larger than the nerves which are thus united into a cord. These knots are generally termed ganglions: they have thicker coats, and are more liberally supplied with blood-vessels, than the nerves. Dr. Monro observes, that they are full of nervous fibrilli, intermixed with a yellowish or reddish brown substance, somewhat similar to the cortical substance of the brain. Hence he supposes, that they are sources of nervous matter or energy.

Derived from this origin, (the brain,) we find forty pairs of nerves distributed through the body, viz. ten which immediately proceed from the encephalon, and thirty which pass off from the medulla spinalis. Of these we find four proceeding immediately from the brain, which are destined to receive various impressions from external objects, by which the sensations of sight, hearing, smell, and taste, are produced. The rest are distributed to the various muscles, and extended on the surface of the body,

affecting the motion of the muscular solid, and producing, in every part of the system, by impressions from different substances, that sensation which we call feeling. To whatever purpose the nerve is applied, whether to receive sensation, or to excite motion, we do not perceive any difference in its structure; it is in every instance formed of the same soft medullary fibre. We perceive, indeed, that the optic nerve, at its termination, is extended into a delicate web, which covers the surface of the eye. The portio mollis, also, of the auditory nerve, is extended in a very soft pulpy form on the inner camera of the ear; but, excepting these two, we observe no variations in the external appearance of the nerves at their terminations: nor do we discover, even in these, any peculiarities of structure, by which we can be able to assign a reason why the one should receive the rays of light, reflected from surrounding bodies, by which the sensation of sight is produced; or why the other should be affected by percussions of the air, so as to communicate the different sensations of sound. We observe, indeed, that several of the nerves which are designed to communicate particular sensations to the mind, are furnished with peculiar apparatus. Such we observe in the wonderful structure of the eye; and in the striking contrivance exhibited in the vestibule, cochlea, and semicircular canals of the ear. That these apparatus are essentially requisite to enable the nervous matter to receive particular sensations, cannot be doubted; but it must remain as a question which probably will never be determined, whether the medullary matter itself does not undergo some modification, by which it is fitted respectively to receive impressions from light, sound, odorous or sapid substances: to distinguish the nature of other substances by what we call feeling; or to excite the muscular action. Whatever may be in this, we are certain, that sensation altogether, and muscular motion in a great measure, are produced by the operation of various agents upon the nervous system. If a nerve is irritated, acute pain is induced; and, in proportion to the number of nerves with which any part of the body is supplied, it is possessed of a greater or smaller sensibility. Thus, in the eye and the penis, which are plentifully supplied with nerves, the feeling is extremely acute; and the tendons, ligaments, bones, and cartilages, into which few nerves enter, have in the sound state little or no sensation. But if, on the other hand, the communication between the sentient extremities of the nerves and the sensorium commune is obstructed, as by the division of the nerve, the sensation of the part beyond the division is entirely destroyed.

Having thus taken a cursory view of the outline of anatomy, with the physiology appertaining thereto, we shall now proceed to the dissection of the human subject; noting by the way the most recent and important discoveries, calculated to improve the knowledge and success of medical practice.

Of the BONES, or HUMAN SKELETON.

However solid and compact adult bones are, yet they were once cartilages, membranes, nay, a mere jelly. This needs no farther proof than repeated observations of embryos when dissected: and how much more tender must the bones be before that time, when neither knife nor eye is capable to discover the least rudiments of them? By degrees they become more solid, then assume the nature of gristles, and at last ossify; the cohesion of their plates and fibres always increasing in proportion to their increased solidities; as is evident from the time necessary to unravel the texture of bones of people of different ages, or of dense and of spongy bones, or of the different parts of the same bone, and from the more tedious exfoliations of the bones of adults than of children. As the solidity of bones increases, their periosteum more easily separates from them. When bones are membranous, the periosteum cannot be distinguished; they appear to be the same substance. When they are cartilages, their membrane adheres so firmly to them, that it is difficult to separate it from them. Where the

the bony fibres are rigid, the periosteum is easily taken off.

The ossification of bones depends principally on their vessels being so disposed, and of such diameters, as to separate a liquor, which may easily turn into a bony substance, when it is deprived of its thinner parts; as seems plain from the observation of the callous matter separated after fractures and ulcers, where part of the bone is taken out: for, in these cases, the vessels extending themselves, and the liquors added to them, are gradually formed into granulated flesh, which fills up all the space where the bone is taken from, then hardens till it becomes as firm as any other part of the bone. This happens frequently, even when the ends of the diseased bone are at a considerable distance from each other.

The induration of bones is also greatly assisted by their being exposed more than any other parts to the strong pressure of the great weights they support, to the violent contraction of the muscles fixed to them, and to the force of the parts they contain, which endeavour to make way for their own further growth. By all this pressing force, the solid fibres and vessels of bones are thrust closer, and such particles of the fluids conveyed in these vessels as are fit to be united to the fibres are sooner and more firmly incorporated with them, while the remaining fluids are forcibly driven out by the veins, to be mixed with the mafs of blood. In consequence of this, the vessels gradually diminish as the bones harden. From which again we can understand one reason why the bones of young animals sooner re-unite after a fracture than those of old, and why cattle that are too soon put to hard labour, seldom are of such large size as others of the same brood who are longer kept from labour.

That the ossifying of bones greatly depends on pressure, seems to be evinced from the frequent examples we meet with of other parts turning bony, when long exposed to the pressing force of the surrounding parts, or when they are subjected to the like circumstances by their own frequent and violent contraction. Witness the bones found frequently near the base of the heart in some old men, and in several other creatures. Nay, the muscular substance of the heart has been ossified in such, and the arteries of old men often become bony. The cartilages of the larynx are generally ossified in adults. In beasts of burden, the cartilages between the vertebræ of the back very often change into complete bones; and, being intimately united with the vertebræ, the whole appears one continued bone: nor is the periosteum exempted from such an induration.

From the effects of pressure only it is that we can account for the bones of old people having their sides much thinner, yet more dense and solid, while the cavities are much larger than in those of young people; and for the prints of muscles, vessels, &c. being so much more strongly marked on the surfaces of the former than of the latter, if they belong to people of near the same condition in life. Pressure must likewise be the cause which, in people of equal ages, make these prints stronger in the bones of those who had much labour and exercise, than they are in people who have led an indolent and inactive life.

Perhaps the causes of ossification may be assisted by the nature of the climate people live in, and the food they use. Whence, in hot countries, the inhabitants sooner come to their height of stature than in the northerly cold regions: and thence seems to have arisen the common practice among the ladies, of making puppies drink brandy or spirit of wine, and of bathing them in these liquors, to prevent their growing big. Nay, it has been observed, that much use of such spirits has occasioned parts, naturally soft, to petrify in some, and to ossify in other people of no great age.

To express the connection of bones, anatomists have contrived a great number of technical terms; about the meaning, propriety, and classing, of which, there has unluckily been variety of opinions. Some of these terms it is necessary to retain, since they serve to express the various circumstances of the articulations, and to understand the

writers on this subject. The articulations are most commonly divided into three classes, viz. Symphysis, Synarthrosis, and Diarthrosis.

First, *Symphysis*, which properly signifies the conception or growing together of parts, when used to express the articulations of bones, does not seem to comprehend, under the meaning generally given to it, any thing relating to the form or motion of the conjoined bones; but by it most authors only denote the bones to be connected by some other substance; and as there are different substances which serve this purpose, therefore they divide it into the three following species. 1. *Synchondrosis*, when a cartilage is the connecting substance: thus the ribs are joined to the sternum; thus the bodies of the vertebræ are connected to each other; as are likewise the ossa pubis. 2. *Synneurosis*, or *syndesmosis*, when ligaments are the connecting bodies, as they are in all the moveable articulations. 3. *Syffarcosis*, when muscles are stretched from one bone to another, as they must be where there are moveable joints.

The second class of articulations, the *synarthrosis*, which is said to be the general term by which the immoveable conjunction of bones is expressed, is divided into three kinds. 1. The *suture* is that articulation where two bones are mutually indented into each other, or as if they were sewed together; and is formed by the fibres of two bones meeting while they are yet flexible and yielding, and have not come to their full extent of growth; so that they mutually force themselves into the interstices of each other, till, meeting with such resistance as they are not able to overcome, they are stopped from sprouting out farther, or are reflected; and therefore these indentations are very different both in figure and magnitude: thus the bones of the head are joined; thus epiphyses are joined to the bones, before their full connection and union with them. Under this title of *suture*, the *harmonia* of the ancients may be comprehended; scarcely any unmoved bones being joined by plain surfaces. 2. *Gomphosis* is the fixing one bone into another, as a nail is fixed in a board: thus the teeth are secured in their sockets. 3. *Schindylesis* or *ploughing*, when a thin lamella of one bone is received into a long narrow furrow of another: thus the processus azygos of the sphenoid, and the nasal process of the ethmoid, bone, are received by the vomer.

The third class, or *diarthrosis*, is the articulation where the bones are so loosely connected as to allow large motion. This is subdivided into three kinds. 1. *Enarthrosis*, or the ball and socket, when a large head is received into a deep cavity; as the head of the os femoris is into the acetabulum coxendicis. 2. *Arthrodia*, when a round head is received into a superficial cavity; as in the articulation of the arm bone and scapula. These two species of diarthrosis allow motion to all sides. 3. *Ginglimus*, which properly signifies the hinge of a door or window; in it the parts of the bones mutually receive and are received, and allow of motion two ways: workmen call it *charnal*.

The ginglimus is generally divided into three kinds; to which some give the name of *contiguous*, *distant*, and *compound*. The first kind of ginglimus is when a bone has several protuberances and cavities, which answer to as many cavities and processes of the other bone with which it is articulated; as in the conjunction of the femur with the tibia. The second species is, when a bone receives another at one end, and is received by the same bone at the other end; as in the radius and ulna. The last sort is, when a bone receives another, and is received by a third; as in the oblique processes of the vertebræ.

With regard to the different opinions concerning the use of these technical names, it has been said, that symphysis should be the name for the immoveable articulations, and synarthrosis should be understood to be the conjunction of bones by some connecting medium. Those who have taken symphysis in the sense of its expressing the conjunction of bones with a connecting substance, have disagreed in their definition of it; some inserting, and others leaving out, its allowing motion. When they have agreed in their

definition, they have not been of the same mind concerning the species of it: for several think the *syllarcosis* and *syndesmosis* applicable to so many joints which are universally allowed to be classed under the *diarthrosis*, that it must create confusion to name them by any species of the *symphysis*. Few keep to such a general definition of the *synchondrosis*; and whether they determine it to allow no motion, or an obscure or a manifest one, they bring themselves into difficulties, because there are examples of all these three kinds. Some again, by too nicely distinguishing obscure and manifest motions of bones, have blended the *synarthrosis* and *diarthrosis*; and from thence have branched out the different compound species of articulations that may be formed of them, so far, that they could find no examples in the body to illustrate them by. It would be tedious to enumerate the jarring opinions, and useless to give a detail of the arguments adopted by the disputants on this occasion.

Before we proceed to the division and particular description of the skeleton, it is to be observed, that, when the bones are put into their natural situation, scarcely any one of them is placed in a perpendicular bearing to another; though the fabric composed of them is so contrived, that, in an erect posture, a perpendicular line, for their common centre of gravity, falls in the middle of their common base. On this account, we can support ourselves as firm as if the axis of all the bones had been a straight line perpendicular to the horizon; and we have much greater quickness, ease, and strength, in several of the most necessary motions we perform. It is true, indeed, that wherever the bones, on which any part of our body is sustained, decline from a straight line, the force required in the muscles to counteract the gravity of that part is greater than was otherwise necessary: but then this is effectually provided for in such places, by the number and strength of the muscles. So long, therefore, as we remain in the same posture, a considerable number of muscles must be in a constant state of contraction; which we know, both from reason and experience, must soon create an uneasy sensation. This we call *being weary of one posture*: an inconvenience that we should not have had in standing erect, if the bearing of all the bones to each other had been perpendicular; but it is more than compensated by the advantages above-mentioned. The human skeleton is generally divided into the *Head*, the *Trunk*, the *Superior*, and the *Inferior*, *Extremities*.

BONES of the HEAD.

By the *head* is meant all that spheroidal part which is placed above the first bone of the neck. It therefore comprehends the cranium and bones of the face.

The *cranium*, *helmet*, or *brain-case*, consists of several pieces, which form a vaulted cavity, for lodging and defending the brain and cerebellum, with their membranes, vessels, and nerves. The cavity of the cranium is proportioned to its contents. Hence such a variety of its size is observed in different subjects; and hence it is neither so broad nor so deep at its fore-part, in which the anterior lobes of the brain are lodged, as it is behind, where the large posterior lobes of the brain, and the whole cerebellum, are contained. The roundish figure of the skull, which makes it more capacious, and better able to defend its contents from external injuries, is chiefly owing to the equal pressure of these contained parts as they grow and increase before it is entirely ossified. It is to be observed, however, that the sides of the cranium are depressed below a spherical surface by the strong temporal muscles, whose action hinders here the uniform protrusion of the bones, which is more equally performed in other parts where no such large muscles are. In children whose muscles have not acted much, and consequently have not had great effects on the bones, this depression is not so remarkable; and therefore their heads are much rounder than in adults. These natural causes, differently disposed in different people, produce a great variety in the shapes of skulls, which

is still increased by the different management of the heads of children when very young: so that one may know a Turk's skull by its globular figure, a German's by its breadth and the flatness of the occiput, Dutch and English by their oblong shapes, &c. Two advantages are reaped from this flatness of the sides of the cranium, viz. the enlargement of our sphere of vision, and more advantageous situation of our ears for receiving a greater quantity of sound, and for being less exposed to injuries.

The external surface of the upper part of the cranium is very smooth and equal, being only covered with the *periosteum* (common to all the bones, but in the skull distinguished by the name of *pericranium*,) the thin frontal and occipital muscles, their tendinous aponeurosis, and with the common teguments of the body; while the external surface of its lower part has its numerous risings, depressions, and holes, which afford convenient origin and insertion to the muscles that are connected to it, and allow safe passage for the vessels and nerves that run through and near it.

The bones of the cranium are composed of two tables, and intermediate cancelli, commonly called their *diploë*. The external table is thickest; the inner, from its thinness and consequent brittleness, has got the name of *vitrea*. Whence we may see the reason of those mischievous consequences which so often attend a collection of matter in the *diploë*, either from an internal or external cause, before any sign of such a collection appears in the teguments which cover that part of the skull where it is lodged.

The cranium consists of eight bones, six of which are said to be proper, and the other two are reckoned common to it and to the face. The six proper are the *os frontis*, two *os parietalia*, two *os temporum*, and the *os occipitis*. The common are the *os ethmoides* and *sphenoides*. The *os frontis* forms the whole fore-part of the vault; the two *os parietalia* form the upper and middle part of it; the *os temporum* compose the lower part of the sides; the *os occipitis* makes the whole hinder part, and some of the base; the *os ethmoides* is placed in the fore-part of the base, and the *os sphenoides* in the middle of it.

These bones are joined to each other by five *sutures*; the names of which are the *coronal*, *lambdoidal*, *sagittal*, and two *squamous*. The coronal suture is extended over the head, from within about an inch of the external canthus of one eye, to the like distance from the other; which being near the place where the ancients wore their *vittæ*, coronæ, or garlands, has thence got its name.

The lambdoidal suture begins farther back than the vertex or crown of the head, whence its two legs are stretched obliquely downwards, and are now generally said to extend themselves to the base of the skull: but formerly anatomists reckoned the proper lambdoidal suture to terminate at the squamous sutures; and what is extended at an angle down from that on each side, where the indentations are less conspicuous than in the upper part of the suture, they called *aditamentum suturæ lambdoidis*. This suture is sometimes very irregular, being made up of a great many small sutures, which surround so many little bones that are generally larger and more conspicuous on the external surface of the skull than internally. These bones are commonly called *triquetra* or *Wormiana*: but some other name ought to be given them, for they are not always of a triangular figure, and older anatomists than Wormius have described them.

The *sagittal* suture is placed longitudinally in the middle of the upper part of the skull, and commonly terminates at the middle of the coronal and of the lambdoidal sutures; between which it is said to be placed, as an arrow is between the string and the bow. However, this suture is frequently continued through the middle of the *os frontis* down to the root of the nose; which, some say, happens oftener in women than in men.

The *squamous agglutinations*, or *false sutures*, are one on each side, a little above the ear, of a semicircular figure, formed by the over-lapping (like one scale upon another) of

of the upper part of the temporal bones on the lower part of the parietal, where, in both bones, there are a great many small ridings and furrows, which are indented into each other; though these inequalities do not appear till the bones are separated. In some skulls, indeed, the indentations here are as conspicuous externally as in other futures; and what is commonly called the posterior part of this squamous future always has the evident serrated form, and therefore is reckoned by some a distinct future, under the name of *additamentum posterius futuræ squamosæ*.

The bones of the skull are joined to those of the face, by schindylefis and futures. The schindylefis is in the partition of the nose. The futures said to be common to the cranium and face are five, viz. the ethmoidal, sphenoidal, transverse, and two zygomatic. The *ethmoidal* and *sphenoidal* futures surround the bones of these names; and in some places help to make up other futures, particularly the *squamous* and *transverse*; and in other parts there is but one future common to these two bones. The *transverse* future is extended quite across the face, from the external canthus of one orbit to the same place of the other, by sinking from the canthus down the outside of the orbit to its bottom; then, mounting upon its inside, it is continued by the root of the nose down to the internal part of the other orbit, and rises up again on its outside to the other canthus. The *zygomatic* futures are one on each side, being short and slanting from above obliquely downwards and backwards, to join a process of the cheek bone to one of the temporal bones, which advance towards the face; so that the two processes thus united, form a sort of bridge or jugum, under which the temporal muscle passes; on which account the processes, and future joining them, have been called *zygomatic*.

It is alleged, that through the futures there is a transpiration of steams from the brain, which was the old doctrine; or some communication of the vessels without and of those within the skull, larger here than in any other part of the cranium, according to some moderns; and therefore cucuphæ, fomentations, cataplasms, cephalic plasters, blisters, are applied, and issues are eroded or cut in the head, at those places where the futures are longest in forming, and where the connection of the bones is afterwards loosest, for the cure of a phrenitis, mania, inveterate head-ach, epilepsy, apoplexy, and other diseases of the head. The favourers of the doctrine of transpiration, or communication of vessels at the futures, endeavour to support it by observations of persons subject to head-achs which caused death, from the futures being too closely united.

The *os frontis* has its name from its being the only bone of that part of the face we call the *forehead*, though it reaches a good deal farther. It has some resemblance in shape to the shell of the concha bivalvis, commonly called the *cockle*: for the greatest part of it is convex externally, and concave internally, with a serrated circular edge; while the smaller part has processes, and depressions, which make it of an irregular figure. Between the internal and external angular processes on each side, an arched ridge is extended, on which the eye-brows are placed. Very little above the internal end of each of these superciliary ridges a protuberance may be remarked, where there are large cavities, called *sinuses*. Between the internal angular processes a small process rises, which forms a part of the nose, and thence is named *nasal*. Some observe a protuberant part on the edge of the bone which they call *temporal* processes; but these are inconsiderable. From the under part of the superciliary ridges, the frontal bone runs a great way backwards: these parts may justly enough be called *orbital* processes, which, contrary to the rest of this bone, are concave externally, for receiving the globes of the eyes, with their nuses, fat, &c. In each of the orbital processes, behind the middle of the superciliary ridges, a considerable sinusity is observed, where the glandula innominata Galeni, or lacrymalis, is lodged. Behind each internal angular process, a small pit may be remarked, where the cartilaginous pully of the musculus

obliquus major of the eye is fixed. Between the two orbital processes, there is a large discontinnuation of the bone, in which the cribriform part of the *os ethmoides* is incased.

The *foramina*, or holes, observable on the external surface of the frontal bone, are three in each side. One in each superciliary ridge, a little removed from its middle towards the nose; through which a twig of the ophthalmic branch of the fifth pair of nerves passes out of the orbit, with a small artery from the internal carotid, to be distributed to the teguments and muscles of the forehead. These vessels, in some skulls, make furrows in the *os frontis*, especially in the bones of children, as has also been observed of another considerable vessel of this bone near its middle; and therefore we ought to beware of transverse incisions on either side of the *os frontis*, which might either open these vessels, or hurt the nerves, while they are yet in part within the bone: for, when vessels are thus wounded, it is difficult to stop the hæmorrhage, because the adhesion of a part of the artery to the bone hinders its contraction, and consequently styptics can have little effect; the sides of the furrow keep off compressing substances from the artery; and we would wish to shun cauteries or escharotics, because they make the bone carious; and nerves, when thus hurt, sometimes produce violent symptoms. Near the middle of the inside of each orbit, hard-by or in the transverse future, there is a small hole for the passage of the nasal twig of the first branch of the fifth pair of nerves, and of a branch of the ophthalmic artery. This hole is sometimes entirely formed in the *os frontis*; in other skulls, the sides of it are composed of this last bone and of the *os planum*. It is commonly known by the name of *orbitalium internum*, through *anterior* should be added, because of the next, which is commonly omitted. This, which may be called *orbitalium internus posterius*, is such another as the former; only smaller, and about an inch deeper in the orbit. Through it a small branch of the ocular artery passes to the nose.

The internal surface of the *os frontis* is concave, except at the orbital processes, which are convex, to support the anterior lobes of the brain. This surface is not so smooth as the external; for the larger branches of the arteries of the dura mater make some furrows in its sides and back parts. The sinusities from the luxuriant risings of the brain are often very observable on its upper part; and its lower and fore parts are marked with the contortions of the anterior lobes of the brain. Through the middle of this internal surface, where always in children, and sometimes in old people, the bone is divided, either a ridge stands out, to which the upper edge of the falx is fastened, or a furrow runs, in which the upper side of the superior longitudinal sinus is lodged; on both these accounts, chirurgical authors justly forbid the application of the trepan here.

The *os frontis* is composed of two tables, and an intermediate diploë, as the other bones of the cranium are. It is of a mean thickness between the *os occipitis* and the parietal bones; and is nearly equally dense throughout, except at the orbital processes, where, by the action of the eye on one side, and pressure of the lobes of the brain on the other, it is made extremely thin and diaphanous, and the medullium is entirely obliterated. In this place there is so weak a defence for the brain, that fences esteem a push in the eye mortal. The diploë is also exhausted in that part above the eye-brows, where the two tables of the bone separate, by the external being protruded outwards, to form two large cavities, called *sinus frontales*. These are divided by a middle perpendicular bony partition. Their capacity in the same subject is seldom equal; in some the right, in others the left, is largest. In some skulls, besides the large perpendicular *septum*, several bony pillars, or short partitions, are found in each sinus: in others these are wanting. For the most part the septum is entire; at other times it is discontinued, and the two *sinuses* communicate. When the sinuses are seen in such skulls as have the frontal bone divided by the sagittal future,

ture, the partition dividing these cavities is evidently composed of two plates, which easily separate. Each sinus commonly opens by a roundish small hole, at the inner and lower part of the internal angular processes, into a sinus formed in the nose, at the upper and back part of the os unguis; near to which there are also some other small sinuses of this bone, the greater part of which open separately near the septum narium, and often terminate in the same common canal with the large ones.

In a natural and sound state, these cavities are of considerable advantage: for, the organ of smelling being thus enlarged, the effluvia of odorous bodies more difficultly escape it; and their impressions, being more numerous, are therefore stronger, and affect the organ more. That odorous particles may be applied to the membrane of the sinuses, is evident from the pain felt in this part of the forehead, when the effluvia of volative spirits, or of strong aromatics, are drawn up into the nose by a quick inspiration. These, and the other cavities which open into the nose, increase the sound of our voice, and render it more melodious, by serving as so many vaults to rebound the notes. Hence people labouring under a coryza, or stoppage of the nose from any other cause, when they are by the vulgar, though falsely, said to speak through the nose, have such a disagreeable voice. The liquor separated in the membrane of these sinuses runs down upon the membrane of the nose to keep it moist.

The upper circular part of the os frontis is joined to the ossa parietalia, from one temple to the other, by the coronal suture. From the termination of the coronal suture to the external angular processes, this bone is connected to the sphenoid by the sphenoidal suture. At the external canthi of the eyes, its angular processes are joined by the transverse suture to the ossa malarum, to which it adheres one-third down the outside of the orbits; whence to the bottom of these cavities, and a little upon their internal sides, these orbital processes are connected to the sphenoidal bone by that same suture.

The frontal bone serves to defend and support the anterior lobes of the brain. It forms a considerable part of the cavities that contain the globes of the eyes, helps to make up the septum narium, organ of smelling, &c. In a ripe child, the frontal bone is divided through the middle; the superciliary holes are not formed; often a small round piece of each orbital process, behind the superciliary ridge, is not ossified; and there is no sinus to be seen within its substance.

Each of the two *ossa parietalia*, or bones serving as walls to the encephalon, is an irregular square; its upper and fore sides being longer than the one behind or below. The inferior side is a concave arch; the middle part receiving the upper round part of the temporal bone. The external surface of each os parietale is convex. Upon it, somewhat below the middle height of the bone, there is a transverse arched ridge, generally of a whiter colour than any other part of the bone; from which, in bones that have strong prints of muscles, we see a great many converging furrows, like so many radii drawn from a circumference towards a centre. From this ridge of each bone the temporal muscle rises: and, by the pressure of its fibres, occasions the furrows just now mentioned. Below these we observe, near the semicircular edges, a great many risings and depressions, which are joined to like inequalities on the inside of the temporal bone, and form the squamous suture. The temporal bone may therefore serve here as a buttress, to prevent the lower side of the parietal from starting outwards when its upper part is pressed or struck. Near the upper sides of these bones is a small hole in each, through which a vein passes from the teguments of the head to the longitudinal sinus. In some skulls, one of the ossa parietalia has not this hole. In others, there are perhaps two in one bone; and, in some, not one in either. Most frequently this hole is through both tables; at other times the external hole only is perforated. The knowledge of the course of these vessels may be of use to sur-

geons when they make any incision near this part of the head; left, if the vessels are rashly cut near the hole, they shrink within the substance of the bone, and cause an obstinate hæmorrhage, which neither ligatures nor medicines can stop.

The ossa parietalia are the most equal and smooth, and are among the thinnest bones of the cranium; but they enjoy the general structures of two tables and dispoſe the completeſt. These bones are joined at their fore-side to the os frontis by the coronal suture; at their long inferior angles, to the sphenoid bone, by part of the suture of this name; at their lower edge, to the ossa temporum, by the squamous suture, and its posterior additamentum; behind, to the os occipitis, or ossa triquera, by the lambdoid suture; and above, to one another, by the sagittal suture.

The large unossified ligamentous part of the cranium, observable between the parietal bones and the middle of the divided os frontis of new-born children, called by the vulgar the *open of the head*, was imagined by the ancients to serve for the evacuation of the superfluous moisture of the brain: and therefore they named it *bregma*, or the fountain; sometimes adding the epithet *pulsatilis*, or beating, on account of the pulsation of the brain felt through this flexible ligamento-cartilaginous substance. Hence the parietal bones are very frequently called *ossa bregmatis*.

Ossa temporum, so named from the hair's first becoming grey on the temples, and thus discovering people's ages, are each of them equal and smooth above, with a very thin semicircular edge; which, from the manner of its connection with the neighbouring bones, is distinguished by the name of *os squamosum*. Behind this, the upper part of the temporal bone is thicker, and more unequal; and is sometimes described as a distinct part, under the name of *pars mamillaris*. Towards the base of the skull, the temporal bone appears very irregular and unequal; and this part, instead of being broad, and placed perpendicularly, as the others are, is contracted into an oblong very hard substance, extended horizontally forwards and inwards, which in its progress becomes smaller, and is commonly called *os petrosum*.

Three external processes of each temporal bone are generally described. The first, placed at the lower and hind part of the bone, from its resemblance to a nipple, is called *mastoides* or *mamillaris*. It is not solid; but is composed of cancelli, or small cells, which have a communication with the large cavity of the ear, the drum; and therefore sounds, being multiplied in this vaulted labyrinth, are increased before they are applied to the immediate organ of hearing. Into the mastoid process the sterno-mastoid muscle is inserted: and to its back part, where the surface is rough, the trachelo-mastoides and part of the splenius are fixed. About an inch farther forward, the second process begins to rise out of the bone; and, having its origin continued obliquely downwards and forwards for some way, it becomes smaller, and is stretched forwards to join with the os malæ; they together forming the bony jugum, under which the temporal muscle passes. Hence this process has been named *zygomatic*. Its upper edge has the strong aponeurosis of the temporal muscle fixed into it; and its lower part gives rise to a share of the masseter. From under the craggy part of the os temporum, the third process stands out obliquely forwards. The shape of it is generally said to resemble the ancient *stylus scriptorius*; and therefore it is called the *styloid process*. Some authors however contend, that it ought to be named *stelioid*, from its being more like a pillar. Several muscles have their origin from this process, and borrow one half of their name from it; as *stylo-glossus*, *stylo-hyoides*, *stylo-pharyngeus*. This process is often, even in adults, not entirely ossified, but is ligamentous at its root, and is sometimes composed of two or three distinct pieces. Round the root of it, especially at the fore-part, there is a rising of the os petrosum, which some authors have esteemed a process: and, from the appearance it makes with the styliform, have named it *vaginalis*. Others again have, under the name of

auditory process, reckoned among the external processes, that semicircular ridge, which, running between the root of the mastoid and zygomatic processes, forms the under part of the external *meatus auditorius*.

The *sinuosities* or depressions on the external surface of each temporal bone are these: A long fossa at the inner and back part of the root of the mammary process, where the posterior head of the digastric muscle has its origin. Immediately before the root of the zygomatic process, a considerable hollow is left for lodging the crotaphite muscle. Between the zygomatic, auditory, and vaginal processes, a large cavity is formed; thro' the middle of which, from top to bottom, a fissure is observable, into which part of the ligament that secures the articulation of the lower jaw with this bone is fixed. The fore-part of the cavity being lined with the same cartilage which covers the tubercle before it, receives the condyle of the jaw; and in the back-part a small share of the parotid gland, and a cellular fatty substance, are lodged. At the inside of the root of the styloid apophyse, there is a thimble-like cavity, where the beginning of the internal jugular vein, or end of the lateral sinus, is lodged. Round the external *meatus auditorius*, several *sinuosities* are formed for receiving the cartilages and ligaments of the ear, and for their firm adhesion.

The *holes* that commonly appear on the outside of each of these bones, and are proper to each of them, are five. The first, situated between the zygomatic and mastoid processes, is the orifice of a large funnel-like canal, which leads to the organ of hearing; and is therefore called *meatus auditorius externus*. The second gives passage to the portio dura of the seventh pair of nerves; and from its situation between the mastoid and styloid processes, is called *foramen stylo-mastoideum*. Some way before, and to the inside of the styloid process, is the third hole: the canal from which runs first upwards, then forwards, and receives into it the internal carotid artery, and the beginning of the intercostal nerve; where this canal is about to make the turn forwards, one, or sometimes two, very small holes go off towards the cavity of the ear, called *tympanum*. Thro' these Valsalva affirms the proper arteries of that cavity are sent. On the anterior edge of this bone, near the former, a fourth hole is observable, being the orifice of a canal which runs outwards and backwards, in a horizontal direction, till it terminates in the tympanum. The whole canal is named *iter a palato ad aurem*, or *Eustachian tube*. On the external side of the bony part of this canal, and on the top of the chink, in the cavity that receives the condyle of the lower jaw, is the course of the little nerve, called *chorda tympani*, and commonly said to be reflected from the lingual branch of the fifth pair, till it enters the tympanum, to run across this cavity. The fifth hole is very uncertain, appearing sometimes behind the mastoid process; sometimes it is common to the temporal and occipital bones; and in several skulls there is no such hole.

The internal surface of the ossa temporum is unequal; the upper circular edge of the squamous part having numerous small ridges and furrows for its conjunction with the parietal bones; and the rest of it is irregularly marked with the convolutions of the middle part of the brain, and with furrows made by the branches of the arteries of the dura mater. From the under part of this internal surface, a larger transverse hard craggy protuberance runs horizontally inwards and forwards, with a sharp edge above, and two flat sides, one facing obliquely forwards and outwards, and the other as much backwards and inwards. To the ridge between these two sides, the large lateral process of the dura mater is fixed.

The internal proper *foramina* of each of these bones are, first, the internal *meatus auditorius* in the posterior plain side of the petrous process. This hole soon divides into two; one of which is the beginning of the aqueduct of Fallopius; the other ends in several very small canals that allow a passage to the branches of the portio mollis of the seventh pair of nerves, into the vestibule and cochlea.

Through it also an artery is sent, to be distributed to the organ of hearing. The second hole, which is on the anterior plain side of the craggy process, gives passage to a reflected branch of the second branch of the fifth pair of nerves, which joins the portio dura of the auditory nerve, while it is in the aqueduct, small branches of blood-vessels accompanying the nerves, or passing through smaller holes near it. The passage of the cutaneous vein into the lateral sinus, or of a branch of the occipital artery, is seen about the middle of the large fossa for that sinus; and the orifice of the canal of the carotid artery is evident at the under part of the point of the petrous process. The upper round part of the squamous bones is thin, but equal; while the low petrous part is thick and strong, but irregular and unequal, having the distinction of tables and diploë confounded, with several cavities, processes, and bones, within its substance, which are parts of the organ of hearing.

The temporal bones are joined above to the parietal bones by the squamous sutures and their posterior additamenta. Before, to the sphenoid bone, by the suture of that name; to the cheek bones, by the zygomatic sutures; and to the occipital bone, by the lambdoid suture and its additaments.

Os occipitis, so called from its situation, is convex on the outside, and concave internally. Its figure is an irregular square, or rather rhomboid; the lower angle of which is stretched forward in the form of a wedge, and thence is called the *cuneiform* process. The external surface is convex, except at the cuneiform apophyse, where it is flattened. At the base of this triangular process, on each side of the great hole, the large oblong protuberances, named the *condyles*, appear, to serve for the articulation of this bone with the first vertebra of the neck. Though the motion of the head is performed on the condyles, yet the centre of gravity of that globe does not fall between them, but is a good way farther forward; from which mechanism it is evident, that the muscles which pull the head back must be in a constant state of contraction; which is stronger than the natural contraction of the proper flexors, else the head would always fall forwards, as it does when a man is asleep, or labours under a palsy, as well as in infants, where the weight of the head far exceeds the proportional strength of these muscles. This seeming disadvantageous situation of the condyles is, however, of singular use, by allowing sufficient space for the cavities of the mouth and fauces, and for lodging a sufficient number of muscles, which commonly serve for other uses; but may at pleasure be directed to act on the head, and then they have an advantageous lever to act with, so as to be able to sustain a considerable weight, or other force applied to pull the head back.

Somewhat more externally than the condyles, there is a small rising and semilunated hollow in each side, which make part of the holes common to the occipital and petrous bones. Immediately behind this, on each side, a scabrous ridge is extended from the middle of the condyle towards the root of the mastoid process. Into this ridge the *musculus lateralis*, commonly ascribed to Fallopius, is inserted. About the middle of the external convex surface, a large arch runs across the bone; from the upper lateral parts of which the occipital muscles have their rise; to its middle the trapezii are attached; and half-way between this and the great hole, a lesser arch is extended. In the hollows between the middle of these arches the complexi are inserted; and, in the depressions more external and farther forward than these, the *splenii* are inserted.

On the inner surface of the *os occipitis* we see two ridges; one standing perpendicularly, the other running horizontally across the first. The upper part of the perpendicular limb, to which the falx is fixed, is hollowed in the middle, or often on one side, for the reception of the superior longitudinal sinus; and the lower part of it has the small or third process of the dura mater fastened to it, and is sometimes hollowed by the occipital sinus. Each side of

the horizontal limb is made hollow by the lateral sinuses inclosed in the transverse process of the dura mater; the fossa in the right side being generally a continuation of the one made by the longitudinal sinus in the perpendicular limb, and therefore is larger than the left one. The inner surface of the cuneiform apophyse is made concave for the reception of the medulla oblongata, and of the basilar artery. A furrow is made on each side, near the edges of this process, by a sinus of the dura mater, which empties itself into the lateral sinus.

The holes of this bone are commonly five proper, and two common. The first of the proper holes, called *foramen magnum* from its size, is immediately behind the wedge-like process; and allows a passage to the medulla oblongata, nervi accessorii, to the vertebral arteries, and sometimes to the vertebral veins. At each side of this great hole, near its fore part, and immediately above the condyles, we always find a hole, sometimes two, which soon unite again into one, that opens externally; through these the ninth pair of nerves go out of the skull. The fourth and fifth holes pierce from behind the condyle of each side into the fossae of the lateral sinuses; they serve for the passage of the cervical veins to these sinuses. Often one of these holes is wanting, sometimes both, when the veins pass through the great foramen. The two common foramina are the large irregular holes, one in each side, between the sides of the cuneiform process and the edges of the petrous bones.

The occipital bone is among the thickest of the cranium, though unequally so; for it is stronger above, where it has no other defence than the common teguments, than it is below; for, being there pressed by the lobes of the brain and cerebellum on one side, and by the action of the muscles on the other, it is so very thin as to be diaphanous in many skulls: but then these muscles ward off injuries; and the ridges and spines, which are frequent here, make it sufficiently strong to resist ordinary forces. The tables and diploë are tolerably distinct in this bone, except where it is so thin as to become diaphanous.

The occipital bone is joined above to the ossa parietalia, and to the triquetra, when present, by the lambdoid suture; laterally to the temporal bones, by the additamenta of the lambdoid suture; below to the sphenoid bone, by the end of its cuneiform process, in the same way that epiphyses and their bones are joined. For in children a ligamentous cartilage is interposed between the occipital and sphenoid bones, which gradually turns thinner as each of the bones advances, till their fibres at last run into each other; and, about sixteen or eighteen years of age, the union of these two bones becomes so intimate, that a separation cannot be made without violence. The os occipitis is joined by a double articulation to the first vertebra of the neck, each condyle being received into a superior oblique process of that vertebra.

Oss ethmoides, or the *sewe-like* bone, has its name from the great number of small holes with which it is pierced. Its several parts are, the *cribriform lamella* with its process, the *nasal lamella*, *cellulae*, and *ossa spongiosa*. The thin horizontal lamella is pierced obliquely by a great number of small holes, through which the filaments of the olfactory nerves pass. In a recent subject, these holes are so closely lined by the dura mater, that they are much less conspicuous than in the skeleton. From the middle of the internal side of this plate, a thick process rises upwards; and, being highest at the fore-part, gradually becomes lower as it is extended backwards. From some resemblance which this process was imagined to have to a cock's comb, it has been called *crista galli*. The falx is connected to its ridge, and to the unperforated part of the cribriform plate. When the crista is broke, its base is sometimes found to be hollow, with its cavity opening into the nose.

From the middle of the outer surface of the cribriform lamella, a thin solid plate is extended downwards and forwards, having the same common base with the crista galli. Generally it is not exactly perpendicular, but is inclined

to one side or other, and therefore divides the cavity of the nose unequally. Its inclination to one side, and flexure in the middle, is sometimes so great, that it fills up a large share of one of the nostrils, and has been mistaken for a polypus there. At a little distance from each side of this external process, a cellular and spongy bony substance depends from the cribriform plate. The number and figure of the cells in this irregular process, are very uncertain; but they open into each other, and into the cavity of the nose: the uppermost, which are below the aperture of the frontal sinuses, are formed like funnels. The outer surface of these cells is smooth and plain, where this bone assists in composing the orbit; at which place, on each side, it has the name of *os planum*. Below the cells of each side, a thin plate is extended inwards; and then, bending down, it becomes thick and of a spongy texture. This spongy part is triangular, with a straight upper edge placed horizontally, an anterior one slanting from above, downwards and forwards, and with a pendulous convex one below. The side of this pendulous spongy part next to the septum narium is convex, and its external side is concave. These two processes of the ethmoid bone have the name of *ossa spongiosa*, or *turbinata superiora*, from their substance, figure, and situation. All the prominences, cavities, and meanders, of this ethmoid bone, are covered with a continuation of the membrane of the nostrils in a recent subject. The cellular part of each palate-bone is contiguous to each *os planum*, and to the cells backwards. The lower edge of the nasal perpendicular plate is received into the furrow of the vomer. Its posterior edge is joined to the fore-part of the process azygos of the sphenoid bone. Its upper edge joins the nasal process of the frontal and nasal bones; and its anterior one is connected to the middle cartilage of the nose.

The uses of this bone are to sustain the anterior lobes of the brain; to give passage to the olfactory nerves, and attachment to the falx; to enlarge the organ of smelling, by allowing the membrane of the nose a great extent, to straighten the passage of the air through the nose, by leaving only a narrow winding canal, on the sensible membranous sides of which the substances conveyed along with the air must strike; to form part of the orbit of the eyes, and septum narium; while all its parts are so light as not to be in hazard of separating by their weight; and they are so thin as to form a large surface, without occupying much space. This brittle substance, however, is sufficiently protected from external injuries by the firm bones which cover it. If this bone is seized on by any corroding matter, we may easily conceive what destruction may ensue. Hence it is, that an *ozæna* is difficult to cure; and that in violent scurvy, or in the lues venerea, the fabric of the nose, the eyes, and even the life itself, are in danger. The situation of the nasal plate may shew us how dangerous a fracture of the bones of the nose may be, when made by a force applied to their middle fore-part, of a person in whom this nasal plate is perpendicular.

Oss sphenoides, or *wedge-like* bone, has two or three remarkable processes from each side of it, which are all of them again subdivided. The first pair is the two large lateral processes or wings; the upper part of each of which is called the *temporal process*, because they join the temporal bones. That part of the wings which juts out towards the inside, somewhat lower than the temporal apophyses, where it makes up part of the orbit, is thence named *orbital processes*. Behind the edge separating these two processes, there is often a small groove, made by a branch of the superior maxillary nerve, in its passage to the temporal muscle. The lowest and back part of each wing, which runs out sharp to meet the *ossa petrosa*, has been filled the *spinous process*: from near the point of which a sharp-pointed process is frequently produced downwards, commonly called *styloid process*, that affords origin to the pterygopharyngeus externus muscle. From this styloid process a very small groove is extended along the edge of the bone to the hollow at the root of the internal plate of the following processes,

cesses, which forms part of the Eustachian tube. The second pair of external processes of the cuneiform bone, is the two which stand out almost perpendicular to the base of the skull. Each of them has two plates, and a middle fossa facing backwards; and are commonly said to resemble the wings of a bat, and therefore are named *pterygoid* or *aliform* processes. From each side of the external plates the pterygoid muscles take their rise. At the root of each internal plate, a small hollow may be remarked, where the musculus ptery-phalpinus internus or circumflexus palati rises, and some share of the cartilaginous end of the Eustachian tube rests; and, at the lower end of the same plate, is a hook-like rising or process, round which the tendon of the last-named muscle plays, as on a pulley. To these may be added the little triangular thin process, which comes from each side of the body of the sphenoid bone, where the pterygoid processes are rising from it, and are extended over the lower part of the aperture of the sinus as far as the ethmoid bone, while their body hangs down into the nares. Besides these pair of processes, there is a sharp ridge which stands out from the middle of its base: and, because it wants a fellow, it may be called *processus azygos*. The lower part of this process, where it is received into the vomer, is thick, and often not quite perpendicular, but inclining more to one side than the other. The fore-part of this process, where it joins the nasal plate of the os ethmoides, is thin and straight. These two parts have been described as two distinct processes by some writers.

The depressions, sinuities, and fossæ, on the external surface of this sphenoid bone, may be reckoned up to a great number, viz. Two on the temporal apophyses, where the crotaphite muscles lodge; two on the orbital processes, to make way for the globes of the eyes; two between the temporal and spinous processes, for receiving the temporal bones; two between the plates of the pterygoid processes, where the muscoli pterygoidei interni and ptery-phalpylini interni are placed; two between the pterygoid and orbital processes, for forming the holes common to this and to the cheek and maxillary bones; two on the lower ends of the aliform processes, which the palate bones enter into; two at the roots of the temporal and pterygoid processes, where the largest share of the external pterygoid muscles have their rise; two at the sides of the processus azygos, for forming part of the nose, &c.

What are described under the name of *temporal* and *spinous processes* on the outside of the skull, are likewise seen on its inside, where they are concave, for receiving part of the brain; and commonly three apophyses on the internal surface of the sphenoid bone are only mentioned. Two, rising broad from the fore-part of its body, become smaller as they are extended obliquely backwards. The third, standing on a long transverse base, rises nearly erect, and of an equal breadth, terminating often in a little knob on each side. The three are called *clinoid*, from some resemblance which they were thought to have to the supporters of a bed. From the roots of the anterior clinoid processes the bone is extended on each side outwards and forwards, till it ends in a sharp point, which may have the name of the *transverse spinous processes*.

Within the skull, there are two *sinuities* in the internal part of each wing of the sphenoid bone, for receiving the middle part of the brain. One between the transverse spinous processes, for lodging the part of the brain where the crura medullæ oblongatæ are. Immediately before the third or middle clinoid process, a single pit may generally be remarked, from which a fossa goes out on each side to the holes through which the optic nerves pass. The pit is formed by the conjoined optic nerves; and in the fossa these nerves are lodged, as they run divided within the skull. Between that third protuberance and the posterior clinoid process, the larger pit of the glandula pituitaria may be remarked. This cavity, because of its resemblance to a Turkish saddle, is always described under the name of *sella turcica*, or *ephippium*. The holes on each side of the os sphenoides are six proper, and three common. The

first is the round one immediately below the anterior clinoid processes, for the passage of the optic nerve, and of the branch of the internal carotid artery that is sent to the eye. The second is the foramen lacerum, or large slit between the transverse spinous and orbital processes. The outer end of it is formed in the os frontis; and therefore this might be reckoned among the common foramina. Through it the third, fourth, the first branch of the fifth, and the greater share of the sixth, pair of nerves, and an artery from the internal carotid, go into the orbit. Sometimes a small branch of the external carotid enters near its end, to be distributed to the dura mater; and a vein, some call it the *venous duct*, or *Nuck's aqueduct*, returns through it to the cavernous sinus. The third hole, situated a little below, is called *rotundum*, from its shape. It allows passage to the second branch of the fifth pair of nerves, or superior maxillary nerve, into the bottom of the orbit. The fourth is the *foramen ovale*, about half an inch behind the round hole. Through it the third branch of the fifth pair, or inferior maxillary nerve, goes out. Very near the point of the spinous process is the fifth hole of this bone; it is small and round, for a passage to the largest artery of the dura mater, which is often accompanied with a vein. The sixth proper hole cannot be well seen, till the cuneiform bone is separated from all the other bones of the cranium; for one end of it is hid by a small protuberance of the internal plate of the pterygoid process; and by the point of the processus petrosus of the temporal bone. Its canal is extended above the inner plate of the pterygoid process; and where it opens into the cavity of the nose, it is concealed by the thin laminous part of the palate-bone.

The first of the *common holes* is that unequal fissure at the side of the sella turcica, between the extreme point of the os petrosus and the spinous process of the cuneiform bone. This hole only appears after the bones are boiled; for in a recent subject its back-part is covered by a thin bony plate that lies over the internal carotid artery, and farther forward it is filled with a cartilaginous ligament, under which the cartilaginous part of the Eustachian tube is placed. The second common hole is the large discontinuation of the external side of the orbit, left between the orbiter processes of the cuneiform bone, the os maxillare, malæ, and palati. In this large hole the fat for lubricating the globe of the eye and temporal muscles is lodged, and branches of the superior maxillary nerve, with small arteries from the carotid, and veins, pass. The third hole is formed between the base of this bone and the root of the orbital process of the palate-bone of each side. Through this a branch of the external carotid artery, and of the second branch of the fifth pair of nerves, are allowed a passage to the nostrils, and a returning vein accompanies them. Sometimes, however, this hole is proper to the palate-bone, being entirely formed out of its substance.

The os sphenoides is joined by its wings to the parietal bones above, to the os frontis and ossa malarum before, to the temporal bones behind; by the fore-part of its body and spinous processes, to the frontal and ethmoid bones; by its back-part, behind the two sinuses, to the occipital, where it looks like a bone with the epiphyses taken off, and, as was formerly observed in the description of the occipital bone, it cannot be separated without violence in adults; to the palate-bones, by the ends of the pterygoid process, and still more by the fore-part of the internal plates of the pterygoid processes, and of the sinuses; to the maxillary bones; by the fore-part of the external pterygoid plates; to the vomer and nasal plate of the os ethmoides, by the processus azygos.

The *face* is the irregular pile of bones composing the fore and under part of the head, which is divided by authors into the *upper* and *lower maxilla*, or jaws. The *superior maxilla* is the common designation given to the upper immovable share of the face. It consists of six bones on each side; of a thirteenth bone which hath no fellow, placed in the middle; and of sixteen teeth. The thirteen bones

bones are, two *ossa nasi*, two *ossa unguis*, two *ossa malarum*, two *ossa maxillaria*, two *ossa palati*, two *ossa spongiosa inferiora*, and the vomer. The *ossa nasi* are placed at the upper part of the nose; *ossa unguis* are at the internal canthi of the orbits; *ossa malarum* form the prominence of the cheeks; *ossa maxillaria* form the side of the nose, with the whole lower and fore-part of the upper jaw, and the greatest share of the roof of the mouth; *ossa palati* are situated at the back part of the palate, nostrils, and orbits; *ossa spongiosa* are seen in the lower part of the nares; and the vomer helps to separate these two cavities.

The bones of the upper jaw are joined to the bones of the skull by the *schindylefis* and sutures already described as common to the cranium and face, and they are connected to each other by *gomphosis* and fifteen sutures. The *gomphosis* is only where the teeth are fixed in their sockets, and the *schindylefis* is only where the edges of the vomer are joined to other bones. The sutures of the face (formerly called *harmonia*) have not such conspicuous indentations as those of the skull; the bones here not having substance enough for forming large indentations, and there being less necessity for security against external injuries, or any internal protruding force, than in the cranium. These sutures often disappear in old people, by the bones running into each other; which can do little prejudice, because the principal use of the bones being so numerous here, is to allow them to be extended into a proper form.

Ossa nasi, are so named, from their situation at the root of the nose. The lower edge of these bones is unequal, and is stretched outwards and backwards, to join the cartilages of the nostrils. Their anterior side is thick, especially above, and unequal, that their conjunction to each other might be stronger; and a small ridge may be remarked on their inner edge, where they are sustained by the septum narium. Their posterior side has externally a depression, where it is a little overlapped by the maxillary bones, while its lower half covers these bones: by which contrivance, they do not yield easily to pressure applied to their fore-part or sides. The nasal bones are firm and solid, with very few cells of cancelli in them. They are joined above to the frontal bone, by the middle of the transverse suture; behind, to the maxillary bones, by the lateral nasal sutures; below, to the cartilages of the nose; before, to one another, by the anterior nasal suture; internally, to the septum narium. The use of these bones is to cover and defend the root of the nose. In an infant they are proportionally shorter, and less thick at their upper part, than in an adult; but are otherwise complete.

Ossa unguis, or *lacrymalia*, are so named, because their figure and magnitude are nearly like those of a nail of one's finger, and because the tears pass upon them into the nose. Their external surface is composed of two smooth concavities and a middle ridge. The depression behind forms a small share of the orbit for the eye-ball to move on; and the one before is a deep perpendicular canal, or *fossa*, larger above than below, containing part of the lacrymal sac and duct. This is the part that ought to be pierced in the great operation for the fistula lacrymalis. This fossa of the bone is cribriform, or has a great number of small holes through it, that the filaments for the membrane which lines it insinuating themselves into these holes, might prevent a separation of the membrane, and secure the bone in its natural situation. The ridge between these two cavities of the os unguis is the proper boundary of the orbit at its internal canthus; and beyond which surgeons should not proceed backwards in performing operations here. The internal or posterior surface of this bone consists of a furrow in the middle of two convexities. The substance of the os unguis is as thin as paper, and very brittle; which is the reason that those bones are often wanting in skeletons, and need little force to pierce them in living subjects. Each of these bones is joined, above, to the frontal bone, by part of the transverse suture; behind, to the os planum of the ethmoid bone, by the same suture; before, and below, to the maxillary bone, by the lacrymal suture. Internally, the

ossa unguis cover some of the sinus ethmoidales; nay, are really continuous with the bony lamellæ which make up the sides of these cells; so that they are as much part of the ethmoid bone as the *ossa plana*. Their situation and tender substance make a rash operator in danger of destroying a considerable share of the organ of smelling, when he is performing the operation of the fistula lacrymalis; but, when these bones are hurt, they cast off without much difficulty, and consequently the wound is soon cured, unless the patient labours under a general cacothesis, or there is a predisposition in the bones to caries; in which case, a large train of bad symptoms follow, or at best the cure proves tedious.

Ossa malarum was the name given by Celsus to all the upper jaw; but is now appropriated to the prominent square bones which form the cheek on each side. Before, their surface is convex and smooth; backward, it is unequal and concave, for lodging part of the *crotophyte* muscles. The four angles of each of these bones have been reckoned processes by some authors. The one at the external canthus of the orbit, called the *superior orbital* process, is the longest and thickest. The second terminates near the middle of the lower edge of the orbit in a sharp point, and is named the *inferior orbital* process. The third, placed near the lower part of the cheek, and thence called *maxillary*, is the shortest and nearest to a right angle. The fourth, which is called *zygomatic*, because it is extended backwards to the *zygoma* of the temporal bone, ends in a point, and has one side straight and the other sloping. Between the two orbital angles there is a concave arch, which makes about a third of the external circumference of the orbit, from which a fifth process is extended backwards within the orbit, to form near one third of that cavity; and hence it may be called the *internal orbital* process. From the lower edge of each of the *ossa malarum*, which is between the maxillary and zygomatic processes, the masseter muscle takes its origin; and from the exterior part of the zygomatic process, the *musculus distortor oris* rises; in both which places the surface of the bone is rough.

Each of the *ossa malarum* is joined, by its superior and internal orbital processes, to the os frontis, and to the orbital process of the sphenoid bone, by the transverse suture; by the edge between the internal and inferior orbital processes, to the maxillary bone, by the external orbital suture; by the side between the maxillary and inferior orbital process, again to the maxillary bone, by the external orbital suture; by the zygomatic process, to the os temporum, by the zygomatic suture.

Ossa maxillaria superiora are the largest bones, and constitute the far greater part, of the upper jaw, which has appropriated the name of *maxillaria* to them. The processes of each os maxillare may be reckoned seven. The first is the long nasal one at its upper and fore part, which is broad below, and turns smaller as it rises upwards, to make the side of the nose. At the root of this a transverse ridge may be observed within the nostrils, which supports the fore part of the upper edge of the os spongiosum inferius. The second is produced backwards and outwards, from the root of the nasal process, to form the lower side of the orbit; and therefore may be called *orbital*. The edge of this orbital process, and the ridge of the nasal one, which is continued from it, make a considerable portion of the external circumference of the orbit. From the proper orbital process, a very rough triangular surface is extended downwards and outwards, to be connected to the cheek-bone; and therefore may be called the *molar process*, from the lowest protuberant part of which some share of the masseter muscle takes its rise. Behind the orbital process, a large tuberosity or bulge of the bone appears, which is esteemed the fourth process. On the internal part of this we often meet with a ridge, almost of the same height with that in the nasal process, which runs transversely, and is covered by a similar ridge of the palate-bone, on which the back-part of the upper edge of the os spongiosum inferius rests.

That

That spongy protuberance at the lower circumference of this bone, where the sockets for the teeth are formed, is reckoned the fifth. The sixth is the horizontal plate, which forms the greater part of the base of the nostrils, and roof of the mouth: its upper surface, which belongs to the nostrils, is very smooth; but the other below is arched and rough, for the stronger adhesion of the membrane of the mouth, which is stretched upon it; and in chewing, speaking, &c. might otherwise be liable to be separated. The seventh rises like a spine from the inner edge of the last, and forms a small part of the partition of the nostrils.

The *depressions* in each maxillary bone are, 1. A sinusity behind the orbital process, made by the temporal muscle. 2. A pit immediately before the same process, where the origin of the musculus elevator labiorum communis and elevator labii superioris, with a branch of the fifth pair of nerves, are lodged. 3. The hollow arch of the palate. 4. The femicircular great notch, or entry to the lower part of the nostrils. 5. Sockets for the teeth. 6. The lacrymal fossa in the nasal process, which assists the os unguis to form a passage for the lacrymal duct. The part of the bone forming this fossa is so firm and strong, that a surgeon can scarcely perforate it with the ordinary instruments for the fistula lacrymalis; and therefore ought to avoid it in doing this operation. Immediately on the outside of this there is a small depression, from which the inferior or lesser oblique muscle of the eye has its origin. 7. The canal on the upper part of the great tuberosity within the orbit, which is almost a complete hole; in this a branch of the superior maxillary nerve passes. Besides these, the superior surface of the great bulge is concave, to receive the under part of the eye. Immediately above the transverse ridge in the nasal process, a small hollow is formed by the os spongiosum. In some subjects, the nasal process has a small round pit above the lacrymal duct, where the little tendon or ligament of the orbicular muscle of the eyelids is inserted. It is this tendon, and not the tendon of the larger oblique muscle of the eye, which there is some hazard of cutting in the operation of the fistula lacrymalis.

The *holes* of this bone are two proper and two common. The first of the proper is the external orbital, immediately below the orbit. The second is the foramen incisivum, just behind the fore teeth. Through them small arteries and veins, and a twig of the second branch of the fifth pair of nerves, pass, and make a communication between, or join the lining coats of the nose and mouth. In some subjects, Steno's duct may be traced some length on the side of these passages next to the nose, and small orifices may be observed opening into the mouth. The first common hole is that which appears at the inner side of the back part of the tuberosity and of the sockets of the teeth; and is formed by a fossa in this bone, and a corresponding one in the os palati: through it a nerve, which is a branch of the second branch of the fifth pair, runs to the palate. The other common hole is the great slit in the outside of the orbit.

All the *body* of the maxillary bone is hollow, and leaves a large *sinus* like the frontal and sphenoid, which is commonly, but unjustly, called *antrum Highmorianum*. When the os maxillare is single, or separated from all the other bones of a skeleton, its antrum appears to have a large aperture into the nostrils; but, in a recent subject, it is so covered at its back-part by the palate-bone, in the middle by the os spongiosum inferius, before by a strong membrane, that one or sometimes two holes, scarcely so large as a crow-quill, are only left at the upper part; which, after a short winding process, open into the nostrils between the two ossa spongiosa. At the bottom of this cavity, we may often observe some protuberances, in which the small points of the roots of the teeth are contained. This cavern and the sockets of the teeth are often divided by the interposition only of a very thin bony plate, which is liable to be eroded by acrid matter collected in the antrum, or to be broken in drawing a tooth. The symptoms

of a collection of matter here naturally led us to the practice of pulling out the teeth, and piercing through this plate into the antrum, to procure an evacuation of the collected matter, by which considerable service is frequently done.

The maxillary bones are joined above, by the upper ends of their nasal processes to the os frontis, by the transverse future; at the sides of these processes, to the ossa unguis, by the lacrymal futures; to the nasal bones, by the lateral nasal futures; by their orbital processes, to the cheek-bones, by the external orbital future; by the internal sides of the internal orbital processes, to the ossa plana, by part of the ethmoidal future; by the back part of the tuberosities, to the palate-bones, by the future palato-maxillares; by the posterior edges of their palatine lamellæ, to the ossa palati, by the transverse palate future; by their nasal spines, to the vomer, by the spinous future; by their socket, to the teeth, by the gomphosis; by the internal edge of the palate-plate, to one another, by the longitudinal palate future, on the upper and fore part of which a furrow is left for receiving the cartilage which forms the partition of the nostrils; between the fore-part of the nostrils and mouth, to each other, by the mystachial future: sometimes they are connected to the ossa spongiosa inferiora, by a plain concretion or union of substance.

These bones form the greater part of the nose and of the roof of the mouth, and a considerable share of the orbit. They contain sixteen teeth, and give rise to muscles, transmission to nerves, &c.

Ossa palati are commonly described as two small square bones, at the back-part of the palate or roof of the mouth, though they are of much greater extent, being continued up the back-part of the nostrils to the orbit. Each palate-bone may therefore be divided into four parts, the palate square-bone, the pterygoid process, nasal lamella, and orbital process. The *square-bone* is unequally concave, for enlarging both the mouth and cavity of the nose. The upper part of its internal edge rises in a spine. Behind, this bone is somewhat in form of a crescent, and thick, for the firm connection of the velum pendulum palati; the internal point being produced backwards, to afford origin to the palato-staphylinus or azygos muscle. This square-bone is well distinguished from the pterygoid process by a perpendicular fossa, which, applied to such another in the maxillary bone, forms a passage for the palatine branch of the fifth pair of nerves; and by another small hole behind this, through which a twig of the same nerve passes. The *pterygoid process* is somewhat triangular, having a broad base, and ending smaller above. The back-part of this process has three fossæ formed in it; the two lateral receive the ends of the two plates of the sphenoid bone; the middle fossa makes up a part of what is commonly called the *fossa pterygoidea*; the fore-side of this palatine pterygoid process is an irregular concave, where it receives the back-part of the great tuberosity of the maxillary bone. The *nasal lamella* of this bone is extremely thin and brittle, and rises upwards from the narrow extremity of the pterygoid process; where it is so weak, and at the same time so firmly fixed to the maxillary bone, as to be very liable to be broken in separating the bones. From the part where the plate rises, it runs up broad on the inside of the tuberosity of the maxillary bone, to form a considerable share of the sides of the maxillary sinus, and to close up the space between the sphenoid and the great bulge of the maxillary bone, where there would otherwise be a large slit opening into the nostrils. From the middle internal side of this thin plate, a cross ridge, placed on such another of the maxillary bone, is extended; on it the back-part of the os spongiosum inferius rests.

The palate-bones are joined to the maxillary, by the fore-edge of the palate square bone, by the transverse palate future; by their thin nasal plates, and part of their orbital processes, to the same bones, by the palato-maxillares futures; by their pterygoid processes, and back-part of the nasal plates, to the alæ vespertilionum, by the sphenoid future; by the transverse ridges of the nasal palates, to

the ossa spongiosa inferiora, by contact; hence there frequently is an intimate union of the substance of these bones in aged skulls; by the orbital processes, to the ossa plana and cellulae ethmoidae, by the ethmoid future; to the body of the sphenoid bone, by the sphenoid future; by the internal edge of the square bones, to each other by the longitudinal palate future; and by their nasal spines, to the vomer, by the spinous future. The palate-bones form part of the palate, nostrils, orbits, and fossae pterygoideae; and they cover part of the sinus maxillares, sphenoidales, and ethmoidi. When we are acquainted with the history of these bones, the reason is evident, why the eyes are so much affected in ulcers of the palate, as to be often attended with blindness, which frequently happens in an ill-managed lues venerea; or why, on the other hand, the palate suffers from an ægylops.

Ossa turbinata, or *spongiosa inferiora*, resemble the superior ossa spongiosa in shape and substance, but have their anterior and upper edges contiguous to the transverse ridges of the nasal processes of the maxillary and palate bones. From their upper straight edge, two small processes stand out: the posterior, which is the broadest, descends to cover some of the antrum Highmorianum; the anterior rises up to join the os unguis, and to make part of the lacrymal duct. The names of these bones sufficiently declare their spongy substance, which has no firm external plate covering it. They are joined to the ossa maxillaria, palati, and unguis, in all subjects, by a firm union of substance; and, as this often happens in people of no great age, some authors are of opinion, that they should be esteemed part of the palate-bones; others think, that, since their upper edge is continued by a plate to part of the os ethmoides, they ought to be esteemed part of this bone. Their use is, to straighten the nostrils, to afford a large surface for extending the organ of smelling, to cover part of the antra maxillaria, and to assist in forming the under part of the lacrymal ducts, the orifices of which into the nose are concealed by these bones.

Vomer, or bone resembling a plough-share, is the thirteenth of the upper jaw, and is without a fellow, forming the lower and back parts of the partition of the nose. The figure of this bone is an irregular rhomboid. Its sides are flat and smooth. Its posterior edge appears in an oblique direction at the back-part of the nostrils. The upper one is firmly united to the base of the sphenoid bone, and to the nasal plate of the ethmoid; and is hollow, for receiving the processus azygos of the sphenoid. The anterior edge has a long furrow in it, where the middle cartilage of the nose enters. The lower edge is firmly united to the nasal spines of the maxillary and palate bone. The vomer is convex at its upper part, and then is straight, as it is extended downwards and forwards, where it is composed of two plates, the edges of which have a great number of small processes, disposed somewhat like the teeth of a saw, but more irregularly, and several of them are reflected back. Between these plates a deep fossa is left, which, as far as the top of the curvature, is wide, and has strong sides, for receiving the processus azygos of the sphenoid bone. Beyond the arch forwards, the fossa is gradually narrower and shallower to the point of the bone, receiving for some way the nasal lamella ethmoidae; which, after the ossification is complete, is so closely united to the vomer by the little processes piercing its substance, as to prevent any separation; on which account it has been esteemed by some authors a part of the ethmoid bone. The middle cartilage of the nose fills up what remains of the fossa at its fore-part. The posterior edge of the vomer, which appears above the back-part of the palate-bones, is broader above; but, as it descends forwards, becomes thinner, though it is still solid and firm. The lower edge of this bone, which rests on the nasal spine of the palate and maxillary bones, has a little furrow on each side of a small middle ridge, answering to the spines of the bones of different sides, and the interstices between them. This and the upper edge meet in the pointed fore-end of this bone.

It is joined above to the sphenoid and ethmoid bones, and to the middle cartilage of the nose by schindyleis; below, to the maxillary and palate bones by the spinous future. The vomer divides the nostrils; enlarges the organ of smelling, by allowing place for expanding the membrane of the nose on its sides; and sustains the palate-plates of the maxillary and palate bones, which otherwise might be in hazard of being pressed into the nostrils.

Maxilla inferior, the lower jaw, consists only of one moveable bone, and sixteen teeth incased in it. This bone is situated at the lower part of the face, so as its convex middle part is forward, and its legs are stretched back. It is commonly divided into the chin, sides, and processes. The *chin* is the middle fore-part; the extent of which to each side is marked on the external surface by the holes observable there, and internally by the beginning of an oblique ridge. Beyond these the *sides* appear; and are continued till the bone, by bending upwards, begins to form the *processes*. On the fore-part of the chin, a transverse ridge appears in the middle; on each side of which the musculi quadrati, or depressores, and the levatores labii inferioris, depress the bone: and below these prints a small rising may be observed, where the depressores commence. On the back-part of the chin, sometimes three, always two, small protuberances appear in the middle. To the uppermost, when it is seen, the frænum of the tongue is connected. From the middle one, the musculi genio-glossi rise; and from the lowest, the genio-hyoidei have their origin. Below the last, we see two rough sinuosities formed by the digastric muscles.

At the lower and fore part of the external surface of each side of the lower jaw, a small eminence may be observed, where the depressor labiorum communis rises. Near the upper edge of the side a ridge runs lengthwise, to which the under-part of the musculus buccinator is connected. Internally, towards the upper edge of each side, another ridge appears, from which the mylo-hyoidei have their origin, and to which the internal membrane of the gums adheres. In the upper edge of both chin and sides, are a great many deep pits or sockets, for receiving the roots of the teeth. The number and magnitude of these sockets are various, because of the different number, as well of the teeth themselves, as of their roots, in different people. These sockets in the lower jaw, as well as in the upper one, are less deep as old age comes on: when freed from the teeth by any means, they are some time after filled up with an osseous net-work, which at last becomes entirely solid, and as smooth as any other part of the bone; so that, in a great many old subjects, we cannot observe a vestige of the sockets: but then the jaw becomes less, and much narrower. Hence we may know why the chin and nose of edentulous people are much nearer than before the teeth were lost; while their lips either fall in towards their mouth, or stand prominent forwards. When new teeth are protruded, new sockets are formed. The lower edge of the chin and sides is smooth and equal, and is commonly called the base of the lower jaw.

The *processes* are two on each side. The anterior sharp thin coronoid ones have the crotaphite muscles inserted into them. The posterior processes or condyles terminate in an oblong smooth head, supported by a cervix. The fore-part of the root and neck of these condyloid processes are a little hollow and rough where the external pterygoid muscles are inserted. The *holes* of the lower jaw are two on each side; one at the root of the processes internally, where a large branch of the third branch of the fifth pair of nerves enters with an artery, and a vein returns. The other hole is external, at the confines of the chin, where branches of the nerve and vessels come out. The canal between these two holes is formed in the middle of the substance of the bone, and is pierced by a great number of small holes, by which the nerves and blood-vessels of the cancelli and teeth pass. This canal is continued a little farther than the external hole at the chin. On account of the vessels and nerves in the lower jaw, fractures of it

may be attended with dangerous symptoms. The *surface* of the lower jaw is hard and firm, except at the spongy sockets, where, however, it is stronger than the upper jaw. Its internal *substance* is cellular, without any solid partition between the cancelli in its middle. At the base, especially of the chin, where this bone is most exposed to injuries, the solid sides of it are thick, compact, and hard.

The lower jaw generally receives the root of sixteen teeth into its sockets, by *gomphosis*; and its condyloid processes, covered with a cartilage, are articulated with the temporal bones, in a manner that is not in general rightly described: for, not only the fore-part of the cavity between the zygomatic, auditory, and vaginal, processes, but also the adjoining tubercle at the root of the zygomatic process of each os temporum, is covered with a smooth cartilage for this articulation. Here also an intermediate moveable cartilage is placed; which being thin in the middle, and thick at the edges, is concave on both sides; and is connected so firmly by ligaments to each condyle, as to follow the motions of the condyle; and so loosely to the temporal bone, as readily to change its situation from the cavity to the tubercle, and to return again; while the common ligament of the articulation affords space enough for such a change of place backwards and forwards: but, like other ligaments of the joints by ginglymus, is strong and short at the sides, to confine the lateral motions. When, therefore, the teeth of both jaws coincide, the condyles are lodged securely in the temporal cavities; but their motions to either side must be confined both by the firmness of the ligaments and the rising brims which are on each side of the cavities. When the jaw is brought directly forwards, the condyle and intermediate cartilages descend and advance forwards upon the tubercles. In this situation, the lateral motions are a little more free than in the former one, from the want of rising brims to stop the condyles. When the fore-teeth of the lower jaw are moved forwards and to a side, the condyle of the opposite side is either advanced from the cavity to the tubercle, while the condyle of the same side remains in the cavity; or, if both condyles are on the tubercles, when the jaw is moved obliquely to a side, the condyle of the side to which the motion is made slides back from the tubercle to the cavity. When the mouth is opened by the descent of the lower jaw, the fore-part of it, where the depressing muscles are fixed, is drawn backwards, as well as downwards, while resistance is made to the angles moving backwards by the masseter and internal pterygoid muscles, and at the same time, the external pterygoid draws the condyles and their moveable cartilages forwards; and therefore, when the mouth is opened, the condyles are carried forwards upon the tubercles, and the axis of motion of the bone is a little above its angles. But in this situation there is less resistance, than in any other, to the condyles luxating forwards; a disease which seldom happens, except when people are gaping too wide; and therefore the common practice of nurses, who support the jaw of infants when they are yawning, is reasonable. In chewing, there is a succession of the motions above described.

The *teeth* are the hard white bodies placed in the sockets of both jaws. Their number is generally sixteen above and as many below; though some people have more, others less. The broad thick part of each tooth, which appears without the socket, is the base or body. The smaller processes, sunk into the maxillæ, are the roots or fangs. At the place where the base ends and the roots begin, there is generally a small circular depression, which some call the neck or collar. Without the gums the teeth are covered with no membrane, and they are said to have no proper periodium within the sockets; but that is supplied by the reflected membrane of the gums, which after a good injection may be evidently seen in a young subject, with the vessels from it penetrating into the substance of the teeth; and it may be discovered in any tooth recently pulled, by macerating it in water. The adhesion of this membrane to these roots is strengthened by the small fur-

rows observable on them. Each tooth is composed of its cortex or enamel, and an internal bony substance. The cortex has no cavity or place for marrow; and is so solid and hard, that saws or files can with difficulty make an impression on it. It is thickest upon the base, and gradually, as the roots turn smaller, becomes thinner, but not proportionally to the difference of the size of the base and roots. The fibres of this enamel are all perpendicular to the internal substance; and are straight on the base, but at the sides are arched with a convex part towards the roots; which makes the teeth resist the compression of any hard body between the jaws with less danger of breaking these fibres than if they had been situated transversely. The bony part of the teeth has its fibres running straight, according to the length of the teeth. When it is exposed to the air, by the breaking or falling off of the hard cortex, it soon corrupts. And thence carious teeth are often entirely hollow within, when a very small hole appears only externally.

The teeth have canals formed in their middle, wherein their nerves and blood-vessels are lodged. The vessels are easily traced as long as they are in the large canal, but can scarcely be observed in their distribution from that to the substance of the teeth of adults. Ruysch however affirms, that after injection he could trace the arteries into the hardest part of the teeth. And Leuwenhoek suspected the fibres of the cortex to be vessels. This plentiful supply of vessels must expose the teeth to the same disorders that attack other vascular parts; and such teeth as have the greatest number of vessels must have the most numerous chances of being seized with these diseases.

Every root of each tooth has a distinct canal, with vessels and nerves in it. These canals in the teeth with more than one root, come nearer each other as they approach the base of the tooth; and at last are only separated by very thin plates, which, being generally incomplete, allow a communication of all the canals; and frequently one common cavity only appears within the base, in which a pulpy substance composed of nerves and vessels is lodged. The condition therefore of the nerves here bears a strong analogy to that of the cutaneous nerves which serve for the sensation of touching. The entry of the canals for these vessels is a small hole placed a little to a side of the extreme point of each root; sometimes, especially in old people, this hole is entirely closed up, and consequently the nerves and blood-vessels are destroyed.

Children are seldom born with teeth; but at two years of age they have twenty; and their number does not increase till they are about seven years old; when the teeth that first made their way through the gums are thrust out by others that have been formed deeper in the jaw, and some more of the teeth begin to discover themselves farther back in the mouth. About fourteen years of age, some more of the first crop are shed, and the number is increased. This shedding of the teeth is of great use: for, if the first had remained, they would have stood at a great distance one from another; because the teeth are too hard in their outer crust to increase so fast as the jaws do. Whereas, both the second layer and the teeth that come out late, meeting, while they are soft, with a considerable resistance to their growth in length, from those situated upon them, necessarily come out broad, and fit to make that close guard to the mouth which they now form.

The teeth are joined to the sockets by *gomphosis*, and the gums contribute to fix them there; as is evident by the teeth falling out when the gums are any way destroyed or made too spongy, as in the scurvy or salivation: whence some authors class this articulation with the *symplicosis*.

Though the teeth so far agree in their structure, yet, because of some things wherein they differ, they are generally divided into three classes, viz. *incisores*, *canini*, and *molars*. The *incisores* are the four fore-teeth in each jaw, receiving their name from their office of cutting our aliment; for which they are excellently adapted, being each formed into a sharp-cutting edge at their base, by their fore-

fore-side turning inwards there, while they are sloped down and hollowed behind; so that they have the form of wedges, and therefore their power of acting must be considerably increased. Seeing, in the action of the incisores, a perpendicular compression is only necessary, without any lateral motion, they are not so firmly fixed in their sockets as the other teeth are, each having only one short root; but that is broader from before backwards than to either side, to have the greatest strength where it is exposed to the strongest force applied to it. The incisores of the upper jaw, especially the two middle ones, are generally broader and longer than those of the under jaw. The *canini*, from the resemblance to dog's tusks, are one on each side of the incisores in each jaw. The two in the upper jaw are called *eye-teeth*, from the communication of nerves which is said to be between them and the eyes. The two in the lower jaw are named *angular* or *wisdom teeth*, because they support the angles of the mouth. The canini are broader, longer, and stronger, than the incisores are; only that the edge rises into a point at the middle. Each of them has generally but one long root, though sometimes they have two. The roots are crooked towards the end. The canini of the upper jaw are larger, longer, and with more crooked roots, than those of the under jaw. The form of their base is fit both for piercing and cutting, and the long crooked root of each makes it secure in the socket. The *dentes molares*, or *grinders*, which have this name because they grind our food, are generally five in the sides of each jaw; in all twenty. Their bases are broader, more scabrous, and with a thinner cortical substance, than the other teeth. They have also more roots; and, as these roots generally divaricate from each other, the partitions of the sockets between them bear a large share of the great pressure they suffer, and hinder it from acting on their points. The base of the first grinder has an edge pointed in the middle, on its outside resembling the canini; from which it slopes inwards till it rises again into a point. It has generally but one root, which sometimes is long and crooked at its point. The second *dens molaris* has two points on its base, rising nearly equally on its out and inside. It has two roots, either separate or run together, but shorter than the root of the first. These two anterior grinders are much smaller than the three that are placed farther back in the mouth. The third and fourth are very broad in their bases, with four or five points standing out; and they have three or more roots. The fifth, commonly called *dens sapientia*, from its coming through the gums later than the other grinders, has four points on its base, which is not so large as the base of the third and fourth, and its roots are less numerous. The incisores of the upper jaw being broader than those of the lower jaw, make the superior grinders to be placed so much farther back than the lower ones, that, when they are brought together, by shutting the mouth, the points of the grinders of one jaw enter into the depressions of the opposite grinders, and they are all equally applied to each other, notwithstanding the inequality of their surface. The numerous roots of the *dentes molares* prevent their loosening by the lateral pressure they suffer in grinding; and as the sockets in the upper jaw are more spongy, and the teeth are more liable, by their situation, to fall out, the grinders there have more numerous and more separated roots than in the lower jaw.

The *os hyoides* is situated horizontally between the root of the tongue and the larynx. It is properly enough named *hyoides*, from the resemblance it bears to the Greek letter *v*; and may, for a clearer demonstration of its structure, be distinguished into its *body*, *cornua*, and *appendices*. The *body* is the middle broad part, convex before and hollow behind. The convex fore-part is divided into two by a ridge, into the middle of which the *mylo-hyoidei*, and into the sides the *stylo-hyoidei*, muscles are inserted. Above the ridge, the bone is horizontal; but pitted in the middle by the insertion of the two *genio-hyoidei* muscles, and a little hollowed more laterally by the *basio-glossi*. Below

the ridge, it is convex; but a little flattened in the middle by the *sterno-hyoidei*, and pitted more externally by the *coraco-hyoidei*. The concavity behind faces backwards and downwards to receive the thyroid cartilage, when the larynx and the *os hyoides* are pulled towards each other by the action of the *sterno-hyoidei* and *hyo-thyroidei* muscles; and, to its upper edge, the ligamentous membranes of the epiglottis, tongue, and thyroid cartilage, are fixed.

The *cornua* of the *os hyoides* are stretched backwards from each side of its body, where often a small furrow points out the former separation; for, in young subjects, the body and cornua are not one continued substance, as they come afterwards to be in adults. These cornua are not always straight, nor of an equal length; their two plain surfaces stand obliquely sloping from above outwards and downwards. Into the external, the *cerato-glossi* is inserted above, and the *thyro-hyoideus* muscle below; and and, to the one behind, the ligamentous membrane of the tongue and larynx adheres. Each of the cornua becomes gradually smaller as it is extended from the base; but ends in a round tubercle, from which a moveable cartilage stands out, which is connected to the upper process of the *cartilago thyroidea*.

Where the body of the *os hyoides* joins on each side with its cornua, a small styloid process, called *appendix*, rises upwards and backwards, into which the *musculi stylo-hyoidei alteri*, and part of the *hyo-glossi* muscles, are fixed. The substance of the *os hyoides* is cellular; but covered with a firm external plate, which is of sufficient strength to bear the actions of so many muscles as are inserted into it. It is not articulated with any bone of the body, except by means of the muscles and ligaments already mentioned. The use of *os hyoides*, is to serve as a solid lever for the muscles to act with, in raising and depressing the tongue and larynx, or in enlarging and diminishing the capacity of the fauces.

BONES of the TRUNK.

The trunk consists of the *spine*, *pelvis*, and *thorax*. The *spine* is the long piles of bones extended from the condyles of the occiput to the end of the rump. It somewhat resembles two unequal pyramids joined in a common base. It is not, however, straight; for, its upper part being drawn backwards by strong muscles, it gradually advances forwards, to support the oesophagus, vessels of the head, &c. Then it turns backwards, to make room enough for the heart and lungs. It is next bent forwards, to support the viscera of the abdomen. It afterwards turns backwards, for the enlargement of the pelvis. And, lastly, it is reflected forwards, for sustaining the lowest great gut. The spine is commonly divided into *true* and *false vertebrae*; the former constituting the long upper pyramid, which has its base below; while the *false vertebrae* make the shorter lower pyramid, whose base is above.

The *true vertebrae* are the twenty-four upper bones of the spine, on which the several motions of the trunk of our bodies are performed; from which use they have justly derived their name. Each of these vertebrae is composed of its body, and processes. The *body* is the thick spongy fore-part, which is convex before, concave backwards, horizontal and plain in most of them above and below. Numerous small holes, especially on the fore and back part of their surface, give passage to their vessels, and allow the ligaments to enter their substance. The edges of the body of each vertebra are covered, especially at the fore-part, with a ring of bone firmer and more solid than the substance of the body any where else. These rings seem to be joined to the vertebrae in the form of epiphyses, but are alleged by some authors to be the ligaments ossified. They are of great use in preventing the spongy bodies from being broken in the motions of the trunk. Between the bodies of each two adjoining vertebrae, a substance between the nature of ligament and cartilage is interposed; which seems to consist of concentric curved fibres, when it is cut horizontally; but, when it is

divided perpendicularly, the fibres appear oblique and decussating each other. The outer part of the intervertebral ligaments is the most solid and hard, and they gradually become softer till they are almost in the form of a glairy liquor in the centre; and therefore these substances were not improperly called mucous ligaments by the ancients. The external fibrous part of each is capable of being greatly extended, and of being compressed into a very small space, while the middle fluid part is incompressible, or nearly so; and the parts of this ligament between the circumference and centre approach in their properties to each other, in proportion to their more solid or more fluid texture. The middle point is therefore a fulcrum or pivot, on which the motion of a ball and socket may be made, with such a gradual yielding of the substance of the ligament, in whatever direction our spines are moved, as saves the body from violent shocks, and their dangerous consequences.

From each side of the body of each vertebra, a bony bridge is produced backwards, and to one side: from the posterior end of which one slanting *process* rises, and another descends; the smooth, and what is generally the flattest, side of each of these four processes, which are called the *oblique*, is covered with a smooth cartilage; and the two lower ones of each vertebra are fitted to, and articulated with, the two upper or ascending oblique processes of the vertebra below, having their articular ligaments fixed into the rough line round their edges. From between the oblique processes of each side, the vertebra is stretched out laterally into a process that is named *transverse*. From the back part of the roots of the two oblique and of the transverse process of each side, a broad oblique bony plate is extended backwards; where these meet, the seventh process of the vertebra takes its rise, and stands out backwards: this being generally sharp-pointed and narrow-edged, is therefore called *spinal* process; from which this whole chain of bones has its name. The substance of the processes is considerably stronger and firmer, and has a thicker external plate, than the bodies of the vertebrae themselves. The seven processes form a concavity at their fore-part, which, joined to the one at the back-part of the bodies, makes a great hole; and the holes of all the vertebrae form a long large conduit, for continuing the spinal marrow. In the upper and lower edge of each lateral bridge, there is a notch. These are so adapted to each other in the contiguous vertebrae, as to form a round hole in each side between each two vertebrae, through which the nerves that proceed from the spinal marrow and its blood-vessels pass.

The articulations, then, of these true vertebrae are plainly double: for their bodies are joined by the intervening cartilage above described; and their oblique processes, being tipped with cartilages, are so connected by their ligaments as to allow a small degree of motion on every side. Hence it is evident, that their centre of motion is altered in different positions of the trunk: for, when we bow forwards, the upper moved part bears entirely on the bodies of the vertebrae; if we bend back, the oblique processes support the weight; if we recline to one side, we rest upon the oblique processes of that side and part of the bodies; if we stand erect, all the bodies and oblique processes have their share in our support.

Hence it follows, 1. That, because the joints of which the spine is composed are so numerous, the spinal marrow, nerves, blood-vessels, &c. are not liable to such compression and over-stretching in the motion of the trunk of the body as they would otherwise be, since several vertebrae must be concerned in every motion of the spine; and therefore a very small curvature is made at the conjunction of any two vertebrae. 2. That an erect posture is the surest and firmest, because the surface of contact of the fulcrum is largest, and the weight is most perpendicular to them. 3. That the muscles which move the spine act with greater force in bringing the trunk into an erect posture, than in drawing it to any other; for, in bending forwards, back-

wards, or to a side, the muscles which perform any of these actions are nearer the centre of motion; consequently the lever with which they act is shorter than when the centre of motion is on the part of the vertebra opposite to that where these muscles are inserted; which is the case in raising the trunk. This is extremely necessary; since, in the deflections of the spine from a perpendicular bearing, the weight of the body soon inclines it in the direction we choose; whereas, in raising us erect, this great weight must be more than counteracted. 4. In calculating the force exerted by the muscles which move the spine, we should always make allowance for the action of the cartilages between the vertebrae, which, in every motion from an erect posture, must be stretched on one side, and compressed on the other, to both which they resist; whereas, in raising the trunk, these cartilages assist by their springy force. 5. We are hence naturally led into the reason of our height of stature increasing in the morning, and diminishing at night: for the intermediate cartilages of the vertebrae, being pressed all day long by the weight of our body, become more compact and thin in the evening; but, when they are relieved from this pressure in the night, they again expand themselves to their former thickness: and, seeing the bulk of any part must vary according to the different distension or repletion of the vessels composing it, we may understand how we become taller after a plentiful meal, and decrease after fasting or evacuations. 6. From the different articulations of the bodies and oblique processes of the vertebrae, and the different strength of the ligaments, it is plain that they are formed so as to allow much larger motion forwards than backwards; this last being of much less use, and might be dangerous, by over-stretching the large blood-vessels that are contiguous to the bodies of the vertebrae. 7. The intervertebral cartilages shrivelling as they become more solid by age, is the cause why old people generally bow forwards, and cannot raise their bodies to such an erect posture as they had in their youth.

From this general mechanism of the spine, an account is easily deduced of all the different preternatural curvatures of which the spine is capable. For, if one or more vertebrae, or their cartilages, are of unequal thickness in opposite sides, the spine must be reclined over to the thinner side; which now, sustaining the greatest share of the weight, must still be more compressed, consequently hindered from extending itself in proportion to the other side, which, being too much freed of its burden, has liberty to enjoy a luxuriant growth. The causes, on which such an inequality of thickness in different sides of the vertebrae depends, may vary. For either it may be owing to an over-distension of the vessels of one side, and from thence a preternatural increase of the thickness of that part: or, which is more commonly the case, it may proceed from an obstruction of the vessels, by which the application of proper nourishment to the bony substance is hindered; whether that obstruction depends on the faulty disposition of the vessels or fluids, or if it is produced by an unequal mechanical pressure occasioned by a paralytic weakness of the muscles and ligaments, or by a spasmodic over-action of the muscles on any side of the spine, or by people continuing long, or putting themselves frequently, into any posture declining from the erect one. In all these cases one common effect follows, to wit, the vertebrae, or their cartilages, or both, turn thick on that side where the vessels are free, and remain thin on the other side where these vessels are straitened or obstructed. When once we understand how these crooked spines are produced, there is little difficulty in forming a just prognosis; and a proper method of cure may be easily contrived, which must vary as to the internal medicines, according to the different causes on which the disease depends. But one general indication must be pursued by surgeons; which is, to counteract the bending force, by increasing the compression on the convex part of the curvature, and diminishing it on the concave side. The manner of executing which in particular

cular cases must be different, and requires a very accurate examination of the circumstances both of the disease and patient.

Though the true vertebræ agree in the general structure above described; yet, because of several specialties proper to a particular number, they are commonly divided into three classes, viz. *cervical*, *dorsal*, and *lumbar*. The *cervical* are the seven uppermost vertebræ; which are distinguished from the rest by these marks: Their bodies are smaller and more solid than any others; and flattened on the fore-part, to make way for the œsophagus; or rather this flat figure is owing to the pressure of that pipe, and to the action of the longi colli and anterior recti muscles. They are also flat behind, where small processes rise, to which the internal ligaments are fixed. The transverse processes of these vertebræ are framed in a different manner from those of any other bones of the spine. For, besides the common transverse process rising from between the oblique processes of each side, there is a second one that comes out from the side of the body of each vertebra; and these two processes, after leaving a circular hole for the passage of the cervical artery and vein, unite, and are considerably hollowed at their upper part, with rising sides, to protect the nerves that pass in the hollow; and at last each side terminates in an obtuse point, for the insertion of muscles. The spinal processes of these cervical bones stand nearly straight backwards, are shorter than those of any other vertebræ, and are forked or double at their ends; and hence allow a more convenient insertion to muscles.

The cervical vertebræ have some particular differences, which oblige us to consider them separately. The first, from its use of supporting the head, has the name of *atlas*; and is also called *epistrophe*, from the motion it performs on the second. The atlas, contrary to all the other vertebræ of the spine, has no body; but, instead of it, there is a bony arch. In the convex fore-part of this arch a small rising appears, where the musculus longi colli are inserted; and, on each side of this protuberance, a small cavity may be observed, where the recti interni minores take their rise. The upper and lower parts are rough and unequal, where the ligaments that connect this vertebra to the os occipitis, and to the second vertebra, are fixed. The back-part of the arch is concave, smooth, and covered with a cartilage, in a recent subject, to receive the tooth-like process of the second vertebra.

The superior oblique process of this atlas are large, oblong, hollow, and more horizontal than in any other vertebra. They rise more in their external than internal brim; by which their articulations with the condyloid processes of the os occipitis are firmer. Under the external edge of each of these oblique processes is the fossa, or deep open channel, in which the vertebral arteries make the circular turn, as they are about to enter the great foramen of the occipital bone, and where the tenth pair of nerves go out. The inferior oblique processes, extending from within outwards and downwards, are large, concave, and circular. So that this vertebra, contrary to the other six, receives the bones with which it is articulated, both above and below.

The second vertebra colli is called *dentata*, from the tooth-like process on the upper part of its body. Some authors call it *epistrophe*; but improperly, since this designation is only applicable to the first, which moves on this as on an axis. The body of this vertebra is somewhat of a pyramidal figure, being large, and produced downwards, especially at its fore-side, to enter into a hollow of the vertebra below; while the upper part has a square process, with a small point standing out from it. A ligament likewise goes out in an oblique transverse direction, from each side of the processus dentatus, to be fixed at its other end to the first vertebra, and to the occipital bone; and another ligament rises up from near the point of the process to the os occipitis. The superior oblique processes of this vertebra are large, circular, very nearly in an horizon-

tal position, and slightly convex, to be adapted to the inferior oblique processes of the first vertebra. The inferior oblique processes of this vertebra answer exactly to the description given of those common to all the cervical vertebræ.

The transverse processes of the vertebra dentata are short, very little hollowed at their upper part, and not forked at their ends; and the canals through which the cervical arteries pass are reflected outwards about the middle substance of each process; so that the course of these vessels may be directed towards the transverse processes of the first vertebra. Had this curvature of the arteries been made in a part so moveable as the neck is, while they were not defended by a bone, and fixed to that bone, scarcely a motion could have been performed without the utmost hazard of compression, and a stop put to the course of the liquids, with all its train of bad consequences. Hence we observe this same mechanism several times used, when there is occasion for a sudden curvature of a large artery. The spinal process of this vertebra dentata is thick, strong, and short, to give sufficient origin to the musculus recti majores and obliqui inferiores, and to prevent the contusion of these and other muscles in pulling the head back. This second vertebra consists, at the birth, of four bony pieces. For, besides the three already mentioned as common to all the vertebræ, the tooth-like process of this bone is begun at this time to be ossified in its middle, and is joined as an appendix to the body of the bone. Left this appendix bent or displaced, good nurses keep the heads of new-born children from falling too far backwards, by stay-bands, or some such means, till the muscles attain strength sufficient to prevent that dangerous motion.

The third vertebra of the neck is by some called *axis*; but this name is applied to it with much less reason than to the second. This third, and the three below, have nothing particular in their structure, but all their parts come under the general description formerly given, each of them being larger as they descend. The seventh vertebra of the neck is near to the form of those of the back, having the upper and lower surfaces of its body less hollow than the others. The oblique processes are more perpendicular; neither spinal nor transverse processes are forked. This seventh and the sixth vertebra of the neck have the hole in each of their transverse processes more frequently divided by a small cross bridge, that goes between the cervical vein and artery, than any of the other vertebræ.

The twelve *dorsal* may be distinguished from the other vertebræ of the spine by the following marks: Their bodies are of a middle size, between those of the neck and loins; they are more convex before than either of the other two sorts; and are flattened laterally by the pressure of the ribs, which are inserted into small cavities formed in their sides. This flatness of their sides, which makes the figure of these vertebræ almost an half oval, is of great use; as it affords a firm articulation to the ribs, allows the trachea arteria to divide at a small angle, and the other large vessels to run secure from the action of the vital organs. Their bodies are more concave behind than any of the other two classes. Their upper and lower surfaces are horizontal. The cartilages interposed between the bodies of these vertebræ are thinner than in any other of the true vertebræ; and contribute to the concavity of the spine in the thorax, by being thinnest at their fore-part. The oblique processes are placed almost perpendicularly; the upper ones slanting but a little forwards, and the lower ones slanting as much backwards. Between the oblique processes of opposite sides, several sharp processes stand out from the upper and lower parts of the plates which join to form the spinal processes; into these, strong ligaments are fixed for connecting the vertebræ. The transverse processes of the dorsal vertebræ are long, thicker at their ends than in the middle, and turned obliquely backwards; which may be owing to the pressure of the ribs, the tubercles of which are inserted into a depression near the end of these processes.

ses. The spinal processes are long, small-pointed, and sloping downwards and backwards: from their upper and back part a ridge rises, which is received by a small channel in the fore-part of the spinal process immediately above, which is here connected to it by a ligament. The conduit of the spinal marrow is here more circular, but, corresponding to the size of that cord, is smaller than in any of the other vertebrae; and a larger share of the holes in the bony bridges, for the transmission of the nerves, is formed in the vertebra above than in one below. The connection of the dorsal vertebrae to the ribs, the thinness of their cartilages, the erect situation of the oblique processes, the length, sloping, and connection, of the spinal processes, all contribute to restrain these vertebrae from much motion, which might disturb the actions of the heart and lungs; and, in consequence of the little motion allowed here, the intervertebral cartilages sooner shrivel, by becoming more solid; and therefore the first remarkable curvature of the spine observed, as people advance to old age, is in the least stretched vertebrae of the back; or old people first become round shouldered.

The lowest order of the true vertebrae is the *lumbar*, which are five bones, that may be distinguished from any other by these marks: 1. Their bodies, though of a circular form at their fore-part, are somewhat oblong from one side to the other; which may be occasioned by the pressure of the large vessels, the aorta and cava, and of the viscera. The epiphyses on their edges are larger; and therefore the upper and lower surfaces of their bodies are more concave than in the vertebrae of the back. 2. The cartilages between these vertebrae are much the thickest of any, and render the spine convex within the abdomen, by their greatest thickness being at their fore-part. 3. The oblique processes are strong and deep; those in opposite sides being almost placed in parallel planes; the superior, which are concave, facing inwards, and the convex inferior ones facing outwards. And therefore each of these vertebrae receives the one above it, and is received by the one below; which is not so evident in the other two classes already described. 4. Their transverse processes are small, long, and almost erect, for allowing large motion to each bone, and sufficient insertion to muscles, and for supporting and defending the internal parts. 5. Between the roots of the superior oblique and transverse processes a small protuberance may be observed, where some of the muscles that raise the trunk of the body are inserted. 6. Their spinal processes are strong, straight, and horizontal, with broad flat sides, and a narrow edge above and below; this last being depressed on each side by muscles. And at the root of these edges, we see rough surfaces for fixing the ligaments. 7. The canal for the numerous cords called *cauda equina*, into which the spinal marrow divides, is rather larger in these bones than what contains that marrow in the vertebrae of the back. 8. The holes for the passage of the nerves are more equally formed out of both the contiguous vertebrae than in the other classes; the upper one furnishes, however, the larger share of each hole. The lumbar vertebrae, as they descend, have their oblique processes at a greater distance from each other, and facing more backwards and forwards. Both transverse and spinal processes of the middlemost vertebrae of the loins are longest and thickest; in the vertebrae above and below, they are less. So that these processes of the first and fifth are the least, to prevent their striking on the ribs or os ilium, or their bruising the muscles in the motions of the spine. The epiphyses round the edges of the bodies of the lumbar vertebrae are most raised in the two lowest; which consequently make them appear hollower in the middle than the others are. The body of the fifth vertebra is rather thinner than that of the fourth. The spinal process of this fifth is smaller, and the oblique processes face more backwards and forwards than in any other lumbar vertebra. After considering the structure of the particular vertebrae, and their mutual connection, we may observe a solicitous care taken that they shall not be disjoined without

great difficulty. For, besides being connected by strong ligaments proportioned to the forces which are to be resisted, their bodies either enter so into each other as to prevent their being displaced any way, as in the vertebrae of the neck; or they are propped on all sides, as those of the back are by the ribs; or their surfaces of contact are so broad, as to render the separation almost impracticable, as in the loins: while the depth and articulation of the oblique processes are exactly proportioned to the quantity of motion which the other parts of the bones allow, or the muscles can perform. Yet as these oblique processes are small, and therefore not capable of so secure a conjunction as the larger bodies, they may sooner yield to a disjoining force; but then their dislocation is not of so near bad consequence as the separation of the bodies would be: for, by the oblique processes being dislocated, the muscles, ligaments, and spinal marrow, are indeed stretched; but this marrow must be compressed, or entirely destroyed, when the body of the vertebra is removed out of its place.

The *false vertebrae* compose the under pyramid of the spine. They are distinguished from the bones already described justly enough by the epithet of false; because, though each bone into which they can be divided in young people resembles the true vertebrae in figure, yet none of them contribute to the motion of the trunk of the body; they being intimately united to each other in adults, except at their lower part, where they are moveable; whence they are commonly divided into two bones, *os sacrum* and *os coccygis*.

Os sacrum, is so called, from being offered in sacrifice by the ancients, or rather because of its largeness in respect of the other vertebrae. This bone is of an irregular triangular shape, broad above, narrow below; convex behind, for the advantageous origin of the muscles that move the spine and thigh backwards; and concave before, for enlarging the cavity of the pelvis. Four transverse lines, of a colour different from the rest of the bone which are seen on its fore-part, are the marks of division of the five different bones of which it consists in young persons. The fore-part of the *os sacrum*, analogous to the bodies of the true vertebrae, is smooth and flat, to allow a larger space for the contained bowels, without any danger of hurting them; or this flat figure may be owing to the equal pressure of these bowels, particularly of the last gut. The back-part of it is almost straight, without so large a cavity as the vertebrae have; because the spinal marrow, now separated into the *cauda equina*, is small. The bridges between the bodies and processes of this bone are much thicker, and in proportion shorter, than in the former class of bones.

There are only two oblique processes of the *os sacrum*; one standing out on each side from the upper part of the first bone. Their plain erect surfaces face backwards, and are articulated with the inferior oblique processes of the last vertebra of the loins, to which each of these processes is connected by a strong ligament, which rises from a scabrous cavity round their roots, where mucilaginous glands are also lodged. Instead of the other oblique processes of this bone, four rough tubercles are to be seen on each side of its surface behind, from which the *musculus sacri* has its origin. The transverse processes here are all grown together into one large strong oblong process on each side; which, so far as it answers to the first three bones, is very thick, and divided into two irregular cavities by a long perpendicular ridge. The foremost of the two cavities has commonly a thin cartilaginous skin covering it in the recent subject, and is adapted to the unequal protuberance of the *os ilium*; and a strong ligament connects the circumference of these surfaces of the two bones. The cavity behind is divided by a transverse ridge into two, where strong ligamentous strings that go from this bone to the *os ilium*, with a cellular substance containing mucus, are lodged. The transverse processes of the two last bones of the *os sacrum* are much smaller than the former. At their back-part near their edge, a knob and oblong flat surface

give rise to two strong ligaments which are extended to the os ischium; and are therefore called *sacrociatic*.

The spinal processes of the three uppermost bones of the os sacrum appear short, sharp, and almost erect, while the two lower ones are open behind; and sometimes a little knob is to be seen on the fourth, though generally it is bifurcated, without the two legs meeting into a spine; in which condition also the first is often to be seen; and sometimes none of them meet, but leave a sinus, or rather fossa, instead of a canal. The *musculus latissimus* and *longissimus dorsi*, *sacro-lumbalis*, and *glutæus maximus*, have part of their origins from these spinal processes. At the root of each oblique process of this bone, the notch is conspicuous; by which, and another similar one in the last vertebra of the loins, a passage is left for the twenty-fourth spinal nerve; and, in viewing the os sacrum, either before or behind, four large holes appear in each side, in much the same height as where the marks of the union of its several bones remain. Some of the largest nerves of the body pass through the anterior holes; and superficial grooves, running outwards from them in different directions, shew the course of these nerves. From the intervals of these grooves, the *pyriformis* muscle chiefly rises. The holes in the back-part of the bone are covered by membranes which allow small nerves to pass through them.

The substance of the os sacrum is very spongy, without any considerable solid external plates, and is lighter proportionally to its bulk than any other bone in the body; but it is secured from injuries by the thick muscles that cover it behind, and by the strong ligamentous membranes that closely adhere to it. As this is one of the most remarkable instances of this sort of defence afforded a soft weak bone, we may make this general observation: That, wherever we meet with such a bone, one or other or both these defences are used; the first to ward off injuries, and the second to keep the substance of the bone from yielding too easily. This bone is articulated above to the last vertebra of the loins, in the manner that the lumbar vertebrae are joined. The articulation of the lower-part of the os sacrum to the os coccygis, seems well enough adapted for allowing considerable motion to this last bone, were it not much confined by ligaments. Laterally, the os sacrum is joined to the *os ilium* by an immoveable *synchondrosis*, or what almost deserves the name of a suture. For the cartilaginous crust on the surface of the bones is very thin; and both their surfaces are so scabrous and unequal, as to be indented into each other; which makes such a strong connection, that great force is required to separate them, after all the muscles and ligaments are cut. Frequently the two bones grow together in old people. The uses of the os sacrum are, to serve as the common base and support of the trunk of the body, to guard the nerves proceeding from the end of the spinal marrow, to defend the back-part of the pelvis, and to afford sufficient origin to the muscles which move the trunk and thigh.

The *os coccygis*, or *rump-bone*, is that triangular chain of bones depending from the os sacrum; each bone becoming smaller as they descend, till the last ends almost in a point. The os coccygis is convex behind, and concave before; from which crooked pyramidal figure, which was thought to resemble a cuckow's beak, it has got its name. This bone consists of four pieces in people of middle age. In children, almost the whole of it is cartilage. In old subjects, all the bones are united, and become frequently one continued bone with the os sacrum. The highest of the four bones is the largest, with shoulders extended farther to each side than the end of the os sacrum. From the back of that bulbous part, called its shoulders, a process often rises up on each side, to join with the bifurcated spine of the fourth and fifth bones of the os sacrum, to form the bony bridge mentioned in the description of the os sacrum. Sometimes these shoulders are joined to the sides of the fifth bone of the os sacrum, to form the hole in each side common to these two bones, for the passage of the twenty-ninth pair of spinal nerves. Immediately

below the shoulders of the os coccygis, a notch may be remarked on each side, where the thirtieth pair of the spinal nerves passes.

The three lower bones gradually become smaller, and are spongy; but are strengthened by a strong ligament which covers and connects them. Their ends, by which they are articulated, are formed in the same manner as those of the first bone. To the sides of these bones the *coccygæi* muscles, and part of the *levatoris ani*, and of the *glutæi maximi*, are fixed. The substance of these bones is very spongy, and in children cartilaginous; there being only a part of the first bone ossified in a new-born infant. Since therefore the *intestinum rectum* of children is not so firmly supported as it is in adults, this may be one reason why they are more subject to a *proctidentia ani* than old people. From the description of this bone, we see how little it resembles the vertebrae; since it seldom has processes, never has any cavity for the spinal marrow, nor holes for the passage of nerves. Its connection hinders it from being moved to either side; and its motion backwards and forwards is much confined: yet, as its ligaments can be stretched by a considerable force, it is of great advantage in the excretion of the *fæces alvinæ*, and much more in child-bearing, that this bone should remain moveable; and the right management of it, in delivering women, may be of great benefit to them. The mobility of the os coccygis diminishing as people advance in age, especially when its ligaments and cartilages have not been kept flexible by being stretched, is probably one reason why the women, who are old maids before they marry, have generally difficult parturition.

The second part of the trunk of the skeleton, viz. the *pelvis*, is the cylindrical cavity at the lower part of the abdomen formed by the os sacrum, os coccygis, and *os innominata*. The *os innominata* are two large broad bones, which form the fore-part and sides of the pelvis, and the lower part of the sides of the abdomen. In children, each of these bones is evidently divided into three; which are afterwards so intimately united, that hardly the least mark of their former separation remains. They are nevertheless described as consisting each of three bones, viz. the *os ilium*, *ischium*, and *pubis*.

The *os ilium*, or *haunch-bone*, is situated highest of the three, and reaches as far down as one third of the great cavity into which the head of the thigh-bone is received. The external side of this bone is unequally convex, and is called its *dorsum*; the internal concave surface is by some authors (but improperly) named its *costa*. The semicircular edge at the highest part of this bone, which is tipped with a cartilage in the recent subject, is named the *spine*, into which the external or descending oblique muscle of the abdomen is inserted; and from it the internal ascending oblique, and the transverse muscles of the belly, with the *glutæus maximus*, *quadratus lumborum*, and *latissimus dorsi*, have their origin. From the anterior spinal process, the *sartorius* and *fascialis* muscles have their rise, and the outer end of the doubled tendon of the external oblique muscle of the abdomen, commonly called *Fallopian's* or *Poupart's* ligament, is fixed to it. The inside of the posterior spinal process, and of part of the spine forward from that, is made flat and rough where the *sacro-lumbalis* and *longissimus dorsi* rise; and to its outside are fixed ligaments extended to the os sacrum and transverse processes of the fifth and fourth vertebrae of the loins. Between the sides of the os ilium, and the strong ligament that is stretched over from the os sacrum to the sharp-pointed process of the os ischium of the recent subject, a large hole is formed, through which the *musculus pyriformis*, the great sciatic nerve, and the posterior crural vessels, pass, and are protected from compression.

The external broad side or *dorsum* of the os ilium, is a little hollow towards the fore-part; farther back, it is as much raised; then is considerably concave; and, lastly, it is convex. These inequalities are occasioned by the actions of the muscles that are situated on this surface.

From behind the uppermost of the two anterior spinal processes, in such bones as are strongly marked by the muscles, a semicircular ridge is extended to the hollow passage of the sciatic nerve. Between the spine and this ridge, the glutæus medius takes its rise. Immediately from above the lowest of the anterior spinal processes, a second ridge is stretched to the niche. Between this and the former ridge, the glutæus minimus has its origin. On the outside of the posterior spinal processes, the dorsum of the os ilium is flat and rough, where part of the musculus glutæus maximus and pyriformis rises. The internal surface of the os ilium is concave in its broadest fore-part, where the internal iliac muscle has its origin, and where some share of the intestinum ilium and colon is lodged. From this large hollow, a small sinuosity is continued obliquely forwards, at the inside of the inferior spinal process, where part of the psoas and iliacus muscles, with the crural vessels and nerves, pass. The large concavity is bounded below by a sharp ridge, which runs from behind forwards; and, being continued with such another ridge of the os pubis, forms a line of partition between the abdomen and pelvis. Into this ridge the broad tendon of the psoas parvus is inserted.

The *os ischium*, or *hip-bone*, is of a middle bulk between the two other parts of the os innominatum, is situated lowest of the three, and is of a very irregular figure. Its extent might be marked by a horizontal line drawn nearly through the middle of the acetabulum. From the upper thick part of the os ischium, a sharp process, called by some authors *spinous*, stands out backwards, from which chiefly the musculus coccygæus and superior gemellus, and part of the levator ani, rise; and the anterior or internal sacrosciatic ligament is fixed to it. Between the upper part of this ligament and the bones, it was formerly observed that the pyriform muscle, the posterior crural vessels, and the sciatic nerve, pass out of the pelvis. Immediately below this process, a sinuosity is formed for the tendon of the musculus obturator internus. Below the sinuosity for the obturator muscle, is the great knob or tuberosity, covered with cartilage or tendon. The upper part of the tuberosity gives rise to the inferior gemellus muscle. To a ridge at the inside of this the external or posterior sacrosciatic ligament is so fixed, that between it, the internal ligament, and the sinuosity of the os ischium, a passage is left for the internal obturator muscle. The upper thick smooth part of the *tuber*, called by some its *dorsum*, has two oblique impressions on it. The inner one gives origin to the long head of the biceps flexor tibiæ, and feminovus muscles; and the semimembranosus rises from the exterior one, which reaches higher and nearer the acetabulum than the other. The lower, thinner, more scabrous, part of the knob which bends forwards, is also marked with two flat surfaces; whereof the internal is what we lean upon in sitting, and the external gives rise to the largest head of the triceps adductor femoris. Between the external margin of the tuberosity and the great hole of the os innominatum, there is frequently an obtuse ridge extended down from the acetabulum, which gives origin to the quadratus femoris. As the tuber advances forwards, it becomes smaller, and is rough, for the origin of the musculus transversalis and erector penis. The small leg of it, which mounts upwards to join the os pubis, is rough and prominent at its edge, where the two lower heads of the triceps or quadriceps adductor femoris take their rise.

The *os pubis*, or *share-bone*, is the least of the three parts of the os innominatum, and is placed at the upper fore-part of it. The thick largest part of this bone is employed in forming the acetabulum; from which, becoming much smaller, it is stretched inwards to its fellow of the other side, where it again grows larger, and sends a small branch downwards to join the end of the small leg of the os ischium. The upper fore-part of each os pubis is tuberculous and rough where the musculus rectus and pyramidalis are inserted. From this a ridge is extended along

the upper edge of the bone, in a continued line with such another of the os ilium, which divides the abdomen and pelvis. The ligament of Fallopius is fixed to the internal end of this ridge, and the smooth hollow below it is made by the psoas and iliacus internus muscles passing with the anterior crural vessels and nerves behind the ligament. Some way below the former ridge, another is extended from the tuberculous part of the os pubis downwards and outwards towards the acetabulum; between these two ridges the bone is hollow and smooth, for lodging the head of the pectineus muscle.

Between the os ischium and pubis a very large irregular hole is left, which, from its resemblance to a door or shield, has been called *thyroides*. This hole is filled up, in a recent subject, with a strong ligamentous membrane, that adheres very firmly to its circumference. From this membrane chiefly the two obturator muscles, external and internal, take their rise. The great design of this hole, besides rendering the bone lighter, is to allow a strong origin to the obturator muscles. The bowels sometimes make their way through the niche at the upper part of this thyroid hole; which causes a hernia in this place.

In the external surface of the ossa innominata, near the outside of the great hole, a large deep cavity is formed by all the three bones conjunctly. The brims of this cavity are very high, and are still much more enlarged by the ligamentous cartilage, with which they are tipped in a recent subject. From this form of the cavity it has been called *acetabulum*; and for a distinguishing character the name of the bone that constitutes the largest share of it is added: therefore *acetabulum ossis ischii* is the name this cavity commonly bears. Round the base of the supercilia the bone is rough and unequal, where the capsular ligament of the articulation is fixed. Besides the difference in the height of the brims, the acetabulum is otherwise unequal; for the lower internal part of it is depressed below the cartilaginous surface of the upper part, and is not covered with cartilage; into the upper part of this depression, where it is deepest and of a semilunar form, the ligament of the thigh-bone, commonly, though improperly called the *round* one, is inserted; while, in its more superficial lower part, the large mucilaginous gland of this joint is lodged.

The *ossa innominata* are joined at their back-part to each side of the os sacrum by a sort of suture, with a very thin intervening cartilage, which serves as so much glue to cement those bones together; and strong ligaments go from the circumference of this unequal surface, to connect them more firmly. The ossa innominata are connected together at their fore-part by the ligamentous cartilage interposed between the two ossa pubis. These bones can therefore have no motion in a natural state, except what is common to the trunk of the body, or to the os sacrum.

Thus the pelvis has a large cavity above where it is continued with the abdomen; is strongly fenced by bones on the sides, back, and fore part; and appears with a wide opening below, in the skeleton; but, in a recent subject, a considerable part of the opening is filled by the sacrosciatic ligaments, pyriform, internal obturator, levatores ani, gemini, and coccygæi muscles, which support and protect the contained parts better than bones could have done; so that space is only left at the lowest part of it, for the large excretories, the vesica urinaria, intestinum rectum, and in females the uterus, to discharge themselves.

The *thorax*, or *chest*, reaches from below the neck to the belly; and, by means of the bones that guard it, is formed into a large cavity. The figure of it is somewhat conoidal: but its upper smaller end is not finished, being left open for the passage of the wind-pipe, gullet, and large blood-vessels; and its lower part or base, has no bones, and is shorter before than behind. The bones which form the thorax are the twelve dorsal vertebrae behind, already described; the ribs on the sides, and the sternum before.

The *ribs*, or *costæ*, (as if they were *cylinders*, or guards, to those principal organs of the animal machine, the heart

and lungs,) are the long crooked bones placed at the side of the chest, in an oblique direction downwards in respect of the back-bone. Their number is generally twelve on each side; though frequently eleven or thirteen have been found. Sometimes the ribs are found preternaturally joined or divided. The ribs are all concave internally; where they are also made smooth by the action of the contained parts, which, on this account, are in no danger of being hurt by them; and they are convex externally, that they might resist that part of the pressure of the atmosphere which is not balanced by the air within the lungs during *inspiration*. The ends of the ribs next the vertebrae are rounder than they are after these bones have advanced forwards, when they become flatter and broader, and have an upper and lower edge; each of which is made rough by the action of the intercostal muscles inserted into them. These muscles, being all of nearly equal force, and equally stretched in the interstices of the ribs, prevent the broken ends of these bones, in a fracture, from being removed far out of their natural place, to interrupt the motion of the vital organs. The upper edge of the ribs is more obtuse and rounder than the lower, which is depressed on its internal side by a long fossa, for lodging the intercostal vessels and nerves; on each side of which there is a ridge, where the intercostal muscles are fixed. The fossa is not observable, however, at either end of the ribs; for, at the posterior or root, the vessels have not yet reached the ribs; and, at the fore-end, they are split away into branches, to serve the parts between the ribs: which plainly teaches surgeons one reason of the greater safety of performing the operation of the empyema towards the sides of the thorax, than either near the back or the breast.

At the posterior end of each rib, a little head is formed, which is divided by a middle ridge into two plain or hollow surfaces; the lowest of which is the broadest and deepest in most of them. The two plains are joined to the bodies of two different vertebrae, and the ridge forces itself into the intervening cartilage. A little way from this head, we find on the external surface a small cavity, where mucilaginous glands are lodged; and, round the head, the bone appears spongy, where the capsular ligament of the articulation is fixed. Immediately beyond this a flattened tubercle rises, with a small cavity at, and roughness about, its root, for the articulation of the rib with the transverse process of the lowest of the two vertebrae, with the bodies of which the head of the rib is joined. Advancing farther on this external surface, we observe in most of the ribs another smaller tubercle, into which ligaments connecting the ribs to each other, and to the transverse processes of the vertebrae and portions of the longissimus dorsi, are inserted. Beyond this the ribs are made flat by the sacro-lumbalis muscle, which is inserted into the part of this flat surface farthest from the spine, where each rib makes a considerable curve, called by some its *angle*. Then the rib begins to turn broad, and continues so to its anterior end, which is hollow and spongy, for the reception of, and firm coalition with, the cartilage that runs thence to be inserted into the sternum, or to be joined with some other cartilage.

To the fore-end of each rib a long, broad, and strong, cartilage is fixed, and reaches thence to the sternum, or is joined to the cartilage of the next rib. This course, however, is not in a straight line with the rib: for the cartilages generally make a considerable curve, the concave part of which is upwards; therefore, at their insertion into the sternum, they make an obtuse angle above, and an acute one below. These cartilages are of such a length as never to allow the ribs to come to a right angle with the spine; but they keep them situated so obliquely as to make the angle very considerably obtuse above, till a force exceeding the elasticity of the cartilage is applied. These cartilages, as all others, are firmer and harder internally than they are on their external surface; and sometimes in old people all their middle substance becomes bony, while a thin cartilaginous lamella appears externally. The of-

fification, however, begins frequently at the external surface. The greatest alternate motions of the cartilages, being made at their great curvature, that part remains frequently cartilaginous after all the rest is ossified.

The ribs then are *articulated* at each end, of which the one behind is doubly joined to the vertebrae; for the head is received into the cavities of two bodies of the vertebrae, and the larger tubercle is received into the depression in the transverse process of the lower vertebra. When we examine the double articulation, we must immediately see that no other motion can be allowed here than upwards and downwards; since the transverse process hinders the rib to be thrust back; the resistance on the other side of the sternum prevents the ribs coming forward; and each of the two joints, with the other parts attached, oppose its turning round. But then it is likewise as evident, that even the motion upwards and downwards can be but small in any one rib at the articulation itself. But, as the ribs advance forwards, the distance from their centre of motion increasing, the motion must be larger; and it would be very conspicuous at their anterior ends, were they not resisted there by the cartilages, which yield so little, that the principal motion is performed by the middle part of the ribs, which turns outwards and upwards, and occasions the twist remarkable in the long ribs at the place near their fore-end where they are most resisted.

The ribs are commonly divided into *true* and *false*. The *true* costae are the seven upper ones of each side, whose cartilages are all gradually longer as the ribs descend, and are joined to the breast-bone: so that, being pressed constantly between two bones, they are flattened at both ends; and are thicker, harder, and more liable to ossify, than the other cartilages that are not subject to so much pressure. These ribs include the heart and lungs; and therefore are the proper or true *custodes* of life. The five inferior ribs of each side are the *false* or *bastard*, whose cartilages do not reach to the sternum; and therefore, wanting the resistance at their fore-part, they are pointed; and, on this account, having less pressure, their substance is softer. The cartilages of these false ribs are shorter as the ribs descend. To all these five ribs the circular edge of the diaphragm is connected; and its fibres, instead of being stretched immediately transversely, and so running perpendicular to the ribs, are pressed so as to be often, especially in expiration, parallel to the plane in which the ribs lie. Nay, one may judge by the attachments which these fibres have so frequently to the sides of the thorax a considerable way above where their extremities are inserted into the ribs, and by the situation of the viscera always to be observed in a dead subject laid supine, that there is constantly a large concavity formed on each side by the diaphragm within these bastard ribs, in which the stomach, liver, spleen, &c. are contained; which, being only reckoned among the viscera naturalia, have occasioned the name of *bastard custodes* to these bones. Hence, in simple fractures of the false ribs, without fever, the stomach ought to be kept moderately filled with food, lest the pendulous ribs, falling inwards, should thereby increase the pain, cough, &c. Hence likewise we may learn how to judge better of the seat of several diseases, and to perform the operation of the empyema, and some others, with more safety than we can do if we follow the common practice.

The eight upper ribs were formerly classed into pairs, with particular names to each two, viz. the *crooked*, the *solid*, the *pectoral*, and the *twisted*. But these names are of so little use, that they are now almost obsolete. The first rib of each side is so situated, that the flat sides are above and below, while one edge is placed inwards and the other outwards, or nearly so; therefore sufficient space is left above it for the subclavian vessels and muscles; and the broad concave surface is opposed to the lungs. But then, in consequence of this situation, the channel for the intercostal vessels is not to be found; and the edges are differently formed from all the other, except the second; the lower one being rounded, and the other sharp. The head, of

of this rib is not divided into two plain surfaces by a middle ridge, because it is only articulated with the first vertebra of the thorax. Its cartilage is ossified in adults, and is united to the sternum at right angles. This first rib frequently has a ridge rising near the middle of its posterior edge, where one of the heads of the scalenus muscles rises. Farther forward it is flattened, or sometimes depressed by the clavicle. The fifth, sixth, and seventh, or rather the sixth, seventh, eighth, and sometimes the fifth, sixth, seventh, eighth, and ninth, ribs, have their cartilages at least contiguous: and they are frequently joined to each other by cross cartilages; and most commonly the cartilages of the eighth, ninth, and tenth, are connected to the former and to each other by firm ligaments. The eleventh, and sometimes the tenth, rib, has no tubercle for its articulation with the transverse process of the vertebra, to which it is only loosely fixed by ligaments. The fossa in its lower edge is not so deep as in the upper ribs, because the vessels run more towards the interstice between the ribs. Its fore-end is smaller than its body, and its short small cartilage is but loosely connected to the cartilage of the rib above. The twelfth rib is the shortest and straightest. Its head is only articulated with the last vertebra of the thorax; therefore it is not divided into two surfaces. To its whole internal side the diaphragm is connected.

The *sternum*, or *breast-bone*, is the broad flat bone, or pile of bones, at the fore-part of the thorax. The number of bones into which this should be divided, has occasioned debates among anatomists, who have considered it in subjects of different ages. In adults of a middle age, it is composed of three bones, which easily separate after the cartilages connecting them are destroyed. The two lower bones are frequently found intimately united; and very often, in old people, the sternum is a continued bony substance from one end to the other; though we still observe two, sometimes three, transverse lines on its surface; which are marks of the former divisions. When we consider the sternum as one bone, we find it broadest and thickest above, and becoming smaller as it descends. The internal surface is somewhat hollowed for enlarging the thorax: but the convexity on the external surface is not so conspicuous, because the sides are pressed outwards by the true ribs; the round heads of whose cartilages are received into seven smooth pits formed in each side of the sternum, and are kept firm there by strong ligaments, which on the external surface have a particular radiated texture. The cartilaginous fibres frequently thrust themselves into the bony substance of the sternum, and are joined by a sort of future. The pits at the upper-part of the sternum are at the greatest distance one from another, and, as they descend, are nearer; so that the two lowest are contiguous.

The *substance* of the breast-bone is cellular, with a very thin external plate, especially on its internal surface, where we may frequently observe a cartilaginous crust spread over it. On both surfaces, however, a strong ligamentous membrane is closely braced; and the cells of this bone are so small, that a considerable quantity of osseous fibres must be employed in the composition of it. Whence, with the defence which the muscles give it, and the moveable support it has from the cartilages, it is sufficiently secured from being broken; for it is strong by its quantity of bone, its parts are kept together by ligaments, and it yields enough to elude considerably any violence offered.

The sternum is *joined* by cartilages to the seven upper ribs, unless when the first coalesces with it in an intimate union of substance; and its unequal cavity on each side of its upper end is fitted for the ends of the clavicles. The *uses* of this bone are, to afford origin and insertion to several muscles; to sustain the mediastinum: to defend the vital organs, the heart and lungs, at the fore-part; and, lastly, by serving as a moveable fulcrum of the ribs, to assist considerably in respiration.

Authors are much divided in their opinions about the number of bones of which each superior extremity should be said to consist; some describing the clavicle and scapula as part of it, others classing these two bones with those of the thorax; but since most quadrupeds have no clavicles, and the human thorax can perform its functions right when the scapula is taken away, while it is impossible for us to have the right use of our arms without these bones, it seems evident that they belong to the superior extremities. Each of the superior extremities may be divided into the shoulder, arm, fore-arm, and hand.

The *shoulder* consists of the *clavicle* and the *scapula*. The *clavicle*, or *collar-bone*, is the long crooked bone placed almost horizontally between the upper lateral part of the sternum and what is commonly called the top of the shoulder; which, as a clavis or beam, bears off from the trunk of the body. The clavicle is larger at its two ends than in the middle. The end next to the sternum is triangular: the angle behind is considerably protruded, to form a sharp ridge, to which the transverse ligament, extended from one clavicle to the other, is fixed. The middle of this protuberant end is as irregularly hollowed as the cavity in the sternum for receiving it is raised; but, in a recent subject, the irregular concavities of both are supplied by a moveable cartilage; which is not only much more closely connected by ligaments to the circumference of the articulation than those of the lower jaw are, but it grows to the two bones at their internal and external ends; its substance at the external end being soft, but very strong, and resembling the intervertebral cartilages. From this internal end, the clavicle, for about two-fifths of its length, is bended obliquely forwards and downwards. On the upper and fore-part of this curvature a small ridge is seen, with a plain rough surface before it; whence the *musculus sterno-hyoideus* and *sterno-mastoideus* have in part their origin. Near the lower angle a small plain surface is often to be remarked, where the first rib and this bone are contiguous, and are connected by a firm ligament. From this a rough plain surface is extended outwards, where the pectoral muscle has part of its origin. Behind, the bone is made flat and rough by the insertion of the larger share of the *subclavian muscle*. After the clavicle begins to be bent backwards, it is round; but it soon after becomes broad and thin, which shape it retains to its external end. Along the external concavity, a rough sinusity runs, from which some part of the *deltoid muscle* takes its rise; opposite to this, on the convex edge, a scabrous ridge gives insertion to a share of the *cucullaris muscle*. The upper surface of the clavicle is here flat; but the lower is hollow, for lodging the beginning of the *musculus subclavius*; and towards its back part a tubercle rises; to which, and to a roughness near it, the strong short thick ligament, connecting this bone to the coracoid process of the scapula, is fixed. The external end of this bone is horizontally oblong, smooth, sloping at the posterior side, and tipped, in a recent subject, with a cartilage, for its articulation with the *acromion scapulæ*. Round this the bone is spongy, for the firmer connection of the ligaments. The medullary arteries, having their direction obliquely outwards, enter the clavicles by one or more small passages in the middle of their back-part. The uses of the clavicles are, to keep the scapulæ, and consequently all the superior extremities, from falling in and forward upon the thorax; by which, as in most quadrupeds, the motions of the arms would be much confined, and the breast made too narrow. The clavicles likewise afford origin to several muscles, and a defence to large vessels. From the situation, figure, and use, of the clavicles, it is evident that they are much exposed to fractures; that their broken parts must generally pass each other; and that they are with difficulty kept in their place afterwards.

The *scapula*, or *shoulder-blade*, is the triangular bone situated on the outside of the ribs; with its longest side, called its

its *base*, towards the spinal processes of the vertebrae; and with the angle at the upper part of this side about three inches, and the lower angle at a greater distance, from these processes. The back-part of the scapula has nothing but the thin ends of the *ferratus anticus major* and *subscapularis* muscles between it and the ribs: but, as this bone advances forwards, its distance from the ribs increases. The upper or shorter side, called the *superior costa*, of the scapula, is nearly horizontal, and parallel with the second rib. The lower side, which is named the *inferior costa*, is extended obliquely from the third to the eighth rib. The body of this bone is concave towards the ribs, and convex behind, where it has the name of *dorsum*. Three processes are generally reckoned to proceed from the scapula. The first is the large spine that rises from its convex surface behind, and divides it unequally. The second process stands out from the fore-part of the upper side; and, from its imaginary resemblance to a crow's beak, is named *coracoides*. The third process is the whole thick bulbous fore-part of the bone. Into the oblique space the *musculus patientia* is inserted. At the root of the spine, on the back-part of the base, a triangular plain surface is formed by the pressure of the lower fibres of the *trapezius*. Below this the edge of the scapula is scabrous and rough, for the insertion of the *ferratus major anticus* and *rhomboid* muscles.

The back-part of the inferior angle is made smooth by the *latissimus dorsi* passing over it. This muscle also alters the direction of the inferior costa some way forwards from this angle; and so far it is flattened behind by the origin of the *teres major*. As the inferior costa advances forward, it is of considerable thickness; it is slightly hollowed and made smooth behind by the *teres minor*, while it has a fossa formed into it below by part of the *subscapularis*; and between the two a ridge with a small depression appears, where the *longus extensor cubiti* has its origin. The superior costa is very thin; and near its fore-part there is a semilunar niche, from one end of which to the other a ligament is stretched; and sometimes the bone is continued to form one, or sometimes two, holes, for the passage of the scapular blood-vessels and nerves. Immediately behind this semilunar cavity the *coraco-hyoid* muscle has its rise. From the niche to the termination of the fossa for the *teres minor*, the scapula is narrower than any where else, and supports the third process. This part has the name of *cervix*.

The whole *dorsum* of the scapula is always said to be convex; but, by reason of the raised edges that surround it, it is divided into two cavities by the spine, which is stretched from behind forwards, much nearer to the superior than to the inferior costa. The cavity above the spine is really concave where the *supra-spinatus* muscle is lodged; while the surface of this bone below the spine, on which the *infra-spinatus* muscle is placed, is convex, except a fossa that runs at the side of the inferior costa.

The internal or anterior surface of this bone is hollow, except in the part above the spine, which is convex. The *subscapularis* muscle is extended over this surface, where it forms several ridges and intermediate depressions, commonly mistaken for prints of the ribs; they point out the interstices of the bundles of fibres of which the *subscapularis* muscle is composed.

The spine rises small at the base of the scapula, and becomes higher and broader as it advances forwards. On the sides it is unequally hollowed and crooked, by the actions of the adjacent muscles. Its ridge is divided into two rough flat surfaces: into the upper one the *trapezius* muscle is inserted; and the lower one has part of the deltoid fixed to it. The end of the spine, called *acromion*, or top of the shoulder, is broad and flat, and is sometimes only joined to the spine by a cartilage. The anterior edge of the *acromion* is flat, smooth, and covered with a cartilage, for its articulation with the external end of the clavicle; and it is hollowed below, to allow a passage to the *infra* and *supra spinati* muscles, and free motion to the *os humeri*.

The *coracoid* process is crooked, with its point inclining forwards; so that a hollow is left at the lower side of its root, for the passage of the *infra scapularis* muscle. The end of this process is marked with three plain surfaces: into the internal, the *ferratus minor anticus* is inserted; from the external, one head of the *biceps flexor cubiti* rises; and from the lower one, the *coraco-brachialis* has its origin. At the upper part of the root of this process, immediately before the semilunar cavity, a smooth tubercle appears, where a ligament from the clavicle is fixed. From all the external side of this *coracoid* apophysis, a broad ligament goes out, which becomes narrower where it is fixed to the *acromion*. The sharp pain, violent inflammation, and tedious cure, of contusions in this part, are probably owing to these tendons and ligaments being hurt.

From the *cervix* scapulae the third process is produced. The fore-part of this is formed into a glenoid cavity, which is of the shape of the longitudinal section of an egg, being broad below and narrow above. Between the brims of this hollow and the fore-part of the root of the spine, a large sinuosity is left for the transmission of the *supra* and *infra spinati* muscles; and on the upper part of these brims we may remark a smooth surface, where the second head of the *biceps flexor cubiti* has its origin. The root of the *supercilia* is rough all round, for the firmer adhesion of the capsular ligament of the articulation, and of the cartilage which is placed on these brims, where it is thick, but becomes very thin as it is continued towards the middle of the cavity, which it lines all over. The medullary vessels enter the scapula near the base of the spine. The scapula is connected to the head, or *hyoides*, vertebrae, ribs, and arm-bone, by muscles, that have one end fastened to these bones, and the other to the scapula, which can move it upwards, downwards, backwards, or forwards; by the quick succession of these motions, its whole body is carried in a circle. But, being also often moved as upon an axis perpendicular to its plane, its circumference turns in a circle whose centre this axis is. Whichever of these motions it performs, it always carries the outer end of the clavicle and the arm along with it.

The use of the scapula is, to serve as a fulcrum to the arm; and, by altering its position on different occasions, to allow always the head of the *os humeri* a right-situated socket to move in; and thereby to assist and to enlarge greatly the motions of the superior extremity, and to afford the muscles which rise from it more advantageous action, by altering their direction to the bone which they are to move. This bone also serves to defend the back-part of the thorax, and is often employed to sustain weights, or to resist forces too great for the arm to bear. The base, *acromion*, *coracoid* process, and head of the scapula, are all in a cartilaginous state at birth; and the three first are joined as epiphyses; while the head, with the glenoid cavity, is not formed into a distinct separate bone, but is gradually produced by the ossification of the body of this bone being continued forwards.

The arm has only one bone, called *os humeri*; which is long, round, and nearly straight. The upper end of this bone is formed in a large round smooth head, whose middle point is not in a straight line with the axis of the bone, but stands obliquely backwards from it. It is distinguished by a circular fossa surrounding its base, where the head is united to the bone, and the capsular ligament of the joint is fixed. Below the fore-part of its base, two tubercles stand out: the smallest one has the tendon of the *subscapularis* muscle inserted into it. The larger is divided, at its upper part, into three smooth plain surfaces; into the anterior of which, the *musculus supra-spinatus*; into the middle or largest, the *infra-spinatus*; and into the one behind, the *teres minor*; is inserted. Between these two tubercles, exactly in the fore-part of the bone, a deep long fossa is formed, for lodging the tendinous head of the *biceps flexor cubiti*; which, after passing in a manner peculiar to itself through the cavity of the articulation, is tied

down by a tendinous sheath extended across the fossa; in which, and in the neighbouring tubercles, are several remarkable holes, which are penetrated by the tendinous and ligamentous fibres, and by vessels. On each side of this fossa, as it descends in the os humeri, a rough ridge, gently flattened in the middle, runs from the roots of the tubercles. The tendon of the pectoral muscle is fixed into the anterior of these ridges, and the latissimus dorsi and teres major are inserted into the internal one. A little behind the lower end of this last, another rough ridge may be observed, where the coraco-brachialis is inserted. From the back-part of the root of the largest tubercle a ridge also is continued, from which the brevis extensor cubiti rises. This bone is flattened on the inside, about its middle, by the belly of the biceps flexor cubiti. In the middle of this plain surface, the entry of the medullary artery is seen slanting obliquely downwards. At the fore-side of this plane the bone rises in a sort of a ridge, which is rough, and often has a great many small holes in it, where the tendon of the strong deltoid muscle is inserted; on each side of which the bone is smooth and flat, where the brachii internus rises. The exterior of these two flat surfaces is the largest; behind it a superficial spiral channel, formed by the muscular nerve and the vessels that accompany it, runs from behind forwards and downwards. The body of the os humeri is flattened behind by the extensors of the fore-arm. Near the lower end of this bone, a large sharp ridge is extended on its outside, from which the musculus spinator radii longus, and the longest head of the extensor carpi radialis, rise. Opposite to this, there is another small ridge to which the aponeurotic tendon, that gives origin to the fibres of the internal and external brachial muscles, is fixed; and from a little depression on the fore-side of it, the pronator radii teres rises.

The body of the os humeri becomes gradually broader towards the lower end, where it has several processes; at the roots of which there is a cavity before and another behind. The anterior is divided by a ridge into two; the external, which is the least, receives the end of the radius; and the internal receives the coronoid process of the ulna in the flexions of the fore-arm, while the posterior deep triangular cavity lodges the olecranon in the extensions of that limb. The bone between these two cavities is pressed so thin by the processes of the ulna, as to appear diaphanous in several subjects. The sides of the posterior cavity are stretched out into two processes, one on each side: these are called *condyles*; from each of which a strong ligament goes out to the bones of the fore-arm. The external condyle, which has an oblique direction also forwards in respect of the internal, when the arm is in the most natural posture, is equally broad, and has an obtuse smooth head rising from it forwards. From the rough part of the condyle, the inferior heads of the bicipitis, the extensor digitorum communis, extensor carpi ulnaris, anconeus, and some part of the spinator radii brevis, take their rise; and on the smooth head the upper end of the radius plays. Immediately on the outside of this, a sinuosity is made by the shorter head of the bicipitis muscle, upon which the muscular nerve is placed. The internal condyle is more pointed and protuberant than the external, to give origin to some part of the flexor carpi radialis, pronator radii teres, palmaris longus, flexor digitorum sublimis, and flexor carpi ulnaris. Between the two condyles, is the trochlea or pulley; which consists of two lateral protuberances, and a middle cavity, that are smooth and covered with cartilage. When the fore-arm is extended, the tendon of the internal brachii muscle is lodged in the fore-part of the cavity of this pulley. The external protuberance, which is less than the other, has a sharp edge behind; but forwards, this ridge is obtuse, and only separated from the little head, already described, by a small fossa, in which the joined edges of the ulna and radius move. The internal protuberance of the pulley is largest and highest; and therefore, in the motions of the ulna upon it, that bone would be inclined outwards, were

it not supported by the radius on that side. Between this internal protuberance and condyle, a sinuosity may be remarked, where the ulnar nerve passes. The round head of the os humeri is articulated with the glenoid cavity of the scapula; which being superficial, and having long ligaments, allows the arm a free and extensive motion. The lower end of the os humeri is articulated with the bone of the fore-arm, and carries them with it in all its motions, but serves as a base on which they perform the motions peculiar to themselves.

The *fore-arm* consists of two long bones, the *ulna* and *radius*. The *ulna*, so named from its being used as a measure, is the longest of the two, and situated on the outside of the radius. At the upper end of the ulna are two processes: the posterior is the largest, and formed like a hook, whose concave surface moves upon the pulley of the os humeri, and is called *olecranon*, or top of the cubit. The convex back-part of it is rough and scabrous, where the longus, brevis, and brachii externus, are inserted. The anterior process is not so large, nor does it reach so high, as the one behind; but is sharper at its end, and therefore is named *coronoid*. Between these two processes, a large semicircular or sigmoid concavity is left; the surface of which, on each side of a middle rising, is slanting, and exactly adapted to the pulley of the bone of the arm. Immediately below the olecranon, on the back-part of the ulna, a flat triangular spongy surface appears, on which we commonly lean. At the internal side of this, there is a larger hollow surface, where the musculus anconeus is lodged; and the ridge at the inside of this gives rise to the musculus supinator radii brevis. Between the top of the ridge and the coronoid process is the semilunated smooth cavity, lined with cartilage; in which, and in a ligament extended from the one to the other end of this cavity, the round head of the radius plays. Immediately below it, a rough hollow gives lodging to mucilaginous glands. Below the root of the coronoid process, this bone is scabrous and unequal, where the brachii internus is inserted.

The body of the ulna is triangular. The internal angle is very sharp where the ligament that connects the two bones is fixed: the sides which make this angle are flat and rough, by the action and adhesion of the many muscles which are situated here. At the distance of one-third of the length of the ulna, the passage of the medullary vessels may be seen slanting upwards. The external side of this bone is smooth, somewhat convex, and the angles at each edge of it are blunted by the pressure of the muscles equally disposed about them. As this bone descends, it becomes gradually smaller; so that its lower end terminates in a little head, standing on a small neck. Towards the fore but outer part of which last, an oblique ridge runs, that gives rise to the pronator radii quadratus. The head is round, smooth, and covered with a cartilage on its internal side, to be received into the semilunar cavity of the radius; while a styloid process rises from its outside, to which is fixed a strong ligament that is extended to the os cuneiforme and pisiforme of the wrist. Between the back-part of that internal smooth side and this process, a sinuosity is left for the tendon of the extensor carpi ulnaris. On the fore-part of the root of the process, such another depression may be marked for the passage of the ulnar artery and nerve.

The *radius*, so called from its imagined resemblance to a spoke of a wheel, or to a weaver's beam, is the bone placed on the inside of the fore-arm. Its upper end is formed into a circular little head, which is hollowed for an articulation with the tubercle at the side of the pulley of the os humeri. Below the head, the radius is much smaller; therefore this part, which is made round by the action of the supinator radii brevis, is named its *cervix*. At the external root of this neck, a tuberosity process rises; into the outer part of which the biceps flexor cubiti is inserted. From this a ridge runs downwards and inwards, where the supinator radii brevis is inserted; and a little below, and behind this ridge, there is a rough scabrous surface,

surface, where the pronator radii teres is fixed. The body of the radius is convex on its internal and posterior surfaces; but the surfaces next to the ulna are flattened and rough, for the origin of the muscles of the hand; and both terminate in a common sharp spine, to which the strong ligament extended between the two bones of the fore-arm is fixed. The lower end of the radius is larger than the superior; its back-part has a flat strong ridge in the middle, and fossæ on each side. In a small groove, immediately on the outside of the ridge, the tendon of the extensor tertii internodii pollicis plays. In a large one beyond this, the tendons of the indicator and of the common extensor muscles of the fingers pass. Contiguous to the ulna there is a small depression made by the extensor minimi digiti. On the inside of the ridge there is a broad depression, which seems again subdivided, where the two tendons of the biconis, or extensor carpi radialis, are lodged. The internal side of this end of the radius is also hollowed by the extensors of the first and second joint of the thumb; immediately above which a little rough surface shews where the supinator radii longus is inserted. The ridges at the sides of the grooves, in which the tendons play, have an annular ligament fixed to them, by which the several sheaths for the tendons are formed. The fore-part of this end of the radius is also depressed, where the flexors of the fingers and flexor carpi radialis pass. The external side is formed into a semilunar smooth cavity, lined with a cartilage, for receiving the lower end of the ulna. The lowest part of the radius is formed into an oblong cavity; in the middle of which is a small transverse rising, gently hollowed for lodging mucilaginous glands; while the rising itself is insinuated into the conjunction of the two bones of the wrist that are received into the cavity. The internal side of this articulation is fenced by a remarkable process of the radius, from which a ligament going out to the wrist, as the styloid process of the ulna with its ligament, guard it on the outside. As the head of the radius receives the tubercle of the os humeri, it is not only bended and extended along with the ulna, but may be moved round its axis in any position; and, that this motion may be sufficiently large, the ligament of the articulation is extended, further down than ordinary, on the neck of this bone, before it is connected to it; and it is very thin at its upper and lower part, but makes a firm ring in the middle. This bone is also joined to the ulna by a double articulation. When the palm is turned uppermost, the radius is said to perform the *supination*: when the back of the hand is above, it is said to be *prone*. But then the quickness and large extent of these two motions are assisted by the ulna, which can move with a kind of small rotation on the sloping sides of the pulley. This lateral motion, though very inconsiderable in the joint itself, is conspicuous at the lower end of such a long bone; and the strong ligament connecting this lower end to the carpus, makes the hand more readily obey these motions. When we design a large circular turn of the hand, we increase it by the rotation of the os humeri, and sometimes employ the spine and inferior extremities, to make these motions of pronation or supination of the hand large enough.

The *hand* comprehends all from the joint of the wrist to the points of the fingers. Its back-part is convex, for greater firmness and strength; and it is concave before, for containing more surely and conveniently such bodies as we take hold of. One-half of the hand has an obscure motion in comparison of what the other has, and serves as a base to the moveable half; which can be extended back very little farther than to a straight line with the fore-arm, but can be considerably bent forwards. As the bones that compose the hand are of different shapes and uses, while several of them that are contiguous agree in some general characters; the hand is, on this account, commonly divided into carpus, metacarpus, and fingers; among which last the thumb is reckoned.

The *carpus* is composed of eight small spongy bones,

viz. os scaphoides, lunare, cuneiforme, pisiforme, trapezium, trapezoides, magnum, unciniforme. *Os scaphoides* is convex above, concave and oblong below; from which small resemblance to a boat it has its name. Its smooth convex surface is divided by a rough middle fossa, which runs obliquely across it. The upper largest division is articulated with the radius. The common ligament of the joint of the wrist is fixed into the fossa; and the lower division is joined to the trapezium and trapezoides. The concavity receives more than an half of the round head of the os magnum. The external side of this hollow is formed into a semilunar plane, to be articulated with the following bone. *Os lunare* has a smooth convex upper surface, by which it is articulated with the radius. The internal side, which gives name to the bone, is in the form of a crescent, and is joined with the scaphoid; the lower surface is hollow, for receiving part of the head of the os magnum. On the outside of this cavity is another smooth, but narrow, oblong sinuosity, for receiving the upper end of the os unciniforme; on the outside of which a small convexity is found, for its connection with the os cuneiforme. Between the great convexity above, and the first deep inferior cavity, there is a rough fossa, in which the circular ligament of the joint of the wrist is fixed. *Os cuneiforme* is broader above, and towards the back of the hand, than it is below and forwards; which gives it the resemblance of a wedge. The superior slightly convex surface is included in the joint of the wrist, being opposed to the lower end of the ulna. Below this the cuneiform bone has a rough fossa, wherein the ligament of the articulation of the wrist is fixed. *Os pisiforme* is almost spherical, except one circular plane or slightly hollow surface, which is covered with cartilage for its motion on the cuneiform bone, from which its whole rough body is prominent forwards into the palm; having the tendon of the flexor carpi ulnaris, and a ligament from the styloid process of the ulna, fixed to its upper part; the transverse ligament of the wrist is connected to its internal side; ligaments extended to the unciniform bone, and to the os metacarpi of the little finger, are attached to its lower part; the abductor minimi digiti has its origin from its fore-part; and, at the internal side of it, a small depression is formed, for the passage of the ulnar nerve. *Trapezium* has four unequal sides and angles in its back-part, from which it has its name. Above, its surface is smooth, slightly hollowed, and semicircular, for its conjunction with the os scaphoides. Its external side is an oblong concave square, for receiving the following bone. The inferior surface is formed into a pulley; the two protuberant sides of which are external and internal. On this pulley the first bone of the thumb is moved. *Os trapezoides*, so called from the irregular quadrangular figure of its back-part, is the smallest bone of the wrist except the pisiforme. The figure of it is an irregular cube. It has a small hollow surface above, by which it joins the scaphoides; a long convex one internally, where it is contiguous to the trapezium; a small external one, for its conjunction with the os magnum; and an inferior convex surface, the edges of which are, however, so raised before and behind, that a sort of pulley is formed, where it sustains the os metacarpi indicis. *Os magnum*, so called because it is the largest bone of the carpus, is oblong, having four quadrangular sides, with a round upper end, and a triangular plain one below. The round head is divided by a small rising, opposite to the connection of the os scaphoides and lunare, which together form the cavity for receiving it. On the inside a short plain surface joins the os magnum to the trapezoides.

Os unciniforme has its name from a thin broad process that stands out from it forwards into the palm, and is hollow on its inside, for affording passage to the tendons of the flexors of the fingers. To this process also the transverse ligament is fixed that binds down and defends these tendons; and the flexor and abductor muscles of the little finger have part of their origin from it. The upper plain surface is small, convex, and joined with the os lunare; the internal side is long, and slightly convex, adapted to the

the contiguous os magnum. The external surface is oblique, and irregularly convex, to be articulated with the cuneiform bone. The lower end is divided into two concave surfaces; the external is joined with the metacarpal bone of the little finger, and the internal one is fitted to the metacarpal bone of the ring finger.

The three first bones of the carpus make an oblong head, by which they are articulated with the cavity at the lower ends of the bones of the fore-arm, so as to allow motion on all sides; and, by a quick succession of these motions, they may be moved in a circle. But as the joint is oblong, and therefore the two dimensions are unequal, no motion is allowed to the carpus round its axis, except what it has in the pronation and supination along with the radius. The articulation of the first three bones of the superior row, with the bones of the inferior, is such as allows of motion, especially backwards and forwards; to the security and caleness of which, the reception of the os magnum into the cavity formed by the scaphoides and lunare considerably contributes; and the greatest number of the muscles that serve for the motion of the wrist on the radius, being inserted beyond the conjunction of the first row of bones with the second, act equally on this articulation as they do on the former; but the joint formed with the radius being the most easily moved, the first effect of these muscles is on it, and the second row of the carpus is only moved afterwards. On account of the many tendons that pass upon the lower end of the fore-arm and the carpus, and of the numerous ligaments of these tendons and of the bones, which have lubricating liquors supplied to them, the pain of sprains here is acute, the parts take a long time to recover their tone, and their swellings are very obstinate.

The *metacarpus* consists of four bones which sustain the fingers. Each bone is long and round, with its ends larger than its body. The upper end, which some call the base, is flat and oblong, without any considerable head or cavity; but it is somewhat hollowed, for the articulation with the carpus; it is made flat and smooth on the sides where these bones are contiguous to each other. Their bodies are flattened on their back-part by the tendons of the extensors of the fingers. The lower ends are raised into large oblong smooth heads, whose greatest extent is forwards from the axis of the bone. At the fore-part of each side of the root of each of these heads, one or two tubercles stand out, for fixing the ligaments that go from one metacarpal bone to another, to preserve them from being drawn asunder: round the heads a rough ring may be remarked, for the capsular ligaments of the first joints of the fingers to be fixed to; and both sides of these heads are flat, by pressing on each other. The metacarpal bones are joined above to the ossa carpi, and to each other by nearly plain surfaces; and they may be distinguished from each other by the following marks: the *os metacarpi indicis* is generally the longest. Its base, which is articulated with the os trapezoides, is hollow in the middle. The small ridge on the internal side is smaller than the one opposite to it, and is made flat on the side by the trapezium. The exterior ridge is also smooth, and flat on its outside, for its conjunction with the os magnum; immediately below which a semicircular smooth flat surface shews the articulation of this to the second metacarpal bone. The back-part of this base is flattened where the long head of the extensor carpi radialis is inserted, and its fore-part is prominent where the tendon of the flexor carpi radialis is fixed. *Os metacarpi medii digiti* is generally the second in length, but often it is as long as the former; sometimes it is longer, and it frequently appears only to equal the first by the os magnum being farther advanced downwards than any other bone of the wrist. Its base is a broad superficial cavity, slanting outwards; the internal posterior angle of which is so prominent, as to have the appearance of a process. The motion of this bone is very little more than that of the former; and therefore these two firmly resist bodies pressed against them by the thumb or fingers, or both. *Os metacarpi digiti annularis* is shorter than the second metacarpal

bone. Its base is semicircular and convex, for its conjunction with the os unciniforme. On its internal side are two smooth convexities, and a middle fossa, adapted to the second metacarpal bone. The external side has a triangular smooth concave surface, to join it with the fourth one. *Os metacarpi minimi digiti* is the smallest and sharpest. Its base is irregularly convex, and rises slanting outwards. Its internal side is exactly adapted to the third metacarpal bone. The external has no smooth surface, because it is not contiguous to any other bone; but it is prominent where the extensor carpi ulnaris is inserted. As this metacarpal bone is furnished with a proper moving muscle, has the plainest articulation, is most loosely connected and least confined, it not only enjoys a much larger motion than any of the rest, but draws the third bone with it, when the palm of the hand is made hollow by its advancement forwards, and by the prominence of the thumb opposite to it.

The *thumb*, and *fingers*, are each composed of three bones. The thumb is situated obliquely in respect of the fingers; and all its bones are much thicker and stronger in proportion to their length. The first bone of the thumb has its base adapted to the double pulley of the trapezium; for, in viewing it from one side to the other, it appears convex in the middle; but, when considered from behind forwards, it is concave there. The articulation of the upper end of this bone is uncommon; for, though it has protuberances and depressions adapted to the double pulley of the trapezium, yet it enjoys a circular motion, as the joints do where a round head of the one plays in the orbicular socket of another; only it is somewhat more confined, and less expeditious, but stronger and more secure, than such joints generally are. The second bone of the thumb has a large base formed into an oblong cavity, whose greatest length is from one side to the other. Round it several tubercles may be remarked, for the insertion of ligaments. Its body is convex or a half-round behind; but flat before, for lodging the tendon of the long flexor of the thumb, which is tied down by ligamentous sheaths that are fixed on each side to the angle at the edge of this flat surface. The articulation and motion of the upper end of this second bone is as singular as that of the former. For, its cavity being joined to the round head of the first bone, it would seem to enjoy motion in all directions; yet, because of the strength of its lateral ligaments, oblong figure of the joint itself, and mobility of the first joint, it only allows flexion and extension, and these are generally much confined. The third bone of the thumb is the smallest, with a large base, whose greatest extent is from one side to the other. This base is formed into two cavities and a middle protuberance, to be adapted to the pulley of the former bone. Its body is rounded behind; but is flatter than in the former bone for sustaining the nail. It is flat and rough before, by the insertion of the flexor tertii internodii. The motion of this third bone is confined to flexion and extension.

The orderly disposition of the bones of the *fingers* into three rows, has made them generally obtain the name of three *phalanges*. All of them have half-round convex surfaces, covered with an aponeurosis, formed by the tendons of the extensors, lumbricales, and interossei, and placed directly backwards, for their greater strength; and their flat concave part is forwards, for taking hold more surely, and for lodging the tendons of the flexor muscles. The ligaments for keeping down these tendons are fixed to the angles that are between the convex and concave sides. The bones of the first phalanx of the fingers answer to the description of the second bone of the thumb; only that the cavity in their base is not so oblong; nor is their motion on the metacarpal bones so much confined; for they can be moved laterally or circularly; but have no rotation, or a very small degree of it, round their axis. The second bone of the fingers has its base formed into two lateral cavities, and a middle protuberance; while the lower end has two lateral protuberances and a middle cavity; therefore

fore it is joined at both ends in the same manner, which none of the bones of the thumb are. The third bone differs nothing from the description of the third bone of the thumb, excepting in the general distinguishing marks; and therefore the second and third phalanx of the fingers enjoy only flexion and extension. All the difference of the phalanges of the several fingers consists in their magnitude. The bones of the middle finger being the longest and largest, those of the fore finger come next to that in thickness but not in length, for those of the ring finger are a little longer. The little finger has the smallest bones. Which disposition is the best contrivance for holding the largest bodies; because the longest fingers are applied to the middle largest periphery of such substances as are of a spherical figure.

OF THE INFERIOR EXTREMITIES.

The *inferior extremities* depend from the acetabula of the ossa innominata; and are commonly divided into three parts, viz. the thigh, leg, and foot.

The *thigh* has only one bone, which is the longest in the body, and the largest and strongest of any of the cylindrical bones. The situation of it is not perpendicular; for the lower end is inclined considerably inwards; so that the knees are almost contiguous, while there is a considerable distance between the thigh-bones above; which is of great use, since sufficient space is thereby left for the external parts of generation, the two great cloacæ of urine and fæces, and for the large thick muscles that move the thigh inwards. At the same time this situation of the thigh-bones renders our progression quicker, surer, straighter, and in less room; for, had the knees been at a greater distance from each other, we must have been obliged to describe some part of a circle with the trunk of our body in making a long step; and, when one leg was raised from the ground, our centre of gravity would have been too far from the base of the other, and we should consequently have been in danger of falling; so that our steps would neither have been straight nor firm, nor would it have been possible to walk in a narrow path, had our thigh-bones been otherwise placed.

The upper end of the thigh-bone is not continued in a straight line with the body of it, but is set off obliquely inwards and upwards, whereby the distance between these two bones at their upper part is considerably increased. This end is formed into a large smooth round head, which is the greater portion of a sphere unequally divided. Towards its lower internal part, a round rough spongy pit is observable, where the strong ligament, commonly, but unjustly, called the *round one*, is fixed, to be extended from thence to the lower internal part of the receiving cavity, where it is considerably broader than near the head of the thigh-bone. The small part below the head, called the *cervix*, of the os femoris, has a great many large holes, into which the fibres of the strong ligament, continued from the capsular, enter, and are thereby firmly united to it; and round the root of the neck, where it rises from the bones, a rough ridge is found, where the capsular ligament of the articulation itself is connected. Below the back-part of this root, the large unequal protuberance, called *trochanter major*, stands out; the external convex part of which is distinguished into three different surfaces; whereof the one on the fore-part is scabrous and rough, for the insertion of the glutæus minimus; the superior one is smooth, and has the glutæus medius inserted into it; and the one behind is made flat and smooth, by the tendon of the glutæus maximus passing over it. The upper edge of this process is sharp and pointed at its back-part, where the glutæus medius is fixed; but forwards it is more obtuse, and has two superficial pits formed in it; into the superior of these the pyriformis is implanted, and the obturator internus and gemini are fixed into the lower one. From the hindmost prominent part of this great trochanter, a rough ridge runs backwards and downwards, into which the quadratus is inserted. In the deep hollow, at the internal

upper side of this ridge, the obturator externus is implanted. More internally, a conoid process, called *trochanter minor*, rises for the insertion of the musculus psoas and iliacus internus; and the pectineus is implanted into a rough hollow below its internal root. The muscles inserted into those two processes being the principal instruments of the rotatory motion of the thigh, have occasioned the name of *trochanters* to be given to those processes. The tendons that are fixed into or pass over the great trochanter, cause bruises, by falls on this part, to be attended with great pain or weakness of the limb, which generally remain long. The fore-part of the thigh-bone is a little flattened above by the beginning of the cruræus muscle, as it is also below by the same muscle and the rectus. Its external surface is likewise made flat below by the vastus externus, where it is separated from the former by an obtuse ridge. The vastus internus depresses a little the lower part of the internal surface. The posterior concave surface has a ridge rising in its middle, commonly called *linea aspera*, into which the triceps is inserted, and the short head of the biceps flexor tibiæ rises from it. At the upper part of it the medullary vessels enter, by a small hole that runs obliquely upwards. A little above which there is a rough fossa, where the tendon of the glutæus maximus is fixed. The lower end of the linea aspera divides into two, which descend towards each side. The two vasti muscles have part of their origin from these ridges; and the long tendon of the triceps is fixed to the internal, by a part of the fascia aponeurotica of the thigh. The lower end of the os femoris is larger than any other part of it, and is formed into a great protuberance on each side, called its *condyles*; between which a considerable cavity is found, especially at the back-part, in which the crural vessels and nerves lie immersed in fat. The internal condyle is longer than the external, which must happen from the oblique position of this bone, to give less obliquity to the leg. Each of these processes seem to be divided into its plain smooth surface. The mark of division on the external is a notch, and on the internal a small protuberance. The fore-part of this division, on which the rotula moves, is formed like a pulley, the external side of which is highest. Behind, there are two oblong large heads, whose greatest extent is backwards, for the motion of the tibia; and from the rough cavity between them, but near to the base of the internal condyle, the strong ligament, commonly called the *cross one*, has its rise.

The thigh-bone being articulated above with the acetabulum of the ossa innominata, which affords its round head a secure and extensive play, can be moved to every side; but is restrained in its motion outwards by the high brims of the cavity, and by the round ligament; for otherwise the head of the bone would have been frequently thrust out at the breach of the brims on the inside, which allows the thigh to move considerably inwards. The body of this bone enjoys little or no rotatory motion, though the head most commonly moves round its own axis; because the oblique progress of the neck and head from the bone is such, that the rotatory motion of the head can only bring the body of the bone forwards and backwards. Nor is the head, as in the arm, ever capable of being brought to a straight direction with its body; so far however, as the head can move within the cavity backwards and forwards, the bone may have a partial rotation. When the thigh-bone resists the actions of its muscles more than the trunk of the body can then do, as in standing, these muscles have their effect on the trunk, causing it to bend forward, raising it up, inclining it to the one or the other side, twisting it obliquely, &c. for which the rolling of the acetabula of the ossa innominata on the round heads of the thigh-bones is well fitted. The nearness of the small neck to the round head of the thigh-bone, and its upper end being covered with very thick muscles, make greater difficulty in distinguishing between a luxation and fracture here, than in any other part of the body.

The leg is composed of two bones, *tibia* and *fibula*, tho' it

it seems to have a very good title to a third, the *rotula*; which bears a strong analogy to the olecranon of the ulna, and moves always with the other two.

The *tibia*, so called from its resemblance to an old musical pipe or flute, is the long thick triangular bone, situated at the internal part of the leg, and continued in almost a straight line from the thigh-bone. The upper end of the tibia is large, bulbous, and spongy, and is divided into two cavities by a rough irregular protuberance, which is hollow at its most prominent part, as well as before and behind. The anterior of the two ligaments that compose the great cross one is inserted into the middle cavity, and the depression behind receives the posterior ligament. The two broad cavities at the sides of this protuberance are not equal; for the internal is oblong and deep, to receive the internal condyle of the thigh-bone; while the external is more superficial and rounder, for the external condyle. In each of these two cavities of a recent subject, a femilunar cartilage is placed, which is thick at its convex edge, and becomes gradually thinner towards the concave or interior edge. The middle of each of these cartilages is broad, and the ends of them turn narrower and thinner as they approach the middle protuberance of the tibia. The thick convex edge of each cartilage is connected to the capsular and other ligaments of the articulation; but so near to their rise from the tibia, that the cartilages are not allowed to change place far; while the narrow ends of the cartilages, becoming almost ligaments, are fixed at the insertion of the strong cross ligament into the tibia, and seem to have their substance united with it; therefore a circular hole is left between each cartilage and the ligament, in which the most prominent convex part of each condyle of the thigh-bone moves. The circumference of these cavities is rough and unequal, for the firm connection of the ligaments of the joint.

Below the fore-part of the upper end of the tibia, a considerable rough protuberance rises, to which the strong tendinous ligament of the *rotula* is fixed. On the internal side of this, there is a broad scabrous slightly-hollowed surface, to which the internal long ligament of the joint, the aponeurosis of the vastus internus, and the tendons of the feminovus, gracilis, and sartorius, are fixed. The lowest part of this surface is therefore the place where the tibia ought to be sawn through in an amputation, so as not to have too long and troublesome a stump, and at the same time to preserve its motions, by saving the proper muscles. Below the external edge of the upper end of the tibia, there is a flat circular surface, covered in a recent subject with cartilage, for the articulation of the fibula; between which and the anterior knob, a rough hollow affords origins to the tibialis anticus and extensor digitorum longus. From this smooth flat surface, a ridge runs obliquely downwards and inwards, to give rise to part of the soleus, tibialis posticus, and flexor digitorum longus, and insertion to the aponeurosis of the semimembranosus which covers the popliteus, and to some of the external fibres of this last-named muscle. At the inside of this ridge an oblique plain surface is left, where the greatest part of the musculus popliteus is inserted. The remaining body of the tibia is triangular. The anterior angle is very sharp, and is commonly called the *spine*, or *spin*. This ridge is not straight; but turns first inwards, then outwards, and lastly inwards again. The plain internal side is smooth and equal, being little subjected to the actions of muscles; but the external side is hollowed above by the tibialis anticus, and below by the extensor digitorum longus and extensor pollicis longus. The two angles behind these sides are rounded by the action of the muscles; the posterior side comprehended between them is not so broad as those already mentioned, but is more oblique and flattened by the action of the tibialis posticus and flexor digitorum longus. A little above the middle of the bone, the internal angle terminates, and the bone is made round by the pressure of the musculus soleus. Near to this the passage of the medullary vessels flants obliquely downwards.

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The lower end of the tibia is hollowed, so as to occasion a small protuberance to rise in the middle. The internal side of this cavity, which is smooth, and in a recent subject is covered with cartilage, is produced into a considerable process, commonly named *malleolus internus*; the point of which is divided by a notch, and from it ligaments are sent out to the foot. We ought to observe here, that this internal malleolus is situated more forwards than the internal condyle of the upper end of this bone; which is necessary to be remembered in reducing a fracture of the leg. The external side of this end of the tibia has a rough irregular femilunar cavity formed in it for receiving the lower end of the fibula. The posterior side has two lateral grooves, and a small middle protuberance. In the internal depression, the tendons of the musculus tibialis posticus and flexor digitorum longus are lodged; and, in the external, the tendon of the flexor longus pollicis plays. From the middle protuberance, ligamentous sheaths go out, for tying down these tendons.

The *fibula* is the small long bone, placed on the outside of the leg, opposite to the external angle of the tibia; the shape of it is irregularly triangular. The head of the fibula has a superficial circular cavity formed on its inside, which, in a recent subject, is covered with a cartilage, and it is so closely connected to the tibia by ligaments, as to allow only a small motion backwards and forwards. This head is protuberant and rough on its outside, where a strong round ligament and the musculus biceps are inserted; and, below the back-part of its internal side, a tubercle may be remarked, that gives rise to the strong tendinous part of the soleus muscle. The external surface of the fibula is depressed obliquely from above downwards and backwards by the two peronæi. Its internal surface is unequally divided into two narrow longitudinal planes, by an oblique ridge extended from the upper part of the anterior angle, to join with the lower end of the internal angle. To this ridge the ligament stretched between the two bones of the leg is connected. The anterior of the two planes is very narrow above, where the extensor longus digitorum and extensor longus pollicis arise from it; but is broader below, where it has the print of the nonus Vesalii. The posterior plane is broad and hollow, giving origin to the larger share of the tibialis posticus. The internal angle of this bone has a tendinous membrane fixed to it, from which some fibres of the flexor digitorum longus take their rise. The posterior surface of the fibula is the plainest and smoothest; but is made flat above by the soleus, and is hollowed below by the flexor pollicis longus. In the middle of this surface, the canal for the medullary vessels may be seen slanting downwards.

The lower end of the fibula is extended into a spongy oblong head; on the inside of which is a convex, irregular, and frequently a scabrous, surface, that is received by the external hollow of the tibia, and so firmly joined to it by a very thin intermediate cartilage and strong ligaments, that it can scarcely move. Below this the fibula is stretched out into a smooth coronoid process, covered with cartilage on its internal side, and is there contiguous to the outside of the first bone of the foot, the astragalus, to secure the articulation. This process, named *malleolus externus*, being situated farther back than the internal malleolus, and in an oblique direction, obliges us naturally to turn the fore-part of the foot outwards. At the lower internal part of this process, a spongy cavity for mucilaginous glands may be remarked; from its point ligaments are extended to the astragalus, os calcis, and os naviculare, bones of the foot; and from its inside short strong ones go out to the astragalus. On the back part of it a sinuosity is made by the tendons of the peronæi muscles. When the ligament extended over these tendons from the one side of the depression to the other is broken, stretched too much, or made weak by a sprain, the tendons frequently start forwards to the outside of the fibula.

Rotula is the small flat bone situated at the fore-part of the joint of the knee. Its shape resembles the common

figure of the heart with its point downwards. The anterior convex surface of the rotula is pierced by a great number of holes, into which fibres of the strong ligament, that is spread over it, enter. Behind, its surface is smooth, covered with cartilage, and divided by a middle convex ridge into two cavities, of which the external is largest; and both are exactly adapted to the pulley of the os femoris, on which they are placed in the most ordinary unstraining postures of the leg: but, when the leg is much bent, the rotula descends far down on the condyles; and, when the leg is fully extended, the rotula rises higher in its upper part than the pulley of thigh-bone. The plain smooth surface is surrounded by a rough prominent edge, to which the capsular ligament adheres. Below, the point of the bone is scabrous, where the strong tendinous ligament from the tubercle of the tibia is fixed. The upper horizontal part of this bone is flatted and unequal, where the tendons of the extensors of the leg are inserted. The substance of the rotula is cellular, with very thin external firm plates; but then these cells are so small, and such a quantity of bone is employed in their formation, that scarcely any bone of its bulk is so strong. Besides, it is covered all over with a thick ligament, to connect its substance, and is moveable to either side; therefore it is sufficiently strong to resist the ordinary actions of the large muscles, or any common external force.

On account of the very large surface of the bones forming the joint of the knee, and the many strong ligaments connecting them, luxations seldom happen here. But these very ligaments, the aponeurosis passing over this joint, and the quantity of fat and mucilaginous glands necessary for lubricating it, make it more subject to white swellings, dropsies, and such other disorders, than any other joint of the body.

The foot is divided, as well as the hand, into three parts, viz. *tarfus*, *metatarfus*, and *toes*. The *tarfus* consists of seven spongy bones, viz. the astragalus, os calcis, naviculare, cuboides, cuneiforme externum, cuneiforme medium, and cuneiforme internum. The upper part of the *astragalus* is formed into a large smooth head, which is slightly hollowed in the middle; and therefore resembles a superficial pulley, by which it is fitted to the lower end of the tibia. The internal side of this head is flat and smooth, to play on the internal malleolus. The external side has also such a surface, but larger, for its articulation with the external malleolus. The lower surface of the astragalus is divided by an irregular deep rough fossa; which at its internal end is narrow, but gradually widens as it stretches obliquely outwards and forwards. The smooth surface, covered with cartilage, behind this fossa, is large, oblong, extended in the same oblique situation with the fossa, and concave for its conjunction with the os calcis. The back-part of the edge of this cavity is produced into two sharp-pointed rough processes; between which is a depression that is made by the tendon of the flexor pollicis longus. The lower surface of it before the fossa is convex, and composed of three distinct smooth planes. The long one behind, and the exterior or shortest, are articulated with the heel-bone; while the internal one, which is the most convex of the three, rests and moves upon a cartilaginous ligament, that is continued from the calcaneum to the os scaphoides. Without which ligament the astragalus could not be sustained; but would be pressed out of its place by the great weight it supports, and the other bones of the tarfus would be separated. The fore-part of this bone is formed into a convex oblong smooth head, called by some its *process*, which is received by the os naviculare. Round the root of this head, especially on the upper surface, a rough fossa may be remarked. The astragalus is articulated above to the tibia and fibula, which together form one cavity. Though in this articulation the bones have prominences and cavities, so small as might allow motions in all directions, yet the flexion and extension are the most considerable, the other motions being confined by the malleoli, and, by the strong ligaments which

go out from the points of these processes to the astragalus and os calcis.

The *os calcis* is the largest bone of the seven. Behind, it is formed into a large knob, commonly called the *heel*: the surface of which is rough behind, where the tendon Achillis is inserted; and above that part it is hollow and spongy. Farther forwards, on the upper surface of the calcaneum, there is an irregular oblong smooth convexity, adapted to the concavity at the back-part of the astragalus: and beyond this a narrow fossa is seen, which divides it from two small concave smooth surfaces, that are joined to the fore-part of the astragalus. Behind the posterior of these smooth surfaces, which is the largest, a small sinuosity is made by the tendon of the flexor digitorum longus; at the fore-part of which a small rough protuberance appears, that gives rise to the musculus extensor digitorum brevis. The external side of this bone is flat, with a superficial fossa running horizontally, in which the tendon of the musculus peroneus longus is lodged. The internal side of the heel-bone is hollowed, for lodging the origin of the massa cornea Jac. Sylvii, and for the safe passage of tendons, nerves, and arteries. Under the side of the internal smooth cavity, a particular groove is made by the tendon of the flexor pollicis longus; and, from the thin protuberance of this internal side the cartilaginous ligament that supports the astragalus goes out to the os naviculare; on which ligament, and on the edge of this bone to which it is fixed, the groove is formed for the tendon of the flexor digitorum profundus. The lower surface of this bone is pressed flat at the back-part, by the weight of our bodies; and, immediately before this plane, there are two tubercles, from the internal of which the musculus abductor pollicis, flexor digitorum sublimis, as also part of the aponeurosis plantaris, and of the abductor minimi digiti, have their origin; and the other part of the abductor minimi digiti and aponeurosis plantaris rises from the external. Before these protuberances this bone is concave, for lodging the flexor muscles; and at its fore-part we may observe a rough depression, from which, and a tubercle behind it, the ligament goes out that prevents this bone from being separated from the os cuboides. The fore-part of the os calcis is formed into an oblong pulley-like smooth surface, which is circular at its upper external end, but is pointed below. The smooth surface is fitted to the os cuboides.

Os naviculare, is somewhat circular. It is formed into an oblong concavity behind, for receiving the anterior head of the astragalus. On the upper surface there is a rough fossa. Below, the os naviculare is very unequal and rough; but hollow for the safety of the muscles. On its inside a large knob rises out, from which the abductor pollicis takes in part its origin, the tendon of the tibialis posticus is inserted into it, and to it two remarkable ligaments are fixed; the first is the strong one, which supports the astragalus; the second is stretched from this bone obliquely across the foot, to the metatarsal bones of the middle toe, and of the toe next to the little one. On the outside of the os naviculare there is a semicircular smooth surface, where it is joined to the os cuboides. The fore-part of this bone is all covered with cartilage, and is divided into three smooth planes, fitted to the three ossa cuneiformia. The os naviculare and astragalus are joined as a ball and socket; and the naviculare moves in all directions in turning the toes inwards, or in raising or depressing either side of the foot, though the motions are greatly restrained by the ligaments which connect this to the other bones of the tarfus. A weakness of these ligaments causes sometimes an unnatural turn of the fore part of the foot inwards.

Os cuboides is a very irregular cube. Behind, it is formed into an oblong unequal concavity, adapted to the fore-part of the os calcis. On its internal side, there is a small semicircular smooth cavity, to join the os naviculare. Immediately before which, an oblong smooth plane is made by the os cuneiforme externum. Below this the bone is hollow and rough. On the internal side of the lower surface

face a round protuberance and fossa are found, where the musculus adductor pollicis has its origin. On the external side of this same surface, there is a round knob, covered with cartilage; immediately before which a smooth fossa may be observed, in which the tendon of the peronæus primus runs obliquely across the foot; and on the knob the thin flat cartilage proper to this muscle plays; in place of which sometimes a bone is found. More externally than the knob, a rough hollow is made, for the strong ligaments stretched between this bone and the os calcis. Before, the surface of the os cuboides is flat, smooth, and slightly divided into two planes, for sustaining the os metatarsi of the little toe, and of the toe next to it.

Os cuneiforme externum is much of the shape of a wedge, being broad and flat above, with long sides running obliquely downwards, and terminating in a sharp edge. The upper surface of this bone is an oblong square. The one behind is nearly a triangle, but not complete at the inferior angle, and is joined to the os naviculare. The external side is half of it smooth, for its conjunction with the os cuboides. The other is a scabrous hollow, and in its superior anterior angles a small smooth impression is made by the os metatarsi of the toe next to the little one. The internal side of this bone is quadrangular, with the fore-part of its edge made flat and smooth by the os metatarsi of the toe next to the great one, and the back-part is also flat and smooth where the os cuneiforme medium is contiguous to it. The fore-part of this bone is an oblong triangle, for sustaining the os metatarsi of the middle toe.

Os cuneiforme medium or *minimum* is still more exactly the shape of a wedge than the former. Its upper part is square; its internal side has a flat smooth surface above and behind, for its conjunction with the following bone; with a small rough fossa below; and a considerable share of it is rough and hollow. The external side is smooth and a little hollowed, where it is contiguous to the last-described bone. Behind, this bone is triangular, where it is articulated with the os naviculare; and it is also triangular at its fore-part, where it is contiguous to the os metatarsi of the toe next to the great one.

Os cuneiforme maximum or *internum* differs from the two former in its situation, being more oblique. Besides, its broad thick part is placed below, and the small thin point is above and outwards; while its under broad surface is concave, for allowing a safe passage to the flexor of the great toe. The surface of this os cuneiforme behind, where it is joined to the os naviculare, is hollow, smooth, and of a circular figure below, but pointed above. The external side consists of two smooth and flat surfaces, whose direction is nearly at right angles with each other. With the posterior, that runs obliquely from below forwards and upwards, the os cuneiforme minimum is joined; and with the anterior, whose direction is longitudinal, the os metatarsi of the toe next to the great one is connected. The fore-part of this bone is semilunar, but flat and smooth, for sustaining the os metatarsi of the great toe. The internal side is scabrous, with two remarkable tubercles below, from which the musculus abductor pollicis rises, and the tibialis anticus is inserted into its upper part.

The seven bones of the *tarfus*, when joined, are convex above, and leave a concavity below, for lodging safely the several muscles, tendons, vessels, and nerves, that lie in the sole of the foot. In the recent subject, their upper and lower surfaces are covered with strong ligaments, which adhere firmly to them; and all the bones are so tightly connected by these and the other ligaments, which are fixed to thorough ridges and fossæ mentioned in the preceding description of the particular bones, that notwithstanding the many surfaces covered with cartilage, some of which are of the form of the very moveable articulations, no more motion is here allowed than only to prevent too great a shock of the fabric of the body in walking, leaping, &c. by falling on too solid a base; which, if it were one continued bone, would likewise be much more liable to be

broken. Sprains occasion here, as in the wrist, great pain and obstinate tumours, which too often cause carious bones.

The *metatarsus* is composed of five bones, of which the *os metatarsi pollicis* is by far the thickest and strongest, as having much the greatest weight to sustain. Its base is oblong, irregularly concave, and of a semilunar figure, to be adapted to the os cuneiforme maximum. The inferior edge of this base is a little prominent and rough, where the tendon of the peronæus primus muscle is inserted. On its outside an oblique circular depression is made by the second metatarsal bone. Its round head has generally on its fore-part a middle ridge, and two oblong cavities, for the ossa sesamoidea. *Os metatarsi* of the *second toe*, is the longest of the five, with a triangular base supported by the os cuneiforme medium and the external side produced into a process; the end of which is an oblique smooth plane, joined to the os cuneiforme externum. Near the internal edge of the base, this bone has two small depressions, made by the os cuneiforme maximum, between which is a rough cavity. *Os metatarsi* of the *middle toe*, is the second in length. Its base, supported by the os cuneiforme externum, is triangular, but slanting outwards, where it ends in a sharp-pointed little process; and the angle below is not completed. The internal side of this base is adapted to the preceding bone; and the external side has two smooth surfaces covered with cartilage. *Os metatarsi* of the *fourth toe* is near as long as the former, with a triangular slanting base joined to the os cuboides, and made round at its external angle; having one hollow smooth surface on the outside, where it is pressed upon by the following bone; and two on the internal side, corresponding to the former bone; behind which is a long narrow surface impressed by the os cuneiforme externum. *Os metatarsi* of the *little toe* is the shortest, situated with its two flat sides above and below, and with the ridges laterally. The base of it, part of which rests on the os cuboides, is very large, tuberos, and produced into a long-pointed process externally, where part of the abductor minimi digiti is fixed; and into its upper part the peronæus secundus is inserted. Its inside has a flat conoidal surface, where it is contiguous to the preceding bone. When we stand, the fore-ends of these metatarsal bones, and the os calcis, are our only supporters; and therefore it is necessary that they should be strong, and should have a confined motion.

The bones of the *toes* are nearly similar to those of the thumb and fingers; particularly the two of the great toe are precisely formed as the two last of the thumb; only their position, in respect of the other toes, is not oblique; and they are proportionally much stronger, because they are subjected to a greater force; for they sustain the force with which our bodies are pushed forwards by the foot at every step we make. The three bones in each of the other four toes, compared to those of the fingers, differ from them in these particulars: They are less and smaller in proportion to their lengths; their bases are much larger than their anterior ends; their bodies are more narrow above than below, and flatter on the sides; and the first phalanx is proportionally much longer than the bones of the second and third, which are very short. Of the four, the toe next to the great one has the largest bones in all dimensions, and more externally the toes are less. The little toe, and frequently that next to it, have the second and third bones intimately united into one; which may be owing to their little motion, and the great pressure they are subject to.

The only bones now remaining to complete the description of the skeleton, are the small ones which are found at the joints of the fingers and toes, and in some other parts, called *ossa sesamoidea*. These are of very different figures and sizes, though they are generally said to resemble the seed of the sesamum. They seem to be nothing else than the ligaments of the articulations, or the firm tendons of strong muscles, or both, become bony by the compression which

which they suffer. Thus the sesamoid bones at the beginning of the gastrocnemii muscles, are evidently composed of the tendinous fibres only. These, at the first joint of the great toe, are as plainly the same continued substance with the ligaments and the tendons of the adductor, flexor, brevis, and abductor. That which is sometimes double at the second joint of that toe is part of the capsular ligament; and, if we enumerate the other sesamoid bones that are at any time found, we may observe all of them formed in like manner. Their number, figure, situation, and magnitude, are so uncertain, that it were in vain to insist on the differences of each; and therefore we shall only in general remark: That wherever the tendons and ligaments are firmest, the actions of the muscles strongest, and the compression greatest, there such bones are most commonly found. That, the older the subject is in which they are sought, their number is greater, and their size larger. And, the more labour any person is inured to, he has, *cæteris paribus*, the most numerous and largest ossa sesamoidea.

However, as the two at the first joint of the great toe are much larger than any other, are early formed, and are seldom wanting in an adult, we may judge, that, besides the more forcible cause of their formation, there should also be some particular advantage necessary at this place, rather than elsewhere; which may possibly be, to allow the flexor muscles to send their tendons along this joint, secure from compression in the hollow between the two oblong sesamoid bones; while by removing these tendons from the centre of motion, and giving them the advantage of an angle at their insertion, the force of the muscle is increased; and therefore the great super-incumbent weight of our body in progression is more easily raised.

MARKS of a FEMALE SKELETON.

To finish the description of the bones, is generally to conclude the history of osteology: but, that no part of the subject may be left untouched, it is necessary to subjoin the distinguishing marks of the male and female skeletons; and we have chosen to illustrate them principally in the latter; because women having a more delicate constitution, and affording lodging and nourishment to their tender foetuses till they have sufficient strength and firmness to bear the injuries of the atmosphere, and contact of other more solid substances, their bones are frequently incomplete, and always of a make in some parts of the body different from those of the robust male. The causes of the following specialities of the female bones may be reduced to these three: A weak lax constitution; a sedentary inactive life, increasing that lax constitution; and a proper frame for being mothers.

The bones of women are smaller in proportion to their length than those of men; because the force of their muscles is not so great, nor is such strong external force applied to them to prevent their stretching out in length. The depressions, ridges, scabrous surfaces, and other inequalities made by the muscles, are not so conspicuous in them; because their muscles are neither so thick nor strong, nor so much employed, as to make strong prints on their bones. The *os frontis* is more frequently divided by a continuation of the sagittal suture. Their *clavicles* are less crooked; because their arms have been less forcibly pulled forwards; which, in our European women, especially those of distinction, is more hindered by their dress. Their *sternum* is more raised by long cartilages below, that the thorax might be there widened in some proportion to what it is shortened by the pressure upon the diaphragm when they are with child.

The defect of bone, or the hole, in the middle of the *sternum*, is oftener found in them; and is owing to a lax constitution, by which the ossification is not so soon completed as in men, where the action of the solids is vigorous, and the circulation of the fluids is brisk: for a much smaller hole might have served this purpose; for the

branches of the internal mammary vessels which are sent to the external parts the thorax do not pass here, but between the cartilages of the ribs, before these are joined to the sternum. The *cartilago xiphoides*, is oftener bifurcated in women than in men, for the reason just assigned, viz. a less forcible power of ossification. The superior cartilages of the ribs sooner ossify, to support the weight of the mammae. The middle cartilages are more flat and broad by the weight of the breasts. The inferior cartilages are longer, for enlarging the chest.

Weak women, who have borne many children when young, often have the *vertebrae* of their back bent forwards, and their *sternum* depressed, or become round-shouldered and flat-breasted, by the pressure and weight of the impregnated uterus, and by the strong action of the abdominal muscles. The *os sacrum* is broader, and turned much more backwards, for enlarging the pelvis. The *os coccygis* is more moveable, and much less bent forwards, to facilitate the birth. The *ossa ilium* are more hollow, and more reflected outwards, and consequently further removed from each other, in order to widen the lower part of their abdomen, and for the better support of the impregnated uterus. The ridge on the upper part of the *os pubis* is larger in such women as have borne children, being extended by the strong action of the *musculi recti abdominis*. The cartilage between the two ossa pubis, especially in women who have borne children, is thicker than in men, by which the pelvis is more capacious in females. The *conjoined surfaces* of the *ossa pubis*, and of the *ossa innominata* and *sacrum*, are less, the angle under the *symphysis* of the *ossa pubis* is much larger, and the arches formed below and behind by the *ossa ilium* and *ischium* are wider, which, with the straighter *os sacrum*, and more distant *tubera ischii*, leave a larger passage for the exclusion of the child in birth. The great tuberosity of the *ossa ischium* is flatter in women than in men, because it is more pressed upon in the sedentary life which females mostly lead. In consequence of the *pelvis* of women being wider, the articulations of their thigh-bones must be farther removed from each other; and therefore a larger space is left for the procreation and birth of children; which distance of the thighs may be one reason why women in running shuffle more from one side to the other than men, to preserve the centre of gravity of their bodies from falling too far to a side of the joint of the thigh that supports them when the other is raised, which would endanger their tumbling to the ground.

The annexed Plate represents a front and back View of the Human Bones, or Skeleton, with some of the ligaments and cartilages which connect the bones to each other.

FRONT VIEW.

HEAD and NECK. *a*, *Os frontis*. *b*, *Os parietale*: between *a* and *b*, part of the coronal suture. *c*, The pars squamosa of the temporal bone: between *b* and *c*, the squamous suture: below the pars squamosa, the zygoma: and, lower down above *f*, the mastoid process: between the pars squamosa and the cavity, which contains the eyeball, called *orbit*, the temporal process of the sphenoid bone is seen. *d*, *Os malæ*: above *d*, a portion of the transverse suture. *e*, *Os maxillare superius*, with the eight teeth of the right side. The nasal process of the superior maxillary bone has the *os nasi* joined, by the nasal suture, to its inside; and, at the outside, within the orbit, the *os unguis*. The *os nasi* joined to each other before, by the anterior nasal suture. *f*, *Os maxillare inferius*, with sixteen teeth; the four anterior named *incisores*, the two corner ones *canini*, and the five posterior on each side *molars*: opposite to *f*, the angle of the lower jaw: above *f*, the condyloid process, by which the jaw is connected to the temporal bone, at the root of the zygoma: and, behind the *os malæ*, the coronoid process. *g*, The seven cervical vertebrae, with their intermediate cartilages: opposite to *g*, their transverse processes.

TRUNK. *a*, Sternum: *a*, its middle piece, to which one half of the cartilage that connects the second rib, the whole

whole of the cartilages of the third, fourth, fifth, sixth, and one-half of the seventh, are fixed: above *a*, the first or upper triangular piece, to which the clavicle, and one half of the cartilage that connects the second rib, are fixed: below *a*, the extremity, or third piece, of the sternum, named *cartilago ensiformis*, to which one half of the cartilage that connects the seventh rib is fixed. *b*, The seventh or last true rib. *c*, The twelfth or last of the five false ribs. *d*, The five lumbar vertebræ, with their intermediate cartilages: opposite to *d*, their transverse processes. *e*, The os sacrum, with its five divisions. *f*, Os innominatum, divided into *g*, Os ilium; *h*, Os pubis; *i*, Os ischium: opposite to *i*, the foramen thyroideum.

SUPERIOR EXTREMITY. *a*, The clavicle fixed before, to the first piece of the sternum, and outwards to the acromion of the scapula. *b*, The scapula: above *b*, the cervix of the scapula: opposite to it, the inferior costa; and, below the outward extremity of the clavicle, the superior costa, and coracoid process, are seen. *c*, The os humeri: the upper end of it, which is connected to the cavity of the scapula, named *glenoid*, below the acromion, is named its *head* or *ball*; on each side of which is seen a tubercle, named *external* and *internal*; and, between these, a groove for lodging the long head of the biceps flexor cubiti. *d*, The internal condyle. *e*, The external condyle: between *d* and *e*, the trochlea, upon which the ulna moves. *f*, The radius: the upper end, which moves on the external condyle of the os humeri, is named its *head*; below that, the tubercle for the insertion of the biceps flexor cubiti, and between these the cervix: the inferior end of it is connected to the carpus. *g*, Ulna: the upper end of it forms the coronoid process for the insertion of the brachialis muscle: the inferior end has a process named *styloid*, which is connected to the carpus by a ligament. *h*, The carpus, formed of eight bones. *i*, Metacarpal bone of thumb. *k*, The metacarpal bones of the four fingers. *l*, The two joints of the thumb. *m*, The three joints or phalanges of the fore-finger; and the same are seen in each of the other three.

INFERIOR EXTREMITY. *a*, Os femoris: the upper end of it is named its *head* or *ball*, which is lodged in a deep socket of the os innominatum, named *acetabulum*: between the head and trochanter major, the cervix. *b*, Trochanter major. *c*, Trochanter minor. *d*, Internal condyle. *e*, External condyle. *f*, Patella: the place where it moves upon the os femoris, is named *trochlea*. *g*, Tibia: between the tibia and the condyles of the os femoris, the femilunar cartilages are seen; and, below the joint, the tubercle of the tibia. *h*, Fibula. *i*, Malleolus internus. *k*, Malleolus externus. *l*, Os calcis: between *l* and *m*, the other six bones of the tarsus. *m*, Metatarsal bones of the four toes. *n*, The three joints, or phalanges, of the four toes. *o*, Metatarsal bone of the great toe. *p*, The two joints of the great toe.

BACK VIEW.

HEAD and NECK. *a*, Os parietale, joined to its fellow by the sagittal suture. *b*, The os occipitis, joined to the parietal bones by the lambdoid suture, which is between *a* and *b*. *c*, Os malæ. *d*, Maxilla inferior, with a view of the teeth of both jaws from behind. *e*, The seven cervical vertebræ.

TRUNK. *a*, The seventh or last true rib. *b*, The twelfth or last rib. *c*, The five lumbar vertebræ. *d*, Os sacrum. *e*, Os coccygis. *f*, Os innominatum, divided into *g*, Os ilium; *h*, Os pubis; *i*, Os ischium.

SUPERIOR EXTREMITY. *a*, The clavicle, joined outwards to the acromion of the scapula. *b*, The scapula. *c*, Os humeri. *d*, Internal condyle. *e*, External condyle. *f*, Radius. *g*, Ulna: its upper end, named *olecranon*; and, near the wrist, its *styloid* process. *h*, The eight bones of the carpus. *i*, The metatarsal bone of the thumb. *k*, The metatarsal bone of the four fingers. *l*, The two joints of the thumb. *m*, The three joints or phalanges of the four fingers.

INFERIOR EXTREMITY. *a*, Os femoris. *b*, Trochan-

ter major, and at the inside of it the cervix. *c*, Trochanter minor. *d*, Internal condyle. *e*, External condyle. *f*, Tibia. *g*, Fibula. *h*, Malleolus internus. *i*, Malleolus externus. *k*, The seven bones of the tarsus. *l*, The metatarsus. *m*, The joints or phalanges of the toes.

Of the MUSCLES.

THE muscles are the organs of motion in the human body; though motion is not wholly performed by one individual organ. In every animal and vegetable fibre, even in hair, feathers, membranes, the cellular texture, and in the humid muscular fibre, in short, in animal and vegetable glutes, there is a contractile or elastic power which preserves the fibre in its natural state, preventing it from being too much extended, and restoring it again to its proper dimensions when the stretching power is removed. This power never ceases endeavouring to bring the elementary particles into the closest contact that the mechanism of the part can admit. It continues even many days after death; so that fibres of a divided muscle contract towards each extremity, leaving a wide gap in the middle. An artery, when cut, likewise contracts itself in length. This force may be called *vis mortua*, because it continues to be efficacious after death, and is different from the powers of life. In the living animal, indeed, it is somewhat brisker; for, both from cold and fear, the skin trembles, grows harder, and has its papillæ erected; and along with this hardness it contracts itself in length. Again, the cellular fibres are animated with this perpetual nifus to shorten, always endeavouring to contract themselves. Hence, when the skin or any other membrane is extended, as soon as the cause of extension is taken off, it returns by a gentle effort to its former shortness. But it even somewhat resists the attempt to perpetual distension; and, by a gentle, but continual, approach of its elements to one another, it propels the contained fat, or water, or other bodies accidentally introduced into it. The same power also seems to limit the excretion of vapour; for the fibres and plates of the cellular texture being preternaturally relaxed, an immense quantity, either of fat or of watery humour, is deposited in that texture. And this debility seems to be the principal cause of a dropsy. The same cause being always efficacious, and at work in the heart, joints, and every where throughout the body of the embryo, brings into nearer contact the arteries, auricles, and ventricles; produces flexures; and contracts the heart into the form of a cone. The same cause, by an unknown or hidden power, seems to form the shape of most parts of the human body; and, while it expels the gluten received into the cells, it brings the terrestrial particles nearer to one another, and gives the proper solidity, curvature, and situation, to the different parts. It is the nature of this power to act continually by gentle but uninterrupted efforts. It is common for it also to be excited by poisons, in every membrane, fibre, and in the cellular texture; but never by cutting or puncturing with a sharp instrument. These are the known properties of the red muscular fibre. The structure of this fibre, therefore, we shall now consider.

By the name of *muscular* or *moving fibres* in the human body, we call bundles of reddish-coloured threads, which perform all the motions visible in the human body. When many of these fibres are collected together, and appear more evidently red, they are called a *muscle*. The extreme simplicity of the texture in these parts has been the cause of the obscurity in understanding how a small soft portion of flesh can produce such strong and ample motions as we see in man, and more especially in the crustaceous insects. In every muscle we meet with long soft threads of *fibres*, somewhat elastic, or extensible, and almost constantly disposed parallel with each other; and these, being surrounded with a good deal of cellular substance, are by that fastened together into little bundles, called *lacertuli*; which are again tied together into larger bundles, by a more loose cellular net-work, that contains some fat; and between these we constantly perceive mem-

braneous partitions and stripes of the cellular substance removing them farther from each other, till at last a number of them combined together, either parallel or inclined, are surrounded with a more thin and dense cellular membrane, continuous with that of their partitions; and this being again surrounded by a thicker plate of the cellular substance, parts the whole bundle from the adjacent flesh, and gives it the denomination of a *single* or *entire muscle*. In every one of these threads there appears a smaller series of filaments, which, by oblique extremities, are cemented to others of the same kind, forming together a large fibre.

The generality of the muscles, but more especially those which are inserted into the bones, have other fibres fixed to them; but these are condensed into a more slender, hard, and shining, substance, of a silver colour, which has the name of *tendon*. When the tendinous fibres expand into a broad flat surface, they form what is called an *aponeurosis*. The cellular texture which covers the whole tendon, is called its *vagina* or *sheath*, and resembles the coat of a muscle. That fleshy fibres truly change into such as are tendinous, says Dr. Haller, is evident from comparing a fœtus, in which there are few tendons, with a child of some years growth, in which there are many more; and both with an adult, in which there are the greatest number. But Dr. Wrisberg observes, in opposition to this, that many tendons are found in a fœtus, which could not assume this nature by muscular action; as the tendo Achillis, aponeurosis plantaris, centrum diaphragmatis, &c. Besides, in various parts of the body there are tendons found without corresponding muscles.

Muscles which are not inserted into any of the bones have commonly no tendons, as the sphincters and muscular membranes of the viscera and vessels. But those commonly end in long tendons, which are required to pass round the joints and heads of the bones, to be inserted in those extremities which are more moveable. In a fœtus the muscles are evidently inserted into the periosteum only; but, in adults, where the periosteum is more closely joined with the bone itself, the tendons, being confused with the periosteum, pass together with that even into the foveoli of the bone. The tendinous fibres, indeed, often lie in a straight line with the fleshy ones, and are as it were a continuation of them. But in many parts of the body the fleshy fibres are obliquely inclined to the tendon, and adhere to it; and the tendon itself grows thicker in its progress by continually receiving new fibres. This is called a *tendinous muscle*. Other tendons lie in the middle between two plates of fibres, which are inserted on each side of the tendon at angles obtuse downward; and this is called a *pennated muscle*. There are instances of numerous tendons, pennated in different places, formed into one muscle. There are also other methods by which the tendinous fibres are joined with the fleshy ones.

Within the cellular tunic that surrounds the fibres, the arteries and veins, running in company with each other, are sub-divided into net-works. From the smaller of these vessels a vapour is exhaled into the thinner, and the fat is transfused into the thicker, cellular substance; from whence again they are both absorbed by the lymphatic vessels; which can be distinctly seen both on the surface and in the substance of the muscles. The nerves of the muscles are still more evident. They are commonly very large; and enter by so many branches, that some anatomists have considered the muscular fibres as formed by them. Several arguments are offered against this opinion: one of the strongest is, that muscles in the limbs of animals do not shrink, although the nerves entering these muscles have been cut through for a considerable length of time. The nerves enter the muscles in a way somewhat similar with that of the arteries and veins; but it is impossible to trace them a great way among the fleshy fibres, for they at length deposit their harder covering, and become soft, and disappear before they can be traced to their terminations.

The fabric of the least fibres, which are supposed to be

the elementary particles of a muscle, being investigated by the microscope in man and other animals, is found to be similar to that of the larger fibres, and they are all joined together by the intermediate cellular substance. The surface of the fibres, however, puts on a curious waved or zigzag appearance. This undulated appearance Prof. Chazka thinks is nothing else than impressions made by the vessels and cellular substance, and perhaps by the nerves; but Dr. Monro has described and delineated a similar appearance in the tendons and nerves; and is of opinion, that they are to be considered as folds or joints, serving to accommodate the parts to the different states of flexion and extension. In proof of this, he finds, that those parts which appear thus in their relaxed state, lose it when they are much stretched.

With regard to the nature of the ultimate moving fibres, there have been many disputes. Some anatomists think them solid; others, hollow, formed of a series of vessels or rhomboidal chains communicating with each other. Some, again, have been of opinion, that they are full of a kind of down or woolly substance, &c. It may be asked, Whether they are hollow? whether they are continued from the arteries? or whether the difference between muscular and tendinous fibres, lies in the latter being rendered more dense, and beat closer together by an expulsion of the fluids? That these are not probable, appears from the minuteness of the fibres, which are found less than the red-blood globules, and from the whiteness of a muscle after the blood is washed out of it. The structure of the tendons and aponeuroses agrees in some respects with, but differs in others from, that of the muscles. We observe their fibres regularly disposed, and separated by cellular substance and blood-vessels; and without doubt they have lymphatics and nerves: but the tendinous fibres are closer together than those of the muscles, the cellular substance which separates them is finer, their red vessels are fewer in number, and the nerves cannot be traced, without difficulty, into their substance. It has been doubted whether the fibres of tendons are a continuation of the moving fibres, or of a different nature. Many, both ancient and moderns, have embraced the first opinion, others the second; but, if we consider that the tendinous fibres are not irritable, have no contraction, that they differ little from those which constitute the ligaments, and that they degenerate sometimes into a substance truly cellular, we should be inclined to adopt the latter opinion.

According to Dr. Haller, a muscle is endowed at least with a threefold force. First the *vis mortua*, in common to it with other animal fibres. Another, which he has called the *vis insita*, and which has different phenomena from the former. It is more peculiar to life; and, though it may continue for a few hours after death, yet it disappears much sooner than the former. Again, in most cases, it acts by alternate oscillations; so that, being driven hither and thither, it sometimes contracts the muscle towards the middle; sometimes again it extends the muscle from the middle towards the extremities, and sometimes also it has a reiterated motion. Moreover, it is manifestly quicker, and performs the greatest motions. It is excited both by the pricking with a sharp instrument, and in the hollow muscles by inflated air, by water, and every kind of acrimony, but most powerfully of all by a torrent of electrical matter. Lastly, it is peculiar to the muscular fibre, and is found in no other part of the human body with the qualities above-mentioned. But we must give a more particular explication of its phenomena.

It is natural to every muscle to shorten itself, by drawing the extremities towards its belly or middle. But to discover the moving power of a muscle from the fabric which we have described, it will be of use to consider the appearances observable in the muscular contraction. Every muscle then becomes shorter and broader in its action. But this contraction of its length is various; in some more, in others less; and is very considerable in some of the sphincters, inasmuch that they appear to be contracted more

more than one third of their extent. The intestines are exceedingly tenacious of their *vis insita*, as they continue to contract themselves long after they are taken out of the body, and even after they are cold; and the heart is even more tenacious of this principle than the intestines, as is evident in a young chicken, and in cold animals. Different muscles are best excited into action by different stimuli; as the bladder by urine, the heart by the blood, and the intestines by air. Though the nerves are removed, or the connection, made by them between the muscles and the brain, cut off, the muscles lose but little of their irritable nature. It appears also from the example of the polypi and other insects, that the same irritable disposition extends very widely through the animal fibres. In many of these creatures, neither brain nor nerves can be traced, yet they are exceedingly affected by stimulus. Lastly, we perceive this *vis insita* in vegetables, many of which expand and contract their flowers and leaves according to the different states of the atmosphere; and some plants exert sudden and violent motions from stimuli externally applied, appearing little inferior in this respect to animals. This *vis insita* does not depend upon weight, attraction, or elasticity; for it is seated in a soft fibre, and vanishes as the fibre grows hard.

That the cause of motion is conveyed through the nerves into the muscles, is certain from the experiments made on the brain and nerves. For the nerve alone has feeling; this alone carries the commands of the soul; and of these commands there is neither intimation nor perception in that part, whose nerve is either tied or cut, or which has no nerve. Moreover, on irritating the nerve or spinal marrow, even in an animal that has been dead for some time, the muscles which have nervous branches from those parts are most vehemently convulsed. When the nerve of any muscle is cut or tied, or the basis of the spinal marrow compressed, or that part of the brain from whence the nerve has its origin, the muscle becomes paralytic, and languishes, and cannot by any force be re-called into an action similar to the vital one. But, if the ligature be taken off from the nerve, the force by which the muscle is put into action is again recovered. The nerve being irritated below the place where it is cut, the muscle to which that nerve goes is contracted. This appears from numerous experiments, especially those made on the phrenic and recurrent nerves. This force, called *vis nervæ*, is not the same with the *vis insita*. The former comes to the muscle from without: whereas the other resides constantly in the muscle itself. The nervous power ceases when life is destroyed; the other appears, from certain experiments, to remain for some time after death: it is also suppressed by tying a ligature upon the nerve, by hurting the brain, or by taking opium. The *vis insita* suffers nothing from all these circumstances: it remains after the nerve is tied; it continues in the intestines though they be taken out of the body and cut in pieces; it appears with great strength in such animals as are destitute of brain; that part of the body is moved which has no feeling; and the parts of the body feel which are without motion. The will excites and removes the nervous power, but has no power over the *vis insita*.

In the motion of the muscles, whether owing to the *vis insita* or the *vis nervæ*, the fibres are contracted towards the middle of their belly, and recede from one another outwards; they are also diversified with various transverse wrinkles; the whole muscle also becomes shorter, and draws its extremities towards the middle; hence it draws towards each other those parts with which it was connected; the muscle also swells by its contraction, becoming hard at the same time, and as it were increases its circumference on every side. Haller has never observed it to turn pale. Whether on the whole it is increased in bulk, or acquires more in breadth than it loses in length, is difficult to be known. It draws after it the tendons, which are obsequious to its motions, though of themselves neither moveable nor irritable. The whole muscle is also

capable of being moved at once, or only a part of it; if one extremity is fixed to an immovable part, that only is moved which is capable of yielding.

If it be demanded, Whether the arteries conduce any thing to muscular motion? and whether the palsy of the lower limbs after a ligature upon the aorta be not an argument of this opinion? we answer, No farther than as they conduce to the sound state of the muscle, or to the conservation of the mutual structure and habit of the parts, which they supply with vapour, fat, &c. for the irritation of an artery does not affect or convulse the muscle to which it belongs; nor does a ligature on it cause a palsy, unless after a considerable time, when the muscles begin to be destroyed by a gangrene. Moreover, it is impracticable to explain the motion of peculiar muscles from a cause derived with an equal force from the heart to all parts of the body. Lastly, the influence of the will is confined to the nerves, without residing in the arteries or other solid parts of the body. But the direct manner by which the nerves excite motion in the muscles, is so obscure, that we may almost for ever despair of its discovery. The opinion, that the nervous vesicles swell by a quicker flux of the nervous spirits, is inconsistent with anatomical truth, which demonstrates the least visible fibres to be cylindrical, and in no part vesicular; it is likewise repugnant to the celerity with which muscular motion is performed; and it seems to be completely refuted by the well-known fact, that the bulk of a muscle is rather diminished than increased during its action. Again, the inflation of rhomboidal chains in the fibres is equally repugnant to the celerity of muscular motion, and to anatomy; they would also occasion an immense waste of strength, and after all render the muscle but little shorter. The nerves want that irritable nature which is observed in the muscular fibre. Finally, it is by no means demonstrable, that the fibres, from so few nerves, can be so numerous, or distributed in so many different transverse directions, with respect to the muscular threads, as those hypotheses require to be allowed. A complication of the nerves round the extremities of fibres, so as to contract them by their elasticity, is founded upon a false structure of the muscular fibre, supposing the nerves to be distributed where filaments of the cellular substance only can be demonstrated. Moreover, the phenomena of animals, which, having neither brain nor nerves, are yet very apt for motion, apparently demonstrate the intrinsic fabric of the muscles to be sufficient for their motion, without other assistance from the nerves. Other explanations, derived from spherules of air in the blood, are founded on a false hypothesis, for the blood contains no elastic air. The animal spirits are not of the nature of an electric torrent.

If we may add any thing to these phenomena, we may suppose the nervous fluid to be of a stimulating nature, by which means it forces the elementary particles of the muscular fibre to approach nearer to each other. The motive cause which occasions the influx of the animal spirits into the muscle, so as to excite it into action, seems not to be the soul, but a law derived immediately from God. For animals newly born, or newly transformed, without any attempt, or exercise, know how to execute compound motions very difficultly to be defined by calculation; whereas the soul knows not how to perform any actions until she has learnt, by making experiments, the methods of performing them. A muscle then is contracted when in a given time it receives more of the nervous fluid, whether that be occasioned by the will, or by some irritating cause arising in the brain or applied to the nerve.

But, though we may suppose the soul to be the cause of the nervous motion, we cannot do the same with regard to that arising from the *vis insita*. The heart and intestines, and also the organs of generation, are governed by a *vis insita*, and by stimuli. These powers do not arise from the will; nor are they lessened, or excited, or suppressed, or changed, by it. No custom nor art can make these organs subject to the will, which have their motions from

from a vis insita; nor can they be made to obey the commands of the soul, like attendants on voluntary motion. It is so certain that motion is produced by the body alone, that we cannot even suspect any motion to arise from a spiritual cause, besides that which we see is occasioned by the will; and, even in that motion which is occasioned by the will, a stimulus will occasion the greatest exertions, when the mind is very unwilling. There seems to be this difference between the muscles obeying the will, and those which are governed by a vis insita; namely, that the latter, being more irritable, are very easily excited into motion by a gentle stimulus; as for instance, the heart and intestines; which organs are most manifestly, and greatly, and constantly, irritable. On the other hand, the muscles, which obey the will, are neither endowed with so great nor so durable a power of this kind. Hence they either stand in need of the power of the will, or of a stronger stimulus; when they are excited by a stimulus, they are animated to motion against the will. Thus it happens, that in apoplexies the muscles which obey the will languish, and become paralytic, as being destitute of all influx from the brain; while the vital muscles, having no occasion for the operation of the brain, continue to be excited into contraction by their stimuli, independent of the will, as the heart by the blood, and the intestines by the air and aliments.

The strength of the muscles is very considerable in all persons, but more especially phrenetic and robust men; since frequently, with the use of a few muscles only, they will raise a weight equal to, or much greater than, that of the whole human body. In a healthy man, very slender muscles suffice to lift two or three hundred pounds: the muscles of the back will even sustain 3000. Notwithstanding this, we see, that much the greater part of the force or power exerted by a muscle is always lost without producing any visible effect. For all the muscles are inserted nearer the point or centre of motion, than the weights they are applied to; and therefore their action is weaker, in the same proportion as they move a shorter part of the lever than that to which the weight is applied. Moreover, in most of the bones, especially those of the limbs, the muscles are inserted at very acute angles; whence again the effect which a muscle exerts in action is proportionally less, as the sine of the angle intercepted between the bone and the muscle is less than the whole sine. Again, the half of all muscular force is lost; because a muscle, like an extended cord, exerts as much force at its fixed as at its moving extremity. Besides, many of the muscles are seated in the angle of two bones; and, when the joint is bent, the muscle becomes also bent; consequently a quantity of force must be first applied to stretch the muscle, before the muscle can act on the bone in which it is inserted. Many of them pass over several joints, each of which they bend in some degree, whereby a less part of their remaining force goes to bend the joint to which they are particularly destined. The fleshy fibres themselves of the muscles frequently intercept angles with the tendon in which they terminate; whence their force is diminished in proportion to the sine of the angle of their insertion. Finally, the muscles move their opposed weights with the greatest velocity and expedition, so as not only to overcome the equilibrium, but likewise to add a considerable celerity to the weight.

All these losses of power being computed, make it evident, that the force exerted by muscles in their contraction, is exceeding great, and almost beyond any mechanical computation. The effect is scarcely one-sixtieth of the whole force exerted by the muscle, and yet only a small number of these muscles, weighing but a few pounds, are able not only to raise some thousands of pounds, but also with a considerable celerity. Nor is this to be reputed any defect of wisdom in the Creator; for all those losses of power were necessary for a just symmetry or proportion of the parts, and for various motions and celerities in different directions. But we may, however, conclude from hence, that the action of the nervous or animal fluid is very power-

ful, since, in an engine so small, it can exert a force equal to some thousand pounds for a considerable time, even for many days together; nor does this seem to be otherwise explicable, than by the incredible celerity by which the influx of this fluid obeys the command of the will. But how or whence it acquires such a velocity, is not in our power to say; it is sufficient that we know the laws of its motion are such, that a given action of the will produces a new and determinate celerity in the nervous fluid.

There are various means by which the motions of the muscles are rendered more safe, certain, and easy. The large long muscles, by which the greater motions of flexure are performed, being included in tendinous capsules or cases, drawn and tightened by other muscles, are thus secured and strengthened; and thus the muscle, in a state of contraction, remains pressed against the bone all the time that the limb is bent, and consequently avoids a considerable loss of its power. The long tendons, which are incurvated or extended over joints in their motion, are received and confined by peculiar ligaments, which retain them within their slippery channels; and in these sheaths a particular liquor is separated for the lubricating of the tendons. Nature makes a similar provision for those muscles which perforate others in their course. In other parts, the tendons are either carried round certain eminences of the bone, in order that they may be inserted at greater angles into the bone which they move; or else they are inserted into another bone, from whence a different tendon descends under a larger angle into the bone to be moved. In other parts, the muscles which are derived from convenient situations, have their tendons carried round in a contrary direction by nature, so that they pass into the part to be moved as it were round a pulley. Nature has likewise surrounded the muscles on all sides with a considerable quantity of fat, which is spread also between the bundles of fibres, and also between the small fibres themselves; which fat, being pressed out by the turgescence of the muscles and fibres, renders them soft, flexible, slippery, and fit for motion. Moreover, the power and action of one muscle is determined by the co-operations or oppositions of others, which serve either to hold firm some part from whence the muscle arises, or to bend it together with the muscle, or else to change its action from the perpendicular to the diagonal, by concurring to assist its force at the same time. Remote muscles often assist each other, the superior muscles keeping the bone, whence the inferior acting muscles arise firm and steady. Therefore, the action of no one muscle can be understood from considering it alone; but all the others, which are either inserted into the muscle itself, or into any of the parts to which the muscle adheres, must likewise be brought into the consideration.

By these muscles, variously conspiring and opposing each other, are performed walking, standing, flexion, extension, deglutition, and all the other gestures and offices of the several parts in the living body. But the muscles have likewise some common actions, by which they are of use to the whole animal. They hasten the return of the venous blood, by pressing it out both from the veins of the muscles themselves, and from the veins which lie between them; for the blood in these vessels, distributed between the turgid bundles of a contracted muscle, is, by the valves, determined towards the heart: they likewise return the fat to the blood; and shake, grind, or condense, the arterial blood, and return it quicker to the lungs; they contribute in a great degree to the secretions and excretions. Again, in the liver, mesentery, womb, &c. they promote the course of the contained blood, bile, and other juices, so as to lessen the danger of their stagnation; they serve also to increase the strength of the stomach, by adding their own strength to it, whereby digestion is promoted; inasmuch that all sedentary and inactive courses of life are contrary to nature, and pave the way to diseases from a stagnation of the humours, or from a corruption or crudity of the aliments. The large muscles, which are generally placed round any of the cavities of the body, propel the blood

blood contained in that cavity, and prefs it towards the heart. By too much exercise or action the muscles themselves grow hard and tendinous on all sides; they render the parts upon which they are incumbent cartilaginous, or else change those which are membranous into a bony nature; they increase the roughness, protuberances, and processes, of the bones which lie next to them, and excavate their flat parts; they dilate the cells of the diploe, and incurvate the bones.

The muscle which the stimulus has ceased to irritate, or for the action of which the mind has no occasion, is relaxed, and grows soft; its wrinkles grow plain; its fibres are rendered longer, receding from the middle towards the fixed extremities; and its swelling falls. Whatever is the cause of additional contraction is then taken away; but the vis inertia remains. It may be asked, What becomes of the spirit that is sent from the brain? A part of it perhaps exhales; a part of it may be suspected to adhere to the fibre; and thus it happens that the muscles grow strong with exercise, and their brawny parts become thicker.

The three noted classes of animal powers, *elasticity*, *irritability*, and *sensibility*, Dr. Wrisberg observes, have been and are yet too much confounded, although it is no difficult task to distinguish these affections from one another. The elasticity and cohesion of the fibres, which in different degrees are found in every part of the body, was fully known to Bellini, Baglivi, Stahl, Pacchioni, Juncker, &c. That power, known to Stahl's followers under the appellation of *tone*, has no similarity to irritability, sensibility, and what is called vital power. It either alone performs the various actions of the animal and vegetable body, or adds strength and vigour to them: the former is manifest in the motion of the ribs and cartilages; and the latter in the construction of the uterus, vessels, and membranes. It by no means depends on the vital powers, but may endure long after death; it is not completely destroyed even by putrefaction. During life it is diminished by various causes, and again restored by several remedies. Irritability, which Haller thought existed in the fibres of the muscles alone, and which indeed was known by name, but not in reality, to Glisson, is a kind of animal power, unknown to earlier anatomists, and is different from that power which Hippocrates calls *ενεργουον*. It is proved, from the experiments of Lups, Haller, Fontana, Hoffman, and several others, to differ from elasticity in its rise, duration, seat, causes, effects, and phenomena. 1. It is most powerful in the muscular fibres of the whole body, but not equally diffused through all; more powerful in the heart, muscles of respiration, and intestines, but becomes gradually weaker among the voluntary muscles; and it exists perhaps, in a small degree, in the vessels and membranes, as appears from the doubts offered by Whyte, De Haen, Van Doeveren, &c. which Haller and the learned Cigna have answered. 2. The phenomena of irritability, and the irritations themselves by which these phenomena are produced, are not always the same. In some parts we constantly perceive a manifest irritability produced by every irritation, as is the case in almost all the muscles. In many other parts, we see the greatest inconstancy and very irregular effects, varying differently, at different times, being sometimes increased and sometimes diminished, at one time yielding to, and at another resisting, the irritations; all which is evident in the skin, viscera, vessels, and iris. The learned pathologists, Eller, Tissot, and Gerhard, have long ago acknowledged the great use of the doctrine of irritability. It would be of much importance to know the remedies, which particularly conduce to excite irritability when it is languid, or to diminish it when it is too great. Opium, and the other narcotics, camphor, cantharides, acrid poisons, bark, the electric shock, shew a clear influx of animal spirits in the production of irritability. That it is different from the sentient faculty, and therefore by no means depends upon the nerves, appears partly from other reasons, and partly from the irritability of vegetables. Though we might take into account some phenomena of

the *dionæa muscipula*, according to Ellis's observations, or of the *hedyfarum* or the *antheræ* of certain other plants, yet we should be averse to compare this contractile power of some parts of vegetables with irritability; for the internal tremor of the constituent parts, which makes the particular character of irritability, is wanting in all vegetables; we see contraction and motion alone, which are also observable in other elastic bodies, where we suppose no irritability to exist. The sentient faculty, depending solely upon the nerves, although it has been regarded as one and the same thing with irritability, has been more strongly opposed by Haller's opponents, De Haen, Whyte, Le Cat, Gerhard, &c. than irritability itself. The sensibility of the parts is to be referred both to the various quantity of the nerves, their situation and state, according to Haller's and Castell's experiments, and to the various violence of irritation, and the nature of the irritating or offending body; for some parts are frequently much affected at one time and less at another, and Haller thinks that some of them may sometimes be altogether insensible. We shall not repeat what has been often offered on the opinion, that a greater pain having preceded, absorbs a less pain following; thus we do not feel the taste of a drop of wine, if we have taken a very small quantity of rectified alcohol upon the tongue a little before. It cannot however be denied, that, in inflammatory diseases, affections of the mind, and other causes, it may happen, that hurt parts may feel, which, under any other condition, seem insensible. The *vital power* of certain learned men of later times, as Vanden Bos, Bikker, Gaubius, Albinus, &c. seems rather compounded of all the animal powers comprehended together; which opinion, except in some minutiae, the great Boerhaave and Simpson have more exactly adopted.

Upon the subject of *irritability*, and the *sentient* principle, as acting upon the human fibre, Dr. Blane, F.R.S. has published some very pertinent remarks. He controverts the doctrine that all muscular irritability depends upon a sentient principle. "There have been several instances (says he) of the production of fœtuses without the brain; and a principal fact in support of this opinion is, the existence of animals without brain or nerves. That there are such, was first observed by Haller, and has been confirmed by Mr. Hunter; who maintains farther, that the stomach is a centre or seat of life more essential to it than the brain. That the stomach should be an organ of so much consequence, seems natural enough from the importance of its function, which is that of assimilation; and life can be more immediately and completely extinguished by an injury to it, such as a blow, than by the same violence to any other part of the body. It is also well known, that the muscular fibres of animals, endowed with a nervous system, will retain their irritability for some time after their separation from the brain and nerves. It is evident likewise, from the phenomena of vegetation, that irritability may exist in nature without sensation, consciousness, or any suspicion of the existence of a nervous system. In favour of this opinion, it is farther observable, that those animals which are destitute of brain and nerves are of the class of *vermes*, the most simple in nature, having only one function, viz. that of assimilation; and therefore not requiring that variety of action, and those perceptions which are peculiar to more complex animals. Lastly, the state of an egg before incubation, and the condition of those animals which become torpid from cold, and afterwards revive, afford facts which favour this opinion; as they shew that there is a certain principle of self-preservation, independent not only of the operation of the nervous system, but even of the circulation; for in this quiescent state, those portions of animal matter are preserved for a great length of time from that corruption to which they would otherwise be liable, and their fluids are prevented from freezing in a degree of cold which would congeal them, were they destitute of every principle of life."

In the course of his reasoning, Dr. Blane considers the nervous system not only as a mere appendage to life, but

as tending to impede its operation, and shorten its existence. "Simple life," he says, "will not only survive sensation, but will survive it longer, if the animal is killed by destroying the nervous system, than if it had been destroyed by hæmorrhage, suffocation, or other violence. If a fish, immediately upon being taken out of the water, be stunned by a violent blow on the head, or by having the head crushed, the irritability and sweetness of the muscles will be preserved much longer than if it had been allowed to die with the organs of sense entire. This is so well known to fishermen, that they put it in practice in order to make them longer susceptible of the operation called *crimping*. A salmon is one of the fishes least tenacious of life, inasmuch that it will lose all signs of life in less than half an hour after it is taken out of the water, if suffered to die without any farther injury; but if, immediately after being caught, it receives a violent blow on the head, the muscles will shew visible irritability for more than twelve hours afterwards."

To the same purpose, he observes, that in warm-blooded animals an excessive exertion of voluntary motion immediately before death, prevents the muscles from being rigid when cold, and renders them more prone to putrefaction. Thus, if an ox is killed immediately after being over-driven, the carcase will not become stiff when it grows cold, nor is it capable of being preserved by means of salt. In confirmation of the same hypothesis, it may be observed, that in some disorders of the brain, such as hydrocephalus, and apopleptic palsy, in which the functions of the brain are suspended, the office of digestion is sometimes better performed than in health. From all which Dr. Blane and Mr. Hunter conclude, that the exercise of sensation is inimical to life, and that a sort of fatigue is induced by this as well as by voluntary motion; "so that all that intercourse carried on through the nerves, whether *towards* the brain in the case of sensation, or *from* the brain in acts of volition, tends to wear out the animal powers. And, as intense and long-continued thought, though not terminating in any outward action, tends also to produce an inability for farther exertions, it would appear that the brain or sensorium is more particularly the organ which is subject to that species of suffering called *fatigue*. From these facts we perceive the necessity of sleep, which consists in a temporary suspension of sensation, volition, and thought, and is a resource of nature, whereby the powers of life recover themselves after satiety and fatigue, which are provided as guards to warn us when nature is in danger of being strained, either by repletion or over-exertion; and it is evident that such barriers were absolutely necessary, in order to set bounds to operations which are only occasionally requisite, and which would otherwise depend on the caprice of the will. The exercise of sensation and voluntary motion in a moderate degree is conformable to the intention of nature, and therefore salutary; and it is only when they are excessive that they tend to wear out the powers of life, and more especially if these are not duly recruited by sleep. It follows, from the same principle, that when life is threatened by certain diseases, of which the chief symptom is *irritation*, any means by which sensation, whether natural or morbid, and muscular motion, whether voluntary or involuntary, convulsive or spasmodic, can be soothed or suspended, will prove salutary, by allowing the powers of life to rally as it were, and to recover themselves. In this consists the operation of narcotic medicines, such as opium; which, in complaints both of a general and local nature, proves useful, not merely as a palliative, by the removal of temporary pain or spasm, or by procuring sleep, but as a principal instrument of recovery, by allowing the powers of life to exert their natural action, in consequence of the removal of irritation." In treating this subject, the doctor considers the effects of opium as affecting simple or sensitive life; and to determine this, he made the following experiments: Having made a solution of opium in water, he put into one portion of it some found living eels, and others with their heads

bruised; and, in a number of trials, it was found that the found eels generally died much sooner than the bruised ones. This, however, was the case only when the solution was of a certain degree of strength, such as half a grain of opium to at least to an ounce of water; for, when only about half this strength, the found eels lived much longer, the time being then protracted to that in which the bruised eels would have died merely in consequence of their injury; but it must be observed, that even the wounded eels died considerably sooner than when put into plain water.

Upon the whole, Dr. Blane concludes, that "the great masses of muscle in the trunk and extremities of the body are the instruments of the mind in acting upon external bodies; and we may therefore rank in the list of stimuli the nervous power by which the will and the passions excite external motions. This is a function sufficiently important for the nerves, without admitting them as the principle on which *irritability* depends."

Having disclaimed all inquiry into the connection between muscular motion and volition, the doctor proceeds to consider the effects of the different passions upon the muscles. Though these are distinct from the motions directly produced by the will, yet he considers them among those arising from consciousness; "for there are emotions of the heart which have visible and powerful effects upon the mind and vascular system, which are organs entirely out of the reach of the will. Not to mention the well-known effects of grief, fear, and joy, which affect the whole circulation, there are certain passions and sentiments which produce partial and local effects. These are established by nature, either to answer some important purpose in nature, as in the case of the congestion of the fluids in the parts of generation, in consequence of the venereal appetite, or to serve as natural expressions, as in the case of blushing or weeping. One of the most striking effects of the passions upon muscular action, is the influence they have upon the strength or mechanical force of the voluntary muscles. Fear produces debility almost amounting to palsy. Courage and order of mind, on the contrary, add to the natural strength. When the mind is agitated by some interesting object, and calls upon the body for an extraordinary exertion to effect its end, the muscles are thereby enabled, as it were by magic, to perform acts of strength of which they would be entirely incapable in cold blood. In circumstances of danger, for instance, where life or honour are at stake, exertions are made for overcoming mechanical resistance which seem incredible, and would be impossible, were not the mind in a sort of phrensy; and it is truly admirable in the œconomy of nature, that an idea in the mind should thus in a moment augment the powers of motion, and inspire additional resources of strength adequate to the occasional calls of life. These considerations would almost lead us to doubt whether or not the accounts we have of the great feats of strength ascribed to individuals in the heroic ages, be fabulous or not. It is also worthy of remark, that, in great and lasting exertions of strength, to which men are impelled by active and generous affections, fatigue is not induced in the same proportion, by many degrees, as by the same quantity of muscular action in the cool and deliberate actions of common life."

Having thus discussed the subject of *internal* stimuli, Dr. Blane next proceeds to take notice of the second class, viz. such as are *external*. These are either immediate or remote, viz. such as are excited by mechanical means, or by acrimony directly and artificially applied to a muscular fibre; or such as occur in the instances of sympathy, and in the case of those instincts which nature has instituted for the purpose of self-preservation in brutes, and in the early part of human life. "There are certain habitudes between outward stimuli and the moving powers whereby natural propensities are constituted, equally necessary to the support of life as the internal functions. Thus, in a new-born animal, the first contact of the external air excites the act of respiration, and the contact of the nipple excites

excites the act of sucking; both of which actions are absolutely necessary to the maintenance of life, and require the nice co-operation of a great number of muscles prior to all experience. Actions of this kind are called *instinctive*; but, though different from those of voluntary motion, they nevertheless run into one another; so that what was at first merely instinctive may afterwards become a matter of deliberate choice. The same muscles are the instruments of both; and they differ from the muscles obeying the internal stimuli, such as the heart, in being liable to fatigue, and thereby concurring with the exercise of sensation and of thought, in rendering sleep necessary. There are no muscles except those of respiration, of which the constant action is necessary to life, and which are void of consciousness in their ordinary exercise, but which are yet in some measure under the controul of the will. The principal end answered by the power of the will over the muscles of respiration in man, is to form and regulate the voice. But, though instinctive motions are in some cases convertible into those which are voluntary, they ought by no means to be confounded together; for, even those animals which are destitute of brain and nerves, are capable of actions evidently of the instinctive kind. A leech, for instance, being brought into contact with a living animal, is impelled by an instinct of its nature to fasten upon it, and suck its blood. There is something very similar to this even in vegetables, as in the case of tendrils and creeping plants being stimulated by the contact of other bodies to cling round them in a particular direction.

It has been demonstrated by Galileo, that in similar unequal bodies, of a cylindrical or prismatic shape, such as the limbs of animals nearly are, the ratio of their efforts to break by their own weight is in the quadruplicate ratio of their lengths; but that the resistance they make to the same force is only the triplicate ratio of their lengths. It follows, from this, that, in order to endow the limbs of animals with the same relative force, it is only necessary that the bones should possess an increased proportion of thickness, in order to give an adequate increase of what may be called the dead strength; but a similar increase of living strength is necessary, by a suitable addition of muscular power, in order to keep pace with the increased size of the bones. Now we observe, in fact, that in large-sized animals, such as the bull and the elephant, the thickness both of their bones and muscles becomes greater in proportion to the length of their limbs than in the smaller animals, and they are therefore of a less elegant form. But nature has not carried this so far as to compensate for the disadvantage arising from the increase of size; for the greater animals have not the same proportional strength, in relation to their bulk, that the smaller animals have. It has been computed, that a flea can draw from seventy to eighty times its own weight, whereas a horse cannot with ease draw more than three times his own weight. This disproportion between size and strength is very observable in different individuals of the human species; for tall men are not muscular, even in the simple proportion of their stature."

OF THE PARTICULAR MUSCLES.

MUSCLES of the TEGUMENTS of the CRANIUM.—The skin that covers the cranium is moved by a single broad digastric muscle, and one small pair, viz. 1. *Occipito-frontalis*, arises fleshy from the transverse protuberant ridge near the middle of the os occipitalis laterally, where it joins with the temporal bone. It is inserted into the orbicularis palpebrarum of each side, and into the skin of the eye-brows, sending down a fleshy slip between them. It pulls the skin of the head backwards; raises the eye-brows upwards; and draws up the wrinkles of the skin of the forehead. 2. *Corrugator supercilii*, arises fleshy from the internal angular process of the os frontis, above the joining of the os nasi, and from thence it runs outwards, and a little upwards. It is inserted into the inner and inferior fleshy part of the occipito-frontalis muscle, where it joins

with the orbicularis palpebrarum. It draws the eye-brow of that side towards the other, and makes it project over the inner canthus of the eye: when both act, they pull down the skin of the forehead, and make it wrinkle, particularly between the eye-brows.

MUSCLES of the EAR.—The muscles of the ear may be divided into three classes, viz. the common, proper, and internal. The common move the whole ear; the proper only affect the particular parts to which they are connected; and the internal, the small bones within the tympanum. The common muscles are, 1. *Attollens aurem*, arises thin, broad, and tendinous, from the tendon of the occipito-frontalis, from which it is almost inseparable, where it covers the aponeurosis of the temporal muscle. It is inserted into the upper part of the ear, opposite to the antihelix, and serves to draw the ear upwards, and make the parts into which it is inserted tense. 2. *Anterior auris*, arises thin and membranous near the posterior part of the zygoma; is inserted into a small eminence on the back of the helix, opposite to the concha; and is used to draw this eminence a little forwards and upwards. 3. *Retrahentes auris*, arise sometimes by three, but always by two distinct small muscles, from the external and posterior part of the root of the mastoid process, immediately above the insertion of the sterno-cleido-muscle; are inserted into that part of the back of the ear which is opposite to the septum that divides the scapha and concha; and serve to draw the ear back, and stretch the concha.

The proper muscles are, 1. *Helicis major*, arises from the upper and acute part of the helix anteriorly; is inserted into its cartilage a little above the tragus; and serves to depress that part, from which it arises a little downwards and forwards. 2. *Helicis minor*, arises from the inferior and anterior part of the helix; is inserted into the crus of the helix, near the fissure in the cartilage opposite to the concha; and is used to contract the fissure. 3. *Tragicus*, arises from the middle and outer part of the concha; is inserted into the point of the tragus; and pulls the point of the tragus a little forwards. 4. *Antitragicus*, arises from the internal part of the cartilage that supports the antitragus; and, running upwards, is inserted into the tip of the antitragus, as far as the inferior part of the antihelix; it turns the tip of the antitragus a little outwards, and depresses the extremity of the antihelix towards it. 5. *Transversus auris*, arises from the prominent part of the concha on the dorsum of the ear; is inserted opposite to the outer side of the antihelix; and draws the parts to which it is connected to each other, and stretches the scapha and concha.

The muscles of the internal ear are three, viz. 1. *Laxator tympani*, arises from the extremity of the spinous process of the sphenoid bone; then runs backwards, along with the nerve called *chorda tympani*, in a fissure of the os temporis that lodges the condyle of the lower jaw. It is inserted into the long process of the malleus, within the tympanum, where it rests upon the edge of the fissure between the pars squamosa and petrosa; and serves to draw the malleus obliquely forwards towards its origin, and consequently the membrana tympani. 2. *Tensor tympani*, arises from the cartilaginous extremity of the Eustachian tube, near the entry of the artery of the dura mater; from thence running backwards near the osseous part of the Eustachian tube, and sends off a slender tendon, which makes a turn into the tympanum along with the nerve called *chorda tympani*. It is inserted into the posterior part of the handle of the malleus, a little lower than the root of its long process; and serves to pull the malleus and membrana tympani inwards towards the pars petrosa, by which the membrane is made more concave and tense. 3. *Stapedius*, arises from a little cavern in the pars petrosa, near the cells of the mastoid process; its tendon passes thro' a small hole in the same cavern, enters the anterior part of the tympanum, and is inserted into the posterior part of the head of the stapes. Its use is to draw the stapes obliquely upwards towards the cavern, by which the posterior part of its base is moved inwards, and the anterior part outwards.

MUSCLES of the EYE-LIDS.—The palpebre or eye-lids, have one muscle common to both, and the upper eye-lid one proper to itself. 1. *Orbicularis palpebrarum*, arises from the outer edge of the orbital process of the superior maxillary bone, and from a tendon near the inner angle of the eye, firmly adhering to the internal angular process of the os frontis, and to the short round tendon which serves to fix the palpebre and muscular fibres arising from it. It is inserted into the nasal process of the superior maxillary bone, covering the anterior and upper part of the lachrymal sac; and serves to shut the eye, by drawing both lids close together, the fibres contracting from the outer angle towards the inner, press the eye-ball, squeeze the lachrymal gland, and convey the tears towards the puncta lachrymalis. The *ciliaris* of some authors is only a part of this muscle covering the cartilages of the eye-lids, called *cilia* or *tarfi*. 2. *Levator palpebræ superioris*, arise from the upper part of the foramen opticum of the sphenoid bone, thro' which the optic nerve passes. It is inserted into the cartilage that supports the upper eye-lid, named *tarfus*; and serves to open the eye, by drawing the eye-lid upwards.

MUSCLES of the EYE-BALL.—The muscles which move the globe of the eye are six, viz. Four *straight* and two *oblique*. 1. *Levatore oculi*, arises from the upper part of the foramen opticum of the sphenoid bone, below the levator palpebræ superioris; and is inserted into the superior and fore-part of the tunica sclerotica, by a broad thin tendon; and is used to raise up the globe of the eye. 2. *Depressor oculi*, arises from the inferior part of the foramen opticum; is inserted opposite to the former; and pulls the globe of the eye down. 3. *Adductor oculi* arises, as the former, between the obliquus superior and depressor, being, from its situation, the shortest. It is inserted opposite to the inner angle, and turns the eye towards the nose. 4. *Abductor oculi*, arises from the bony partition between the foramen opticum and lacerum; is inserted into the globe opposite the outer canthus; and serves to move the globe outwards.

The oblique muscles are two, viz. 1. *Obliquus superior, seu trochlearis*, arises from the edge of the foramen opticum, between the levator and adductor oculi; from thence runs straight along the pars plana of the ethmoid bone to the upper part of the orbit, and runs a little downwards and outwards, inclosed in a loose membranous sheath. It is inserted into the tunica sclerotica; and is used to roll the globe of the eye, and turn the pupil downwards and outwards, so that the upper side of the globe is turned inwards, and the inferior part to the outside of the orbit, and the whole globe drawn towards the inner canthus. 2. *Obliquus inferior*, arises from the outer edge of the orbital process of the superior maxillary bone; and, running obliquely outwards, is inserted into the sclerotica, by a broad thin tendon. Its use is to draw the globe of the eye forwards and inwards; and, contrary to the superior, to turn the pupil upwards, towards the inner extremity of the eye-brow.

MUSCLE of the NOSE.—There is only one muscle on each side proper to the nose; though it is affected by several muscles of the face, viz. *Compressor naris*, arises from the root of the ala nasi externally, and spreads into a number of thin separate fibres, which run up along the cartilage in an oblique manner towards the dorsum of the nose, where it joins with its fellow, and is inserted into the anterior extremity of the os nasi and nasal process of the superior maxillary bone. Its use is to compress the ala towards the septum nasi, particularly when we want to smell acutely; but, if the fibres of the frontal muscle, which adhere to it, act, the upper part of this thin muscle assists to pull the ala outwards. It also corrugates the skin of nose, and assists in expressing certain passions.

MUSCLES of the MOUTH and LIPS.—The mouth has nine pair of muscles, which are inserted into the lips, and a common one formed by the termination of these, viz. three *above*, three *below*, three *outwards*, and the common muscle surrounds the mouth. The three upper are, 1.

Levator anguli oris, arises from the hollow of the superior maxillary bone, and is inserted into the angle of the mouth and under lip, where it joins with its antagonist. It serves to draw the corner of the mouth upwards, and make that part of the cheek opposite to the chin prominent, as in smiling. 2. *Levator labii superioris alæque nasi*, arises by two distinct origins; the first from the external part of the orbital process of the superior maxillary bone; the second, from the nasal process of the superior maxillary bone. The first and shortest portion is inserted into the upper lip and orbicularis labiorum; the second and longest, into the upper lip and outer part of the ala nasi. The first serves to raise the upper lip towards the orbit, and a little outwards; the second portion serves to draw the skin of the nose upwards and outwards, by which the nostril is dilated. 3. *Depressor labii superioris alæque nasi*, arises from the os maxillare superius, immediately above the joining of the gums with the two dentes incisivi, and the dens caninus: from thence it runs up under part of the levator labii superioris alæque nasi; and is inserted into the upper lip and root of the ala nasi. Its use is to draw the upper lip and ala nasi downwards and backwards.

The three lower muscles are, 1. *Depressor anguli oris*, arises from the lower edge of the maxilla inferior, at the side of the chin, and is inserted into the angle of the mouth, joining with the zygomaticus major and levator anguli oris; and serves to pull down the corner of the mouth. 2. *Depressor labii inferioris*, arises from the inferior part of the lower jaw next the chin; runs obliquely upwards; and is inserted into the edge of the under lip, and is lost in its red part. It serves to pull the under lip and skin of the side of the chin downwards, and a little outwards. 3. *Levator labii inferioris*, arises from the lower jaw, at the roots of the alveoli of two dentes incisivi and of the caninus; is inserted into the under lip and skin of the chin; and serves to pull the parts into which it is inserted upwards.

The three outward muscles are, 1. *Buccinator*, arises from the lower jaw, as far back as the last dens molaris and fore-part of the root of the coronoid process; fleshy from the upper jaw, between the last dens molaris and pterygoid process of the sphenoid bone; from the extremity of which it arises tendinous, being continued between both jaws to the constrictor pharyngis superior, with which it joins; from thence, proceeding with straight fibres close to the membrane that lines the mouth, it is inserted into the angle of the mouth within the orbicularis oris; and serves to draw the angle of the mouth backwards and outwards, and to contract its cavity, by pressing the cheek inwards, by which the food is thrust between the teeth.

2. *Zygomaticus major*, arises from the os malæ, near the zygomatic future; and is inserted into the angle of the mouth. Its use is to draw the corner of the mouth and under lip towards the origin of the muscle, and make the cheek prominent, as in laughing. 3. *Zygomaticus minor*, arises from the upper prominent part of the os malæ above the origin of the former muscle; and, descending obliquely downwards, is inserted into the upper lip, near the corner of the mouth, along with the levator anguli oris. It serves to draw the corner of the mouth obliquely outwards, and upwards, towards the external canthus of the eye.

The common muscle is the *orbicularis oris*, which is, in a great measure, formed by the muscles that move the lips; the fibres of the superior descending, those of the inferior ascending, and, decussating each other about the corner of the mouth, run along the lip to join those of the opposite side, so that the fleshy fibres appear to surround the mouth like a sphincter. Its use is to shut the mouth, by contracting and drawing both lips together, and to counteract all the muscles that assist in forming it. There is another small muscle described by Albinus, which he calls *nasalis labii superioris*; but it seems to be only some fibres of the former connected to the septum nasi.

MUSCLES of the LOWER JAW.—The lower jaw has four pair of muscles, viz. two which are seen on the side of

of the face, and two concealed by the angle of the jaw.

1. *Temporalis*, arises from a femicircular ridge of the lower and lateral part of the parietal bone, from all the pars squamosa of the temporal bone, from the external angular process of the os frontis, from the temporal process of the sphenoid bone, and from an aponeurosis which covers it; from these different origins the fibres descend like radii towards the jugum, under which they pass; and are inserted into the upper part of the coronoid process of the lower jaw. This muscle is covered by a tendinous membrane, called its *aponeurosis*, which arises from the bones that give origin to the upper and femicircular part of the muscle; and, descending over it, is inserted into all the jugum, and the adjoining part of the os frontis. The use of this membrane is to give room for the origin of a greater number of fleshy fibres, to fortify the muscle in its action, and to serve as a defence to it. 2. *Masseter*, arises from the superior maxillary bone, where it joins the os malæ; and is inserted into the angle of the lower jaw, serving to pull the lower to the upper jaw, and a little forwards and backwards. 3. *Pterygoideus internus*, arises from the inner and upper part of the internal plate of the pterygoid process, filling all the space between the two plates. It is inserted into the angle of the lower jaw internally; and serves to draw the jaw upwards, and obliquely towards the opposite side. 4. *Pterygoideus externus*, arises from the outer side of the external plate of the pterygoid process of the sphenoid bone, from part of the tuberosity of the os maxillare adjoining to it, and from the root of the temporal process of the sphenoid bone. It is inserted into a cavity in the neck of the condyloid process of the lower jaw; which it pulls forwards, and to the opposite side.

MUSCLES about the ANTERIOR PART of the NECK.—On the side of the neck are two muscles or layers. 1. *Musculus cutaneus, vulgo platysma myoides*, arises from the cellular substance that covers the upper parts of the deltoid and pectoral muscles; in their ascent, they all unite to form a thin muscle, which runs obliquely upwards along the side of the neck, adhering to the skin; and are inserted into the lower jaw, between its angle and the origin of the depressor anguli oris, to which it is firmly connected. It assists the depressor anguli oris in drawing the skin of the cheek downwards; and, when the mouth is shut, it draws all that part of the skin, to which it is connected, below the lower jaw, upwards. 2. *Sterno-cleido-mastoideus*, arises by two distinct origins; the anterior, from the top of the sternum; the posterior, from the upper and anterior part of the clavicle; both unite a little above the anterior articulation of the clavicle, to form one muscle, which runs obliquely upwards and outwards, to be inserted, by a thick strong tendon, into the mastoid process, which it surrounds; and, gradually turning thinner, is inserted as far back as the lambdoid suture. It turns the head to one side, and bends it forwards.

MUSCLES between the LOWER JAW and OS HYOIDES.—There are four layers before, and two muscles at the side. The four layers are, 1. *Digastricus*, arises from the fossa at the root of the mastoid process of the temporal bone, and runs downwards and forwards; then it is fixed by a ligament to the os hyoides; and, having received from that bone an addition of tendinous and muscular fibres, runs obliquely forwards, and is inserted into a rough sinuosity at the inferior and anterior edge of the chin. Its use is to open the mouth; and, when the jaws are shut, to raise the larynx and pharynx upwards, as in deglutition. 2. *Mylo-hyoideus*, arises from the inside of the lower jaw, between the last dens molaris and the middle of the chin, where it joins with its fellow. It is inserted into the lower edge of the basis of the os hyoides, and serves to pull the os hyoides forwards, upwards, and to a side. 3. *Genio-hyoideus*, arises from a rough protuberance in the middle of the lower jaw internally; is inserted into the basis of the os hyoides; and draws this bone forwards to the chin. 4. *Genio-hyo-glossus*, arises from the middle of the lower jaw; its fibres run, like a fan; and are inserted into the tongue,

and base of the os hyoides, near its cornu. It serves to draw the tip of the tongue backwards into the mouth, the middle downwards, and to render its dorsum concave; to draw its root and os hyoides forwards, and to thrust the tongue out of the mouth.

The two muscles at the side are, 1. *Hyo-glossus*, arises from the base, cornu, and appendix of the os hyoides; the fibres run upwards and outwards, to be inserted into the side of the tongue, near the stylo-glossus; and pulls the tongue inwards and downwards. 2. *Lingualis*, arises from the root of the tongue laterally; runs forwards between the hyo-glossus and genio-glossus, to be inserted into the tip of the tongue, along with part of the stylo-glossus. It serves to contract the substance of the tongue, and bring it backwards.

MUSCLES between the OS HYOIDES and TRUNK.—These may be divided into two layers. The first layer consists of two muscles. 1. *Sterno-hyoideus*, arises from the cartilaginous extremity of the first rib, the upper and inner part of the sternum, and from the clavicle where it joins with the sternum. It is inserted into the base of the os hyoides; and its use is to pull the os hyoides downwards. 2. *Omo-hyoideus*, arises from the superior costa of the scapula, near the femilunar notch, and from the ligament that runs across it; thence, ascending obliquely, is inserted into the base of the os hyoides, between its cornu and the insertion of the sterno-hyoideus. Its use is to pull the os hyoides obliquely downwards.

The second layer consists of three muscles. 1. *Sterno-thyroideus*, arises from the whole edge of the uppermost bone of the sternum internally, opposite to the cartilage of the first rib, from which it receives a small part of its origin. It is inserted into the surface of the rough line at the external part of the inferior edge of the thyroid cartilage, and is used to draw the larynx downwards. 2. *Thyro-hyoideus*, arises from the rough line, opposite to the former; is inserted into part of the bases, and almost all the cornu of the os hyoides; and its use is to pull the os hyoides downwards, or the thyroid cartilage upwards. 3. *Crico-thyroideus*, arises from the side and fore-part of the cricoid cartilage, and is inserted by two portions; the first, into the lower part of the thyroid cartilage; the second, into its inferior cornu. It pulls forwards and depresses the thyroid, and elevates and draws back the cricoid, cartilage.

MUSCLES between the LOWER JAW and OS HYOIDES laterally.—These are five in number. These proceed from the styloid process of the temporal bone, from which they have half of their names; and two from the pterygoid process of the sphenoid bone. The three from the styloid process are, 1. *Stylo-glossus*, arises from the styloid process, and from a ligament that connects that process to the angle of the lower jaw. It is inserted into the root of the tongue, runs along its side, and is insensibly lost near its tip. It serves to draw the tongue laterally and backwards. 2. *Stylo-hyoideus*, arises from the middle and inferior part of the styloid process; is inserted into the os hyoides at the junction of the base and cornu; and serves to pull the os hyoides to one side, and a little upwards. Its fleshy belly is generally perforated by the tendon of the digastric muscle, on one or both sides. There is often another accompanying it, called *stylo-hyoideus alter*; and has the same origin, insertion, and use. 3. *Stylo-pharyngeus*, arises from the root of the styloid process; is inserted into the side of the pharynx and back-part of the thyroid cartilage, and serves to dilate and raise the pharynx and thyroid cartilage upwards.

The two from the pterygoid process are, 1. *Circumflexus, or tensor palati*, arises from the spinous process of the sphenoid bone, behind the foramen ovale; it then runs, down the pterygoideus internus, passes over the hook of the internal plate of the pterygoid process, and is inserted into the velum pendulum palati, and the femilunar edge of the os palati, and extends as far as the suture which joins the two bones. Its use is to stretch the velum, to draw it downwards, and to a side towards the hook. It has little effect upon the tube, being chiefly connected to its osseous

part. 2. *Levator palati*, arises from the extremity of the pars petrosa of the temporal bone, and is inserted into the whole length of the velum pendulum palati, as far as the root of the uvula, and unites with its fellow. Its use is to draw the velum upwards and backwards, so as to shut the passage from the fauces into the mouth and nose.

Before we describe the muscles situated about the passage into the throat, it will be necessary to mention the principal parts to which they are connected. Upon looking into any person's mouth, we see a soft curtain hanging from the palate-bones, named *velum pendulum palati*. In the middle of which we likewise observe a papilla projecting from the velum, named *uvula*, or *pap of the throat*. From each side of the uvula, at its root, two arches, or columns, are sent down; the anterior to the root of the tongue, the posterior to the pharynx. Between these arches, on each side, the cellular glands called *amygdalæ*, or *almonds of the ears*, are situated. The common opening behind the anterior arch may be named *fauces*, or *top of the throat*, from which there are six passages, viz. two upwards, being one to each nostril: two at the sides, or one to each ear, called the *Eustachian tubes*: two downwards; the anterior is the passage through the *glottis* and *larynx*, into the *trachea*, which terminates in the lungs; the posterior is the largest, named *pharynx*, or *top of the œsophagus*, which leads to the stomach.

MUSCLES at the ENTRY to the FAUCES.—There are two on each side, and a single one in the middle. The two on each side are, 1. *Constrictor ischmi facium*, arises from the side of the tongue, near its root; from thence running upwards within the anterior arch, before the amygdala, it is inserted into the middle of the velum pendulum palati, at the root of the uvula anteriorly, being connected with its fellow, and with the beginning of the palato-pharyngeus. It draws the velum toward the root of the tongue, which it raises at the same time, and, with its fellow, contracts the passage between the two arches, by which it shuts the opening into the fauces. 2. *Palato-pharyngeus*, arises from the middle of the velum pendulum palati, at the root of the uvula posteriorly, and from the tendinous expansion of the circumflexus palati. It is inserted into the edge of the upper and back part of the thyroid cartilage; some of its fibres being lost between the membrane of the pharynx and the two inferior constrictors. It draws the uvula and velum downwards and backwards; and at the same time pulls the thyroid cartilage and pharynx upwards, and shortens it; with the constrictor superior and tongue, it assists in shutting the passage into the nostrils; and, in swallowing, it thrusts the food from the fauces into the pharynx.

The one in the middle is the *azygos uvula*, which arises from the extremity of the future that joins the palate-bones; runs down the whole length of the velum and uvula; and is inserted into the tip of the uvula. It raises the uvula upwards and forwards, and shortens it.

MUSCLES on the POSTERIOR PART of the PHARYNX.—Of these there are three pair. 1. *Constrictor pharyngis inferior*, arises from the side of the thyroid cartilage, near the attachment of the sterno-hyoideus and thyreo-hyoideus muscles. It is the largest of the three, and is inserted into the white line, where it joins with its fellow; the superior fibres running obliquely upwards, covering nearly one half of the middle constrictor, and terminating in a point; the inferior fibres run more transversely, and cover the beginning of the œsophagus. Its use is to compress that part of the pharynx which it covers, and to raise it with the larynx a little upwards. 2. *Constrictor pharyngis medius*, arises from the appendix of the os hyoides, and from the ligament which connects it to the thyroid cartilage. It is inserted into the middle of the cuneiform process of the os occipitis, before the foramen magnum, and serves to compress that part of the pharynx which it covers, and to draw it and the os hyoides upwards. 3. *Constrictor pharyngis superior*, arises from the cuneiform process of the os occipitis, before the foramen magnum; and, between the jaws, it is continued with the buccinator muscle; and

with some fibres from the root of the tongue, and from the palate. It is inserted into the middle of the pharynx, where it joins with its fellow, and is covered by the constrictor medius. It serves to compress the upper part of the pharynx, and draw it forwards and upwards.

MUSCLES about the GLOTTIS.—They consist generally of four pair of small muscles, and a single one. 1. *Crico-arytenoideus posticus*, arises from the back-part of the cricoid cartilage, and is inserted into the posterior part of the base of the arytenoid cartilage. Its use is to open the rima glottidis, and, by pulling back the arytenoid cartilage, to stretch the ligament so as to make it tense. 2. *Crico-arytenoideus lateralis*, arises from the cricoid cartilage, laterally, where it is covered by part of the thyroid, and is inserted into the side of the base of the arytenoid cartilage near the former. It serves to open the rima glottidis, by pulling the ligaments from each other. 3. *Thyreo-arytenoideus*, arises from the under and back part of the middle of the thyroid cartilage; and, running backwards and a little upwards, along the side of the glottis, is inserted into the arytenoid cartilage, higher up and farther forwards than the crico-arytenoideus lateralis. It serves to pull the arytenoid cartilage forwards, and consequently to shorten and relax the ligament of the larynx or glottis vera. 4. *Arytenoideus obliquus*, arises from the base of one arytenoid cartilage; and, crossing its fellow, is inserted near the tip of the other arytenoid cartilage. When both act, they pull the arytenoid cartilages towards each other. One of these is very often wanting.

The single muscle is the *arytenoideus transversus*. It arises from the side of one arytenoid cartilage, from near its articulation with the cricoid to near its tip. The fibres run straight across, and are inserted, in the same manner, into the other arytenoid cartilage. Its use is to shut the rima glottidis, by bringing these two cartilages, with the ligaments, nearer one another.

Besides these, there are a few separate muscular fibres on each side; which, from their general direction, are named, 1. *Thyreo-epiglottideus*, arises, by a few pale separated fibres, from the thyroid cartilage; and is inserted into the epiglottis laterally. Its use is to draw the epiglottis downwards, and, at the same time, it expands that soft cartilage. 2. *Aryteno-epiglottideus*, arises from the lateral and upper part of the arytenoid cartilage; and, running along the outer side of the external rima, is inserted into the epiglottis along with the former. Its use is to pull that side of the epiglottis towards the external rima; or, when both act, to pull it close upon the glottis. It is counteracted by the elasticity of the epiglottis.

MUSCLES on the ANTERIOR PART of the ABDOMEN.—They consist of three broad layers on each side of the belly; always a long one, and generally a short one, on each side of the linea alba. The three layers are, 1. *Obliquus descendens externus*, arises, by eight heads, from the lower edges of an equal number of inferior ribs, at a little distance from their cartilages: it always intermixes in a fermented manner, with portions of the serratus major anticus; and generally coheres to the pectoralis major, intercostals, and latissimus dorsi: which last covers the edge of a portion of it extended from the last rib to the spine of the os ilium. It is inserted into the whole length of the *linea alba*; becomes thicker towards the lower part of the abdomen, and is perforated in the middle by the umbilicus. On the outside of the rectus muscle, the tendon of the external oblique appears whiter than elsewhere, by its being there connected with the tendons of the internal oblique and transverse muscles; so that this part has been called *linea semilunaris*, from its curved shape. The under part of the tendon divides into two columns, which leaves an oval space between them, named the *ring* of the external oblique muscle, for the passage of the spermatic cord in the male, or round ligament of the womb. From that part, which is named its *anterior superior spinous process*, it is stretched tendinous to the os pubis, and is named *Poupart's* or *Fallopian's* ligament. From this ligament it sends a tendinous

a tendinous layer, which is lost in the membranous fascia of the thigh. It supports and compresses the peritonæum and abdomen; assists the evacuations of fæces and urine, and likewise in the exclusion of the foetus; thrusts the diaphragm upwards, and draws down the ribs in expiration; bends the body obliquely when the ribs are fixed, and raises the pelvis obliquely. 2. *Obliquus ascendens internus*, arises from the spine of the ilium, the whole length between the posterior and superior anterior spinous process; from the os sacrum and the three undermost lumbar vertebræ, by a tendon common to it and to the serratus pecticus inferior muscle; from Poupart's ligament, at the middle of which it sends off the beginning of the cremaster muscle; and the spermatic cord in the male, or round ligament of the womb in the female, passes under its thin edge, except a few detached fibres. It is inserted into the cartilago ensiformis, into the cartilages of the seventh, and those of all the false ribs; but, at the upper part, it is extremely thin, resembling a cellular membrane, and only becomes fleshy at the cartilage of the tenth rib. At its undermost part it is inserted into the fore-part of the os pubis. Its principal use is to assist the former; but it bends the trunk in the reverse direction. 3. *Transversalis*, arises from the inner or back part of the cartilages of the seven lower ribs, where some of its fibres are continued with those of the diaphragm and the intercostal muscles; by a broad thin tendon, connected to the transverse processes of the last vertebra of the back and the four superior vertebra of the loins; fleshy, from the whole spine of the os ilium internally, and from the tendon of the external oblique muscle, where it intermixes with some fibres of the internal oblique. It is inserted into the cartilago ensiformis, and into the whole length of the linea alba, excepting its lowermost part. Its use is to support and compress the abdominal bowels; and it is so particularly well adapted for the latter purpose, that it might be called the *proper constrictor* of the abdomen.

The long muscle in the middle is named *rectus abdominis*. It arises from the ligament of the cartilage which joins the two ossa pubis to each other; runs upwards the whole length of, and parallel to, the linea alba, growing broader and thinner as it ascends. It is inserted into the cartilages of the three inferior true ribs, and often intermixed with some fibres of the pectoral muscle. It serves to compress the fore-part, but more particularly the lower part, of the belly; to bend the trunk forwards, or to raise the pelvis. By its tendinous interfections, it is enabled to contract at any of the intermediate spaces; and, by its connection with the tendons of the other muscles, it is prevented from changing place, and from rising into a prominent form when in action.

The short muscle in the middle is named *pyramidalis*. It arises along with the rectus; and, running upwards within the same sheath, is inserted, by an acute termination, near half-way between the os pubis and umbilicus, into the linea alba and inner edge of the rectus muscle. As it is frequently wanting in both sides, without any inconvenience, its use seems to be to assist the inferior part of the rectus.

MUSCLES OF THE MALE ORGANS OF GENERATION.—The *testicles* are said to have a thin muscle common to both, and one proper to each. The supposed common muscle is called the *dartos*. This appears to be no more than a condensation of the cellular membrane lining the scrotum; yet the skin here is capable of being corrugated and relaxed in a greater degree than in other places.

The muscle proper to each testicle is the *cremaster*. It arises from the internal oblique, where a few fibres of that muscle intermix with the transversalis, near the junction of the os ilium and pubis, over which part it passes, after having pierced the ring of the externus obliquus; and then it descends upon the spermatic cord. It is inserted into the tunica vaginalis of the testicle, upon which it spreads, and is insensibly lost. Its use is to suspend and draw up the testicle, and to compress it in the act of coition.

The penis has three pair of muscles. 1. *Erector penis*,

arises from the tuberosity of the os ischium, and runs upwards, embracing the whole crus of the penis. It is inserted into the strong tendinous membrane that covers the corpora cavernosa penis; and its use is to compress the crura penis, by which the blood is pushed from it into the fore-part of the corpora cavernosa; and the penis is by that means more completely distended. 2. *Accelerator urinæ, seu ejaculator seminis*, arises from the sphincter ani and membranous part of the urethra; and from the crus, nearly as far forwards as the beginning of the corpus cavernosum penis; the inferior fibres run more transversely, and the superior descend in an oblique direction. It is inserted into a line in the middle of the bulb, where it joins with its fellow, by which the bulb is completely enclosed. Its use is to drive the urine or semen forwards; and, by grasping the bulb of the urethra, to push the blood towards its corpus cavernosum and the glans, by which they are distended. 3. *Transversus perinei*, arises from the rough fatty membrane that covers the tuberosity of the os ischium; from thence it runs transversely inwards, and is inserted into the accelerator urinæ, and into that part of the sphincter ani which covers the bulb. It serves to dilate the bulb, and draw the perineum and verge of the anus a little outwards and backwards.

There is often a fourth muscle, named *transversus perinei alter*. It arises behind the former, runs more obliquely forwards, and is inserted into that part of the accelerator urinæ which covers the anterior part of the bulb of the urethra; and serves to assist the former.

MUSCLES OF THE ANUS.—The anus has a single muscle, and one pair. The single muscle is *sphincter ani*. This arises from the skin and fat that surround the verge of the anus on both sides; the fibres are gradually collected into an oval form, and surround the extremity of the rectum. It is inserted, before, by a narrow point, into the perineum, acceleratores urinæ, and transversus perinei; behind, by an acute termination, into the extremity of the os coccygis. It shuts the passage through the anus into the rectum, and pulls down the bulb of the urethra, by which it assists in ejecting the urine and semen. *Levator ani*, arises from the os pubis within the pelvis; from the thin tendinous membrane that covers the obturator internus and coccygeus muscles; from the spinous process of the os ischium; and its fibres run down like rays from a circumference to a centre. It is inserted into the sphincter ani, acceleratores urinæ, and anterior part of the two last bones of the coccygis; surrounds the extremity of the rectum, neck of the bladder, prostate gland, and part of the vesiculæ feminales. It serves to draw the rectum upwards after the evacuation of the fæces, and to assist in shutting it; to sustain the contents of the pelvis, and to help in ejecting the semen, urine, and contents of the rectum; and, perhaps, by pressing upon the veins, to contribute greatly to the erection of the penis.

MUSCLES OF THE FEMALE ORGANS OF GENERATION.—The clitoris has one pair. *Erector clitoridis*, arises from the crus of the os ischium internally, and in its ascent covers the crus of the clitoris as far up as the os pubis. It is inserted into the upper part of the crus and body of the clitoris; and draws the clitoris downwards and backwards, and may serve to make the body of the clitoris more tense, by squeezing the blood into it from its crus.

The vagina has one pair. *Sphincter vaginae*, arises from the sphincter ani, and from the posterior side of the vagina, near the perineum: from thence it runs up the side of the vagina, near its external orifice, opposite to the nymphae, and covers the corpus cavernosum vaginae. It is inserted into the crus and body, or union of the crura clitoridis; and contracts the mouth of the vagina, and compresses its corpus cavernosum.

The perineum has one pair. *Transversus perinei*, arises, as in the male, from the fatty cellular membrane which covers the tuberosity of the os ischium; and is inserted into the upper part of the sphincter ani, and into a white hardish tough substance in the perineum, between the lower

er part of the pudendum and anus. Its use is to sustain and keep the perineum in its proper place.

The anus, as in the male, has a single muscle, and one pair. *Sphincter ani*, arises from the skin and fat surrounding the extremity of the rectum; and is inserted into the white tough substance of the perineum; and into the point of the os coccygis. Its use is to shut the passage into the rectum; and, by pulling down the perineum, to assist in contracting the mouth of the vagina. *Levator ani*, arises, as in the male, within the pelvis, and descends along the inferior part of the vagina and rectum. It is inserted into the perineum, sphincter ani, extremity of the vagina, and rectum. It serves to raise the extremity of the rectum upwards, to contract the inferior part of the rectum, and to assist in contracting and supporting the vagina; and, perhaps, by pressing on the veins, to contribute to the distension of the cells of the clitoris and corpus cavernosum of the vagina.

MUSCLES within the PELVIS.—Of these there are two pair. 1. *Obturator internus*, arises from more than one half of the internal circumference of the foramen thyroideum, formed by the os pubis and ischium: its inside is covered by a portion of the levator ani; and appears to be divided into a number of fasciculi, which unite and form a roundish tendon, that passes out of the pelvis, between the posterior sacro-schiatric ligament and tuberosity of the os ischium; where it passes over the capsular ligament of the thigh-bone. It is inserted into the large pit at the root of the trochanter major; and serves to roll the os femoris obliquely outwards. 2. *Coccygeus*, arises from the spinous process of the os ischium, and covers the inside of the posterior sacro-schiatric ligament; and is inserted into the extremity of the os sacrum, and near the whole length of the os coccygis laterally. Its use is to support and move the os coccygis forwards, and to tie it more firmly to the sacrum.

MUSCLES within the CAVITY of the ABDOMEN.—These consist of a single muscle, and four pair. The *diaphragma*, is a broad thin muscle, which makes a complete septum between the thorax and abdomen, is concave below and convex above; the middle of it on each side reaching as high within the thorax of the skeleton as the fourth rib; it is commonly divided into two portions. 1. The *superior or greater muscle of the diaphragm*, arises, by distinct fleshy fibres, from the cartilago ensiformis, from the cartilages of the seventh, and of all the inferior ribs on both sides. The fibres from the cartilago ensiformis, and from the seventh and eighth ribs, run obliquely upwards and backwards; from the ninth and tenth, transversely inwards and upwards; and, from the eleventh and twelfth, obliquely upwards. From these different origins the fibres run, like radii from the circumference to the centre of a circle; and are inserted into a cordiform tendon, of a considerable breadth, which is situated in the middle of the diaphragm, and in which the fibres from opposite sides are interlaced. Towards the right side the tendon is perforated, by a triangular hole, for the passage of the vena cava inferior; and to the upper convex part of it the pericardium and mediastinum are connected. 2. The *inferior lesser muscle, or appendix, of the diaphragm*, arises from the second, third, and fourth, lumbar vertebrae, by eight heads; of which two in the middle, commonly called its *crura*, are the longest, and begin tendinous. Between the crura, the aorta and thoracic duct pass; and, on the outside of these, the great sympathetic nerves and branches of the vena azygos perforate the shorter heads. The muscular fibres run obliquely upwards and forwards, and form in the middle two fleshy columns, which decussate and leave an oval space between them for the passage of the oesophagus and eighth pair of nerves. It is inserted, by strong fleshy fibres, into the posterior part of the middle tendon. The diaphragm is the principal agent in respiration, particularly in inspiration: for, when it is in action, the fibres, from their different attachments, endeavour to bring themselves into a plane towards the middle tendon, by which

the cavity of the thorax is enlarged, particularly at the sides, where the lungs are chiefly situated; and, as the lungs must always be contiguous to the inside of the thorax and upper side of the diaphragm, the air rushes into them, in order to fill up the increased space. This muscle is assisted by the two rows of intercostals, which elevate the ribs, and the cavity of the thorax is more enlarged. In time of violent exercise, or whatever cause drives the blood with unusual celerity towards the lungs, the pectoral muscles, the *ferrati antei majores*, the *ferrati postici superiores*, and *scaleni* muscles, are brought into action. And, in laborious inspiration, the muscles which arise from the upper part of the thorax, when the parts into which they are inserted are fixed, likewise assist. In expiration, the diaphragm is relaxed and pushed up by the pressure of the abdominal muscles upon the viscera of the abdomen; and at the same time that they press it upwards, they also, together with the *sterno-costales* and *ferrati postici inferiores*, pull down the ribs, and are assisted in a powerful manner by the elasticity of the cartilages that join the ribs to the sternum; by which the cavity of the thorax is diminished, and the air suddenly pushed out of the lungs; and, in laborious expiration, the *quadrati lumborum*, *sacro-lumbales*, and *longissimi dorsi*, concur in pulling down the ribs.

The four pair are, 1. *Quadratus lumborum*, arises from the posterior part of the spine of the os ilium; and is inserted into the transverse processes of all the vertebrae of the loins, into the last rib near the spine, and by a small tendon into the side of the last vertebra of the back. Its use is to move the loins to one side, pull down the last rib, and, when both act, to bend the loins forwards. 2. *Psoas parvus*, arises from the sides of the two upper vertebrae of the loins, and sends off a small long tendon, which ends thin and flat, and is inserted into the brim of the pelvis, at the junction of the os ilium and pubis. Its use is to assist the *psoas magnus* in bending the loins forwards; and, in certain positions, to assist in raising the pelvis. 3. *Psoas magnus*, arises from the side of the body, and transverse process of the last vertebra of the back; and, in the same manner, from all those of the loins, by as many distinct slips. It is inserted into the trochanter minor of the os femoris; and into that bone a little below the same trochanter. Its use is to bend the thigh forwards; or, when the inferior extremity is fixed, to assist in bending the body. 4. *Iliacus internus*, arises from the transverse process of the last vertebra of the loins, from all the inner lip of the spine of the os ilium, from the edge of that bone between its anterior superior spinous process and the acetabulum, and from most of the hollow part of the ilium. It joins with the *psoas magnus*, where it begins to become tendinous; and is inserted along with it. Its use is to assist the *psoas* in bending the thigh, and to bring it directly forwards.

MUSCLES on the ANTERIOR PART of the THORAX.—These may be divided into two layers. The first layer consists of one muscle, named *pectoralis major*. It arises from the cartilaginous extremities of the fifth and sixth ribs; from almost the whole length of the sternum, and from near half of the anterior part of the clavicle. It is inserted, by two broad tendons, which cross each other at the upper and inner part of the os humeri, above the insertion of the deltoid muscle, and outer side of the groove for lodging the tendon of the long head of the biceps. Its use is to move the arm forwards, and obliquely upwards, towards the sternum.

The second layer consists of three muscles: 1. *Subclavius*, arises from the cartilage that joins the first rib to the sternum; and is inserted into the inferior part of the clavicle; and serves to pull the clavicle downwards and forwards. 2. *Pectoralis minor*, arises from the upper edge of the third, fourth, and fifth, ribs; and is inserted into the coracoid process of the scapula. It serves to bring the scapula forwards and downwards, or to raise the ribs upwards. 3. *Serratus magnus*, arises from the nine superior ribs, by an equal number of fleshy digitations, resembling

the teeth of a saw; and is inserted into the whole base of the scapula, internally, between the insertion of the rhomboid and the origin of the subscapularis muscles, being folded about the two angles of the scapula. It serves to move the scapula forwards; and, when the scapula is forcibly raised, to draw upwards the ribs.

MUSCLES between the RIBS and within the THORAX.—Between the ribs, on each side, there are eleven double rows of muscles, which are named *intercostals*. These decussate each other like the strokes of the letter X. 1. *Intercostales externi*, arise from the inferior acute edge of each superior rib, and run obliquely forwards, the whole length from the spine to near the joining of the ribs with their cartilages; and are inserted into the upper obtuse edge of each inferior rib, as far back as the spine, into which the posterior portion is fixed. 2. *Intercostales interni*, arise in the same manner as the external: but they begin at the sternum, and run obliquely backwards, as far as the angle of the rib; and are inserted in the same manner as the external. By means of these muscles, the ribs are equally raised upwards during inspiration. Their fibres being oblique, give them a greater power of bringing the ribs near each other, than could be performed by straight ones. But, by the obliquity of the fibres, they are almost brought contiguous: and as the fixed points of the ribs are before and behind, if the external had been continued forwards to the sternum, and the internal backwards to the spine, it would have hindered their motion, which is greatest in the middle, though the obliquity of the ribs renders it less perceptible; and, instead of raising the fibres fixed to the sternum and spine, would have depressed the ribs. The muscles within the thorax are one pair, viz. *triangularis* or *sternocostalis*, arises from the cartilago ensiformis laterally, and from the edge of the lower half of the middle bone of the sternum, from whence its fibres ascend obliquely upwards and outwards. It is inserted, generally by three triangular terminations, into the lower edge of the cartilages of the third, fourth, and fifth, ribs, near where these join with the ribs. Its use is to depress these cartilages, and the extremities of the ribs; and consequently to assist in contracting the cavity of the thorax. This muscle often varies; and is sometimes inserted into the cartilage of the second rib; sometimes into the cartilage of the sixth rib.

MUSCLES on the ANTERIOR PART of the NECK.—These consist of one layer formed by four muscles. 1. *Longus colli*, arises from the bodies of the three vertebrae of the back laterally; and from the transverse process of the third, fourth, fifth, and sixth, vertebrae of the neck; and is inserted into the fore-part of the bodies of all the vertebrae of the neck. Its use is to bend the neck gradually forwards, and to one side. 2. *Rectus capitis internus major*, arises from the anterior points of the transverse processes of the third, fourth, fifth, and sixth, vertebrae of the neck; and is inserted into the cuneiform process of the os occipitis. Its use is to bend the head forwards. 3. *Rectus capitis internus minor*, arises from the fore-part of the body of the first vertebra of the neck; and is inserted near the root of the condyloid process of the os occipitis, under the former muscle. Its use is to bend the head forwards. 4. *Rectus capitis lateralis*, arises from the anterior part of the point of the transverse process of the first vertebra of the neck, and is inserted into the os occipitis, opposite to the foramen stylo-mastoideum of the temporal bone. Its use is to bend the head a little to one side.

MUSCLES on the POSTERIOR PART of the TRUNK.—These may be divided into four layers, and a single pair. The first layer consists of two muscles, which cover almost the whole posterior part of the trunk. 1. *Trapezius superficialis*, arises from the middle of the os occipitis behind; and from the rough curved line that extends from the protuberance towards the mastoid process of the temporal bone; runs down the nape of the neck, and covers the spinous processes of the superior vertebrae of the neck; but rises from the spinous processes of the two inferior, and from the spinous processes of all the vertebrae of the back;

adhering to its fellow the whole length of its origin. It is inserted into the posterior half of the clavicle; into the acromion, and into almost all the spine of the scapula. It moves the scapula according to the three different directions of its fibres; for the upper descending fibres draw it obliquely upwards, the middle transverse straight fibres draw it directly backwards, and the inferior ascending fibres draw it obliquely downwards and backwards. Where it is inseparably united to its fellow in the nape of the neck, it is named *ligamentum nuchæ* or *colli*. 2. *Latissimus dorsi*, arises from the posterior part of the spine of the os ilium, from all the spinous processes of the os sacrum and vertebrae of the loins, and from the seven inferior ones of the vertebrae of the back; also from the extremities of the three or four inferior ribs, by as many distinct slips. The inferior fibres ascend obliquely, and the superior run transversely, over the inferior angle of the scapula, towards the axilla, where they are all collected, twisted, and folded. It is inserted into the inner edge of the groove, for lodging the tendon of the long head of the biceps; and serves to pull the arm backwards and downwards, and to roll the os humeri.

The second layer consists of three pair, two on the back, and one on the neck. On the back, 1. *Serratus posterior inferior*, arises in common with that of the latissimus dorsi, from the spinous processes of the two inferior vertebrae of the back, and from the three superior vertebrae of the loins; and is inserted into the lower edges of the four inferior ribs, at a little distance from their cartilages; and serves to depress the ribs into which it is inserted. 2. *Rhomboideus*. This muscle is divided into two portions: 1. *Rhomboideus major*, arises from the spinous processes of the five superior vertebrae of the back; and is inserted into all the basis of the scapula below its spine. This serves to draw the scapula obliquely upwards and directly inwards. 2. *Rhomboideus minor*, arises from the spinous processes of the three inferior vertebrae of the neck; and from the ligamentum nuchæ; and is inserted into the base of the scapula, opposite to its spine. Its use is to assist the former. On the neck, 3. *Splenius*, arises from the four superior spinous processes of the vertebrae of the back, and from the five inferior of the neck, and adheres firmly to the ligamentum nuchæ. At the third vertebrae of the neck, the splenii recede from each other, so that part of the complexus muscle is seen. It is inserted into the five superior transverse processes of the vertebrae of the neck; and into the posterior part of the mastoid process, and into the os occipitis. Its use is to bring the head and upper vertebrae of the neck backwards laterally; and, when both act, to pull the head directly backwards. Albinus divides this muscle into two; viz. that portion which arises from the five inferior spinous processes of the neck, and is inserted into the mastoid process and os occipitis, he calls *splenius capitis*; and that portion which arises from the third and fourth of the back, and is inserted into the five superior transverse processes of the neck, is called by him *splenius colli*. The single pair, *serratus superior posterior*, arises from the spinous processes of the three last vertebrae of the neck, and the two uppermost of the back; is inserted into the second, third, fourth, and fifth, ribs; and serves to elevate the ribs, and dilate the thorax.

The third layer consists of three pair on the back, and three on the neck. Those on the back are, 1. *Spinalis dorsi*, arises from the spinous processes of the two uppermost vertebrae of the loins, and the three inferior of the back; and is inserted into the spinous processes of the nine uppermost vertebrae of the back. Its use is to erect and fix the vertebrae, and to assist in raising the spine. 2. *Longissimus dorsi*, arises from the side, and all the spinous processes of the os sacrum; from the posterior spine of the os ilium; from all the spinous processes; and from the roots of the transverse processes of the vertebrae of the loins. It is inserted into all the transverse processes of the vertebrae of the back; and serves to extend the vertebrae, and to raise and keep the trunk of the body erect. 3. *Sacro-lumbalis*,

lumbalis, arises, in common, with the *longissimus dorsi*; and is inserted into all the ribs, where they begin to be curved forwards; and from the upper part of the six or eight lower ribs, arise as many bundles of thin fleshy fibres, which soon terminate in the inner side of this muscle. Its use is to pull the ribs down, and assist to erect the trunk of the body. There is a fleshy slip, which runs from the upper part of this muscle into the fourth, fifth, and sixth, transverse processes of the vertebrae of the neck, by three distinct tendons: it is named *cervicalis descendens*; and its use is to turn the neck obliquely backwards, and to one side. On the neck are, 1. *Complexus*, arises from the transverse processes of the seven superior vertebrae of the back, and four inferior of the neck; in its ascent it receives a fleshy slip from the spinous process of the first vertebra of the back; and is inserted into the interior edge of the protuberance in the middle of the *os occipitis*, and into a part of the curved line that runs forwards from that protuberance. Its use is to draw the head backwards, and to one side; and, when both act, to draw the head directly backwards. The long portion of this muscle that is situated next the spinous processes, lies more loose, and has a roundish tendon in the middle of it; for which reason Albinus calls it *biorenter cervicis*. 2. *Trachelo-mastoideus*, arises from the transverse processes of the three uppermost vertebrae of the back, and from the five lowermost of the neck, where it is connected to the *transversalis cervicis*; and is inserted into the middle of the posterior side of the mastoid process. Its use is to assist the *complexus*; but it pulls the head more to a side. 3. *Levator scapulae*, arises from the transverse processes of the five superior vertebrae of the neck; and is inserted into the superior angle of the scapula. It pulls the scapula upwards, and a little forwards.

The fourth layer consists of two pair on the back, two on the posterior part of the neck, four small pair situated immediately below the posterior part of the occiput, and three on the side of the neck. On the back are, 1. *Semi-spinalis dorsi*, arises from the transverse processes of the seventh, eighth, ninth, and tenth, vertebrae of the back, by as many distinct tendons; and are inserted into the spinous processes of all the vertebrae of the back above the eighth, and into the two lowermost of the neck, by as many tendons, which serve to extend the spine obliquely backwards. 2. *Multifidus spinae*, arises from the side and spinous processes of the *os sacrum*, and from the posterior part of the *os ilium*, where it joins with the sacrum; from all the oblique and transverse processes of the vertebrae of the loins; from all the transverse processes of the vertebrae of the back, and from those of the neck, except the three first, by as many distinct tendons, which run in an oblique direction; and are inserted into all the spinous processes of the vertebrae of the loins, of the back, and of the neck, except the first. When the different portions of this muscle act on one side, they extend the back obliquely, or move it laterally; but, if they act together on both sides, they extend the vertebrae backwards. On the posterior part of the neck are, 1. *Semi-spinalis colli*, arises from the transverse processes of the uppermost six vertebrae of the back, by as many distinct tendons, ascending obliquely under the *complexus*, and inserted into the spinous processes of all the vertebrae of the neck, except the first and the last. Its use is to extend the neck obliquely backwards. 2. *Transversalis colli*, arises from the transverse processes of the five uppermost vertebrae of the back, by as many tendinous and fleshy origins; runs between the *trachelo-mastoideus*, and *splenius colli* and *cervicalis descendens*, and is inserted into the transverse processes of all the cervical vertebrae, except the first and the last. Its use is to turn the neck obliquely backward, and a little to one side. Below the posterior part of the occiput are, 1. *Rectus capitis posterior major*, arises from the external part of the spinous process of the second vertebra of the neck; and grows broader in its ascent, which is obliquely outwards. It is inserted into the *os occipitis*, near the *rectus*

capitis lateralis, and the insertion of the *obliquus capitis superior*; and serves to pull the head backwards, and to assist a little in its rotation. 2. *Rectus capitis posterior minor*, arises close to its fellow, from a little protuberance in the middle of the back part of the first vertebra of the neck, its outer edge being covered by the *rectus major*; and is inserted into the sides of a dimple in the *os occipitis*, near its foramen magnum. Its use is to assist the *rectus major* in moving the head backwards. 3. *Obliquus capitis superior*, arises from the transverse process of the first vertebra of the neck; and is inserted into the *os occipitis* behind the back-part of the mastoid process of the temporal bone, and under the insertion of the *complexus* muscle. Its use is to draw the head backwards. 4. *Obliquus capitis inferior*, arises from the spinous process of the second vertebra of the neck; and is inserted into the transverse process of the first vertebra of the neck. Its use is to give a rotatory motion to the head. On the side of the neck are, 1. *Scalenus anticus*, arises from the fourth, fifth, and sixth, transverse processes of the first vertebra of the neck; and is inserted into the upper side of the first rib near its cartilage. 2. *Scalenus medius*, arises from all the transverse processes of the vertebrae of the neck, by as many strong tendons; the nerves to the superior extremity pass between it and the former. It is inserted into the upper and outer part of the first rib, from its root, to within the distance of an inch from its cartilage. 3. *Scalenus posterior*, arises from the fifth and sixth transverse processes of the vertebrae of the neck, and is inserted into the upper edge of the second rib, not far from the spine. The use of the three *scaleni* is, to bend the neck to one side; or, when the neck is fixed, to elevate the ribs, and to dilate the thorax.

There are also a number of small muscles situated between the spinous and transverse processes of contiguous vertebrae; which are accordingly named, 1. *Inter-spinales colli*. The space between the spinous processes of the vertebrae of the neck, most of which are bifurcated, is filled up with fleshy portions; which arise from the spinous processes of the inferior vertebrae of the neck; and ascend to be inserted into the spinous process of the superior vertebra. They are five in number, and their use is to draw these processes nearer to each other. 2. *Intertransversales colli*. They begin from the transverse process of the first vertebra of the back, and fill up the spaces between the transverse processes of the vertebrae of the neck, which are likewise bifurcated; and, consequently, there are six distinct double muscles, which arise from the inferior transverse process of each vertebra of the neck, and first of the back, and are inserted into the superior transverse processes. They serve to draw these processes towards each other, and turn the neck a little to one side. 3, 4, 5. *Inter-spinales dorsi et lumborum*, and the *intertransversales dorsi*, are rather small tendons than muscles, serving to connect the spinal and transverse processes. 6. *Intertransversales lumborum*, are four distinct small bundles of flesh, which fill up the spaces between the transverse processes of the vertebrae of the loins, and serve to draw them towards each other.

MUSCLES OF THE SUPERIOR EXTREMITIES.—These may be divided into the muscles that are situated on the scapula, on the *os humeri*, on the cubit or fore-arm, and on the hand. The muscles situated on the scapula, are called *muscles of the os humeri*; and are three behind, one along its inferior costa, two before, and one beneath it. Behind are, 1. *Supraspinatus*, arises from all that part of the base of the scapula that is above its spine; also from the spine and superior costa; passes under the acromion, and adheres to the capsular ligament of the *os humeri*. It is inserted into that part of the large protuberance on the head of the *os humeri* that is next the groove for lodging the tendon of the long head of the biceps. Its use is to raise the arm upwards; and, at the same time, to pull the capsular ligament from between the bones, that it may not be pinched. 2. *Infraspinatus*, arises from all that part of the base of the scapula that is between its spine and inferior angle; from the spine as far as the cervix of the scapula.

pula. It is inserted into the upper and middle part of the large protuberance on the head of the os humeri. Its use is to roll the humerus outwards; to assist in raising, and in supporting it when raised; and to pull the ligament from between the bones. 3. *Teres minor*, arises from the round edge of the inferior costa of the scapula, and runs forwards along the inferior edge of the infraspinatus muscle, and adheres to the ligament. It is inserted into the back-part of the large protuberance on the head of the os humeri, a little behind, and below the termination of the last-named muscles. Its use is to roll the humerus outwards; to draw the humerus backwards; and to prevent the ligament from being pinched between the bones.

Along the inferior costa of the scapula is, *teres major*, which arises from the inferior angle of the scapula, and from all that portion of its inferior costa that is rough and thicker than the rest; its fleshy fibres are continued over part of the infraspinatus muscle, to which they firmly adhere. It is inserted into the ridge at the inner side of the groove for lodging the tendon of the head of the biceps, along with the latissimus dorsi. Its use is to roll the humerus inwards, and to draw it backwards and downwards.

The two before the scapula are, 1. *Deltoides*, arises from the posterior part of the clavicle that the pectoralis major does not possess; from the acromion, and lower margin of almost the whole spine of the scapula; from these origins it runs in three different directions, and is composed of a number of fasciculi, which form a strong fleshy muscle that covers the anterior part of the joint of the os humeri. It is inserted into a rough protuberance in the outer side of the os humeri, near its middle, where the fibres of this muscle intermix with some part of the brachialis externus. Its use is to pull the arm directly outwards and upwards, and a little forwards and backwards, according to the different directions of its fibres. 2. *Coraco-brachialis*, arises from the fore-part of the coracoid process of the scapula; adhering, in its descent, to the short head of the biceps. It is inserted about the middle of the internal part of the os humeri, near the origin of the third head of the triceps, called *brachialis externus*, where it sends down a thin tendinous expansion to the internal condyle of the os humeri; and serves to raise the arm upwards and forwards. There passes a nerve through this muscle, called *muscula cutaneus*.

The one beneath the scapula is, *subscapularis*, arises from the base of the scapula internally, and from its superior and inferior costæ, being composed of a number of tendinous and fleshy fasciculi, which make prints on the bone; it is inserted into the upper part of the internal protuberance at the head of the os humeri. It serves to roll the humerus inwards, and to draw it to the side of the body; and to prevent the capsular ligament from being pinched.

MUSCLES on the OS HUMERI.—These are called *Muscles of the cubit or fore-arm*. They consist of two before and two behind. Before are, 1. *Biceps flexor cubiti*, which arises by two heads. The first and outermost, called *longus*, begins from the upper edge of the glenoid cavity of the scapula; passes over the head of the os humeri within the joint; and, in its descent without the joint, is inclosed in a groove near the head of the os humeri, by a membranous ligament that proceeds from the capsular ligament and adjacent tendons. The second, or innermost head, called *brevis*, arises from the coracoid process of the scapula, in common with the coraco-brachialis muscle. A little below the middle of the fore-part of the os humeri, these heads unite. It is then inserted into the tubercle of the upper end of the radius internally, and serves to turn the hand supine, and to bend the fore-arm. 2. *Brachialis internus*, arises from the middle of the os humeri, at each side of the insertion of the deltoid muscle; and is inserted into the coronoid process of the ulna. Its use is to bend the fore-arm, and to prevent the capsular ligament of the joint from being pinched. Behind are, 1. *Triceps extensor cubiti*, arises by three heads; the first, called *longus*, from the inferior costa of the scapula, near its cer-

vix. The second, called *brevis*, from the back-part of the os humeri, and a little below its head, outwardly. The third, called *brachialis externus*, from the back-part of the os humeri. These three heads unite lower than the insertion of the *teres major*, and cover the whole posterior part of the humerus; and are inserted into the upper and external part of the process of the ulna, called *olecranon*, and partly into the condyles of the os humeri, adhering firmly to the ligament; and serve to extend the fore-arm. 3. *Anconeus*, arises from the posterior part of the external condyle of the os humeri; is inserted into a ridge on the outer and posterior edge of the ulna, and assists in extending the fore-arm.

MUSCLES on the CUBIT or FORE-ARM.—These may be divided into three classes: first, flexors and extensors of the whole hand; second, flexors and extensors of the fingers; and third, supinators and pronators, or those that roll the radius on the ulna. The first class consists of three flexors, and three extensors. Flexors are, 1. *Palmaris longus*, arises from the internal condyle of the os humeri; and is inserted into the ligamentum carpi annulare, and into a tendinous membrane that is expanded on the palm of the hand, named *aponeurosis palmaris*; which, above, begins at the transverse or annular ligament of the wrist, and, below, is fixed to the roots of the fingers. Its use is to bend the hand, and to stretch the membrane that is expanded on the palm. This muscle is sometimes wanting; but the *aponeurosis palmaris* is always to be found, and a small muscle named *palmaris brevis*, which arises from the ligamentum carpi annulare, and tendinous membrane that is expanded on the palm of the hand; and is inserted into the skin and fat that covers the abductor minimi digiti, and into the os pisiforme. Its use is to assist in contracting the palm of the hand. 2. *Flexor carpi radialis*, arises from the internal condyle of the os humeri, and from the anterior part of the upper end of the ulna; it is inserted into the fore and upper part of the metacarpal bone that sustains the fore finger; and serves to bend the hand, and to assist in its pronation. 3. *Flexor carpi ulnaris*, arises from the internal condyle of the os humeri. It has likewise a small fleshy beginning from the outer side of the olecranon; between which and the condyle the ulnar nerve passes to the fore-arm; and a number of its fleshy fibres arise from the tendinous membrane which covers the fore-arm. It is inserted into the os pisiforme; at a little distance from its insertion, a small ligament is sent off to the metacarpal bone that sustains the little finger. It assists the former in bending the arm.

The extensors are, 1. *Extensor carpi radialis longior*, arises immediately below the supinator radii longus, from the lower part of the external ridge of the os humeri, above its external condyle. It is inserted into the posterior and upper part of the metacarpal bone that sustains the fore-finger; and serves to extend and bring the hand backwards. 2. *Extensor carpi radialis brevior*, arises from the external condyle of the os humeri, and from the ligament that connects the radius to it, and runs along the outside of the radius. It is inserted into the upper and back part of the metacarpal bone that sustains the middle finger, and serves as an assistant to the last-mentioned muscle. 3. *Extensor carpi ulnaris*, arises from the external condyle of the os humeri; and, in its progress, passes over the ulna. Its round tendon is enclosed by a membranous sheath, in a groove which is situated at the extremity of the ulna. It is inserted into the posterior and upper part of the metacarpal bone that sustains the little finger; and assists the former in extending the hand.

Second Class.—The flexors and extensors of the four fingers are two long, and one small, flexor to each finger, and one extensor. 1. *Flexor sublimis perforatus*, arises from the internal condyle of the os humeri; from the coronoid process of the ulna, near the edge of the cavity that receives the head of the radius; from the tubercle of the radius; and from the middle of the fore-part of the radius, where the flexor pollicis longus arises. It is inserted into

the anterior and upper part of the second bone of each finger, being, near the extremity of the first bone, divided for the passage of the perforans. Its use is to bend the second joint or phalanx of the fingers. 2. *Flexor profundus perforans*, arises from the external side and upper part of the ulna, and from a large share of the interosseous ligament. It splits into four tendons, and is inserted into the fore and upper part of the third or last bone of all the four fingers; and serves to bend the last joint of the fingers.

The four small flexors are named *lumbricalis*. They arise from the outside of the tendons of the flexor profundus, a little above the lower edge of the ligamentum carpi annulare; and are inserted into the outer sides of the broad tendons of the interossei muscles, about the middle of the first joint. They increase the flexion of the fingers, while the long flexors are in full action.

The extensors are, *Extensor digitorum communis*, arises from the external condyle of the os humeri, where it adheres to the supinator radii brevis. Before it passes under the ligamentum carpi annulare externum, it splits into four tendons; some of which may be divided into several smaller: and about the fore-part of the metacarpal bones they remit tendinous filaments to each other. They are inserted into the posterior part of all the bones of the four fingers, by a tendinous expansion; and serve to extend all the joints of the fingers.

The *Third Class* consists of four muscles, viz. two *supinators*, and two *pronators*. The supinators are, 1. *Supinator radii longus*, arises from the external ridge of the os humeri, above the external condyle; and is inserted into the outer-side of the inferior extremity of the radius. Its use is to roll the radius outwards, and consequently the palm of the hand upwards. 2. *Supinator radii brevis*, arises from the external condyle of the os humeri; and from the external and upper part of the ulna, and adheres firmly to the ligament that joins these two bones. It is inserted into the head, neck, and tubercle, of the radius, near the insertion of the biceps; and serves to roll the radius outwards, and so bring the hand supine.

The pronators are, 1. *Pronator radii teres*, arises from the internal condyle of the os humeri, and from the coronoid process of the ulna; and is inserted into the middle of the posterior part of the radius. Its use is to roll the radius, together with the hand, inwards. 2. *Pronator radii quadratus*, arises from the lower and inner part of the ulna; and is inserted into the lower and anterior part of the radius, opposite to its origin. Its use is to turn the radius, together with the hand, inwards.

MUSCLES ON THE HAND.—These may be divided into four classes, viz. muscles of the thumb, fore-finger, little-finger, and metacarpal bones. The muscles of the thumb consist of three flexors, three extensors, one abductor, and one adductor. The flexors are, 1. *Flexor longus pollicis manus*, arises from the upper part of the radius, immediately below its tubercle, and is continued down for some space on the fore-part of this bone. It has likewise generally another origin from the internal condyle of the os humeri, which forms a distinct fleshy slip that terminates near the upper part of the origin from the radius. It is inserted into the last joint of the thumb, after having passed its tendon under the ligament of the wrist, and serves to bend the last joint of the thumb. 2. *Flexor brevis pollicis manus*, arises from the os trapezoides, magnum, and unciforme, of the carpus, and is divided into two portions by the tendon of the flexor pollicis longus. It is inserted into the ossa sesamoidea and first bone of the thumb. 3. *Flexor ossis metacarpi pollicis, or opponens pollicis*, arises from the os trapezium and ligamentum carpi annulare, lying under the abductor pollicis; and is inserted into the under and anterior part of the metacarpal bone of the thumb. Its use is to bring the thumb inwards, opposite to the other fingers.

The extensors are, 1. *Extensor ossis metacarpi pollicis manus*, arises from the middle and posterior part of the ulna, immediately below the insertion of the anconæus muscle, from the posterior part of the middle of the radius, and

from the interosseous ligament. It is inserted into the os trapezium, and upper back-part of the metacarpal bone of the thumb, and often joins with the abductor pollicis. Its use is to extend the metacarpal bone of the thumb outwards. 2. *Extensor primi internodii*, arises from the posterior part of the ulna near the former muscle, and from the interosseous ligament; is inserted into the posterior part of the first bone of the thumb; and serves to extend the first bone of the thumb obliquely outwards. 3. *Extensor secundi internodii*, arises from the middle back-part of the ulna, and from the interosseous ligament; its tendon runs through a small groove at the inner and back part of the lower end of the radius, and is inserted into the last bone of the thumb. Its use is to extend the last joint of the thumb obliquely backwards.

Abductor pollicis manus, arises, by a broad tendinous and fleshy beginning, from the ligamentum carpi annulare, and from the os trapezium. It is inserted into the outer side of the root of the first bone of the thumb, and draws the thumb from the fingers. *Adductor pollicis manus*, arises from almost the whole length of the metacarpal bone that sustains the middle finger; and is inserted into the inner part of the root of the first bone, and serves to pull the thumb towards the fingers.

Fore-finger: Indicator, arises from the middle of the posterior part of the ulna; its tendon passes under the same ligament with the extensor digitorum communis, with part of which it is inserted into the posterior part of the fore-finger. *Abductor indicis manus*, arises from the os trapezium, and from the superior part and inner side of the metacarpal bone of the thumb. It is inserted into the outer and back part of the first bone of the fore-finger, and serves to bring the fore-finger towards the thumb.

Little-finger: Abductor minimi digiti manus, arises from the os pisiforme, and from that part of the ligamentum carpi annulare next it. It is inserted into the inner side of the upper end of the first bone of the little finger, and serves to draw this finger from the rest. *Adductor metacarpi minimi digiti manus*, arises from the thin edge of the os unciforme, and from that part of the ligament of the wrist next it. It is inserted into the inner side and anterior part of the metacarpal bone of this finger, and serves to bend and bring the metacarpal bone of this finger towards the rest. *Flexor parvus minimi digiti*, arises from the outer side of the os unciforme, and from the ligament of the wrist which joins with that bone. It is inserted into the inner and anterior part of the upper end of the first bone of this finger; and is used to bend the little finger, and assist the adductor.

Between the metacarpal bones, there are four internal and three external muscles, named *interossei*. Interossei interni are: 1. *Prior indicis*, arises from the upper and outer part of the metacarpal bone that sustains the fore-finger; and is inserted into the outside of that part of the tendinous expansion from the extensor digitorum communis, which covers the posterior part of the fore-finger. Its use is to draw the fore-finger inwards towards the thumb, and extend it obliquely. 2. *Posterior indicis*, arises from the root and inner part of the metacarpal bone that sustains the fore-finger; and is inserted into the inner side of the tendinous expansion which is sent off from the extensor digitorum communis along the posterior part of the fore-finger. It serves to extend the fore-finger obliquely, and to draw it outwards. 3. *Prior annularis*, arises from the root of the outside of the metacarpal bone that sustains the ring-finger; and is inserted into the outside of the tendinous expansion of the extensor digitorum communis which covers the ring-finger. Its use is to extend and pull the ring-finger towards the thumb. 4. *Interosseus auricularis*, arises from the root and outer side of the metacarpal bone of the little finger; and is inserted into the outside of the tendinous expansion of the extensor digitorum communis, which covers the posterior part of the little finger. It serves to extend and draw the little finger outwards.

Interossei externi, seu bicipites: 1. *Prior medii*, arises from

from the roots of the metacarpal bones that sustain the fore and middle fingers externally, and next each other; runs along the outside of the middle finger; and, being conspicuous on both sides of the hand, is inserted into the outside of the tendinous expansion from the extensor digitorum communis, which covers the posterior part of the middle finger. It serves to extend, and to draw the middle finger inwards. 2. *Posterior medii*, arises from the roots of the metacarpal bones, next to each other, that sustain the middle and ring fingers; and is inserted into the inside of the tendinous expansion from the extensor digitorum communis, which runs along the posterior part of the middle finger. Its use is to extend and draw the middle finger outwards. 3. *Posterior annularis*, arises from the roots of the metacarpal bones that sustain the ring and little fingers next each other, and is inserted into the inside of the tendinous expansion of the extensor digitorum communis, which runs along the posterior part of the ring-finger. Its use is to extend and draw the ring-finger inwards.

MUSCLES OF THE INFERIOR EXTREMITIES.—These may be divided into the muscles situated on the *outside* of the *pelvis*, on the *thigh*, on the *leg*, and on the *foot*. The muscles on the outside of the pelvis, which are called *muscles of the thigh*, are composed of *one layer before*, and *three layers behind*. The layer before consists of five muscles: 1. *Psoas magnus*, 2. *Iliacus internus*; both which are already described in page 572. 3. *Pectinalis*, arises from the upper and anterior part of the os pubis or pectinis, and is inserted into the anterior and upper part of the linea aspera of the os femoris, a little below the trochanter minor. Its use is to bring the thigh upwards and inwards, and to give it a degree of rotation outwards. 4. *Triceps adductor femoris*; under which application are comprehended three distinct muscles: i. *Adductor longus femoris*, arises from the upper and inferior part of the os pubis, and ligament of its synchondrosis, on the inner side of the pectinalis; and is inserted near the middle of the posterior part of the linea aspera, being continued for some way down. ii. *Adductor brevis femoris*, arises from the os pubis near its joining with the opposite os pubis below and behind the former; and is inserted into the inner and upper part of the linea aspera, from a little below the trochanter minor, to the beginning of the insertion of the adductor longus. iii. *Adductor magnus femoris*, arises a little lower down than the former, near the symphysis of the ossa pubis; and is inserted into almost the whole length of the linea aspera; into a ridge above the internal condyle of the os femoris; and into the upper part of that condyle, a little above which the femoral artery takes a spinal turn towards the ham, passing between this muscle and the bone. The use of these three muscles or triceps is, to bring the thigh inwards and upwards, according to the different directions of their fibres; and, in some degree, to roll the thigh outwards. 5. *Obturator externus*, arises from the lower fore-part of the os pubis, and fore-part of the inner crus of the ischium, and surrounds the foramen thyroideum. It is inserted into the cavity at the inner and back part of the root of the trochanter major, adhering in its course to the capsular ligament of the thigh-bone; and is used to roll the thigh-bone obliquely outwards, and to prevent the capsular ligament from being pinched.

The muscles behind are: First layer, *gluteus maximus*, arises from the posterior part of the spine of the os ilium; from the whole external side of the os sacrum; from the posterior sacro-ischiatic ligament, over which part of the inferior edge of this muscle hangs in a folded manner; and from the os coccygis. All the fleshy fibres run obliquely forwards, and a little downwards, to form a thick broad muscle, which is divided into a number of strong fasciculi. It is inserted into the upper and outer part of the linea aspera, which is continued from the trochanter major; and its use is to extend the thigh, by pulling it directly backwards, and a little outwards.

The second layer consists of *gluteus medius*, which arises from the anterior superior spinous process of the os ilium,

and from all the outer edge of the spine of the ilium, except its posterior part, where it arises from the dorsum of that bone. It is inserted into the outer and posterior part of the trochanter major; and its use is to draw the thigh-bone outwards, and a little backwards; and to roll the thigh-bone outwards, especially when it is bended.

The third layer consists of four muscles, viz. 1. *Gluteus minimus*, arises from a ridge that is continued from the superior anterior spinous process of the os ilium, and from the middle of the dorsum of that bone as far back as its great niche. It is inserted into the fore and upper part of the trochanter major; and serves to assist the former in pulling the thigh outwards and backwards, and in rolling it. 2. *Pyriformis*, arises within the pelvis, by three tendinous and fleshy origins, from the second, third, and fourth, pieces of the os sacrum; from thence, growing gradually narrower, it passes out of the pelvis along with the posterior crural nerve, below the niche in the posterior part of the os ilium, where it receives a few fleshy fibres. It is inserted into the upper part of the cavity at the inner side of the root of the trochanter major. Its use is to move the thigh a little upwards, and roll it outwards. 3. *Geminus*, arises by two distinct origins; the superior from the spinous process, and the inferior from the tuberosity of the os ischium; also, from the posterior sacro-ischiatic ligament. It is inserted into the cavity at the inner side of the root of the trochanter major, on each side of the tendon of the obturator internus; and its use is to roll the thigh outwards, and to preserve the tendon of the obturator internus from being hurt by the hardness of that part of the ischium over which it passes; also, to hinder it from starting out of its place, while the muscle is in action. 4. *Quadratus femoris*, arises from the outside of the tuberosity of the os ischium; and, running transversely, is inserted into a rough ridge, continued from the root of the large trochanter to the root of the small one. Its use is to roll the thigh outwards.

MUSCLES ON THE THIGH.—These are called *muscles of the leg*; and consist of *one on the outside*, *two on the inside*, *four before*, and *four behind*. On the outside is, *tensor vagina femoris*. It arises from the external part of the anterior superior spinous process of the os ilium; and is inserted a little below the trochanter major, into the inner side of the membranous fascia which covers the outside of the thigh. It stretches the membranous fascia, assists in the abduction of the thigh, and helps its rotation inwards.

On the inside are: 1. *Sartorius*, arises from the anterior superior spinous process of the os ilium, runs down upon the rectus, and, going obliquely inwards, it passes over the vastus internus, and about the middle of the os femoris, over part of the triceps, it runs down farther between the tendon of the adductor magnus and that of the gracilis muscle. It is inserted into the inner side of the tibia, near the inferior part of its tubercle; and serves to bend the leg obliquely inwards, or to bring one leg across the other. 2. *Gracilis*, arises from the os pubis near the symphysis of these two bones. It descends by the inside of the thigh, and is inserted into the tibia under the sartorius; which it assists.

Those before are: 1. *Rectus*, arises from the inferior anterior spinous process of the os ilium, and from the dorsum of the ilium, a little above the acetabulum; runs down over the anterior part of the cervix of the os femoris, the fibres not being straight, but running down like the plume of a feather obliquely outwards and inwards, from a tendon in the middle; and is inserted into the upper part of the patella, from which a thin tendon runs down, on the fore-part of this bone, to terminate in a thick strong ligament, which is sent off from the inferior part of the patella, and inserted into the tubercle of the tibia. Its use is to extend the leg in a powerful manner, by the intervention of the patella, like a pulley. 2. *Vastus externus*, arises from the root of the trochanter major, and upper part of the linea aspera, its origin being continued from near the insertion of the gluteus minimus, the whole length of the linea aspera, by fleshy fibres which run obliquely

obliquely forwards to a middle tendon, where they terminate. It is inserted into a large share of the upper part of the patella; and part of it ends in an aponeurosis, which is continued down to the leg, and in its passage is firmly fixed to the head of the tibia. Its use is to extend the leg. 3. *Vastus internus*, arises from between the fore-part of the os femoris and root of the trochanter minor, and from almost all the inside of the linea aspera, by fibres running obliquely forwards and downwards. It is inserted into the upper and inside of the patella, continuing fleshy lower than the vastus externus. Part of it likewise ends in an aponeurosis continued down to the leg, and fixed in its passage to the upper part of the tibia. The use of this also is to extend the leg. 4. *Cruralis*, arises from between the two trochanters of the os femoris, but nearer the minor, and firmly adhering to most of the fore-part of the os femoris, and connected to both vasti muscles. It is inserted into the upper part of the patella, behind the rectus; and also assists in the extension of the leg. These four muscles before, being inserted into the patella, have the same effect upon the leg as if they were immediately inserted into it, by means of the strong tendon, or rather ligament, which is sent off from the inferior part of the patella to the tibia.

Those behind are: 1. *Semitendinosus*, arises from the posterior part of the tuberosity of the os ischium; and is inserted into the inside of the ridge of the tibia, a little below its tubercle. Its use is to bend the leg backwards and a little inwards. 2. *Seminembranosus*, arises from the upper and posterior part of the tuberosity of the os ischium, and is inserted into the inner and back part of the head of the tibia. Its use is to bend the leg, and bring it directly backwards. These two last muscles form what is called the *inner hamstring*. 3. *Biceps flexor cruris*, arises by two distinct heads. The first, called *longus*, arises, in common with the semitendinosus, from the upper and posterior part of the tuberosity of the os ischium. The second, called *brevis*, arises from the linea aspera, a little below the termination of the gluteus maximus; and is inserted into the upper part of the head of the fibula. Its use is to bend the leg. This is called the *outer hamstring*; and between it and the inner the nervous popliteus and arteria vena poplitea are situated. 4. *Popliteus*, arises from the lower and back part of the external condyle of the os femoris; then runs over the ligament that involves the joint, firmly adhering to it, and part of the semilunar cartilage. It is inserted into a ridge at the upper and internal edge of the tibia, a little below its head; and its use is to assist in bending the leg, and to prevent the capsular ligament from being pinched. After the leg is bent, this muscle also serves to roll it inwards.

MUSCLES of the LEG.—These are called *muscles of the foot*; and may be divided into two classes, viz. *extensors* and *flexors of the foot*; and *common extensors* and *flexors of the toes*. First class: The extensors are, 1. *Gastrocnemius externus, seu gemellus*, which arises by two distinct heads. The first head arises from the upper and back part of the internal condyle of the os femoris, and from that bone, a little above its condyle. The second arises from the upper and back part of the external condyle of the os femoris. 2. *Soleus, seu gastrocnemius internus*, arises by two origins. The first is from the upper and back part of the head of the fibula; the second begins from the posterior and upper part of the middle of the tibia. The flesh of this muscle, covered by the tendon of the gemellus, runs down near as far as the extremity of the tibia; a little above which the tendons of both gastrocnemii unite, and form a strong round cord, which is called *tendo Achillis*. It is inserted into the upper and posterior part of the os calcis; by the projection of which the tendo Achillis is at a considerable distance from the tibia. Its use is to extend the foot, by bringing it backwards and downwards. 3. *Plantaris*, arises from the upper and back part of the root of the external condyle of the os femoris, near the inferior extremity of that bone, adhering to the ligament that

involves the joint in its descent. It is inserted into the inside of the posterior part of the os calcis, below the tendo Achillis; and its use is to assist the former, and to pull the capsular ligament of the knee from between the bones. It seems likewise to assist in rolling the foot inwards.

The flexors consist of four muscles: two belong to the tibia, and two to the fibula. 1. *Tibialis anticus*, arises from the middle of that process of the tibia, to which the fibula is connected above; then it runs down fleshy on the outside of the tibia; from which, and the upper-part of the interosseus ligament, it receives a number of distinct fleshy fibres. It is inserted into the inside of the os cuneiforme internum, and posterior end of the metatarsal bone that sustains the great toe; and serves to bend the foot, by drawing it upwards, and, at the same time, to turn the toes inwards. 2. *Tibialis posticus*, arises from the fore and upper part of the tibia, just under the process which joins it to the fibula; then, passing through a perforation in the upper part of the interosseus ligament, it continues its origin from the back-part of the fibula. It is inserted into the upper and inner part of the os naviculare, and gives some tendinous filaments to the os calcis, os cuboides, and to the root of the metatarsal bone that sustains the middle toe. Its use is to extend the foot, and to turn the toes inwards. 3. *Peroneus longus*, arises from the fore-part of the head of the perone, or fibula, the fibres running straight down; also from the upper and external part of the fibula, where it begins to rise into a round edge; as also, from the hollow between that and its anterior edge, as far down as to reach within a hand's breadth of the ankle, by a number of fleshy fibres, which run outwards towards a tendon, that sends off a long round one, which passes through a channel at the outer ankle, in the back-part of the inferior extremity of the fibula; then, being reflected to the sinus of the os calcis, it runs along a groove in the os cuboides, above the muscles in the sole of the foot. It is inserted into the outside of the root of the metatarsal bone that sustains the great toe, and by some tendinous fibres in the os cuneiforme internum. Its use is to move and extend the foot outwards. 4. *Peroneus brevis*, arises from above the middle of the external part of the fibula; from the outer side of the anterior spine of this bone; as also, from its round edge externally, the fibres running obliquely outwards towards a tendon on its external side. It is inserted into the root and external part of the metatarsal bone that sustains the little toe; and serves to assist the former.

Second class: The common extensors consist of two muscles. 1. *Extensor longus digitorum pedis*, arises from the upper and outer part of the head of the tibia, and from the head of the fibula, and from the interosseus ligament; also from the tendinous fascia, which covers the upper and outside of the leg by a number of fleshy fibres; and from the anterior spine of the fibula, almost its whole length, where it is inseparable from the *peroneus tertius*. It is inserted into the root of the first joint of each of the four small toes; and is expanded over the upper side of the toes, as far as the root of the last joint; and serves to extend all the joints of the four small toes. A portion of this muscle, which arises from the middle of the fibula, continues down to its inferior extremity, and sends its fleshy fibres forwards to a tendon, which passes under the annular ligament, and is inserted into the root of the metatarsal bone that sustains the little toe. It is called by Albini *peroneus tertius*, and by others the *nonus vesalii*. It serves to assist in bending the foot. 2. *Extensor brevis digitorum pedis*, arises from the fore and upper part of the os calcis, and is inserted into the tendinous expansion from the extensor longus, which covers the small toes, except the little one; also into the tendinous expansion from the extensor pollicis that covers the upper part of the great toe. Its use is to extend the toes.

The flexors may be reckoned three. 1. *Flexor brevis digitorum pedis, sublimis perforatus*, arises from the inferior and posterior part of a protuberance of the os calcis, be-

tween the abductors of the great and little toes; and is inserted into the second phalanx of the four smaller toes. Its use is to bend the second joint of the toes. 2. *Flexor longus digitorum pedis, profundus, perforans*, arises from the back part of the tibia, near the entry of the medullary artery; which beginning is continued down the inner edge of this bone by short fleshy fibres, ending in its tendon; also by tendinous and fleshy fibres, from the outer edge of the tibia; and between this double order of fibres the tibialis pollicis muscle lies inclosed. It is inserted into the extremity of the last joint of the four smaller toes; and its use is to bend the last joint of the toes. This muscle is assisted by the *flexor digitorum accessorius, seu massa carnea Jacobii Sylvi*. It arises from the sinuosity at the inside of the os calcis, which is continued forwards for some space on the same bone; also, by a thin tendinous beginning, from before the tuberosity of the os calcis externally; and, soon becoming fleshy, is inserted into the tendon of the flexor longus, just at its division into four tendons. Its use is to assist the flexor longus. 3. *Lumbricales pedis*, arise, by four tendinous and fleshy beginnings, from the tendon of the flexor profundus, just before its division, near the insertion of the massa carnea; are inserted, by four slender tendons, into the inside of the first joint of the four smaller toes, and are lost in the tendinous expansion that is sent from the extensors to cover the upper part of the toes. They increase the flexion of the toes, and draw them inwards.

MUSCLES OF THE FOOT.—These may be divided into the muscles of the great toe, of the little toe, and of the metatarsal bones. The muscles of the great toe are five: 1. *Extensor proprius pollicis pedis*, arises some way below the head and anterior part of the fibula, along which it runs to near its lower extremity, connected to it by a number of fleshy fibres, which descend obliquely towards a tendon. It is inserted into the posterior part of the first and last joint of the great toe, which it serves to extend. 2. *Flexor longus pollicis pedis*, arises from the posterior part of the fibula, some way below its head, being continued down the same bone, almost to its inferior extremity, by a double order of oblique fleshy fibres; and is inserted into the last joint of the great toe, and generally sends a small tendon to the os calcis. Its use is to bend the last joint of this toe. 3. *Flexor brevis pollicis pedis*, arises from the under and fore part of the os calcis, where it joins with the os cuboides, from the os cuneiforme externum, and is inseparably united with the abductor and adductor pollicis. It is inserted into the external os sesamoideum and root of the first joint of the great toe; and serves to bend the first joint. 4. *Abductor pollicis pedis*, arises from the inside of the root of the protuberance of the os calcis, where it forms the heel; and, from the same bone, where it joins with the os naviculare. It is inserted into the internal os sesamoideum, and root of the first joint of the great toe; and serves to separate the great toe from the rest. 5. *Adductor pollicis pedis*, arises from the os calcis, from the os cuboides, from the os cuneiforme externum, and from the root of the metatarsal bone of the second toe. It is inserted into the external os sesamoideum, and root of the metatarsal bone of the great toe; and its use is to bring this toe nearer the rest.

The muscles of the little toe, besides the common extensors and flexors, are two, viz. 1. *Abductor minimi digiti pedis*, arises from the semicircular edge of a cavity on the inferior part of the protuberance of the os calcis, and from the root of the metatarsal bone of the little toe. It is inserted into the root of the first joint of the little toe externally; and serves to draw the little toe outwards from the rest. 2. *Flexor brevis minimi digiti pedis*, arises from the os cuboides, near the sulcus or furrow for lodging the tendon of the peroneus longus; and from the outside of the metatarsal bone that sustains this toe, below its protuberant part. It is inserted into the anterior extremity of the metatarsal bone, and root of the first joint of this toe; and serves to bend the toe.

Muscles from the metatarsal bones, consist of four ex-

ternal, and three internal, interossei; and one muscle, which is common to all the metatarsal bones. Interossei pedis externi, bicipites: 1. *Abductor indicis pedis*, arises from the root of the inside of the metatarsal bone of the fore toe, from the outside of the root of the metatarsal bone of the great toe, and from the os cuneiforme internum. It is inserted into the inside of the root of the first joint of the fore toe; and serves to pull the fore toe inwards from the rest of the small toes. 2. *Adductor indicis pedis*, arises from the roots of the metatarsal bones of the fore and second toe, and is inserted into the outside of the root of the first joint of the fore toe. Its use is to pull the fore toe outwards towards the rest. 3. *Adductor medii digiti pedis*, arises from the roots of the metatarsal bones of the second and third toes, and is inserted into the outside of the root of the first joint of the second toe. Its use is to pull the second toe outwards. 4. *Adductor tertii digiti pedis*, arises from the roots of the metatarsal bones of the third and little toe, and is inserted into the outside of the root of the first joint of the third toe. Its use is to pull the third toe outwards.

Interossei pedis interni: 1. *Abductor medii digiti pedis*, arises from the inside of the root of the metatarsal bone of the middle toe internally, and is inserted into the inside of the root of the first joint of the middle toe, and serves to pull the middle toe inwards. 2. *Abductor tertii digiti pedis*, arises from the inside and inferior part of the root of the metatarsal bone of the third toe, and is inserted into the inside of the root of the first joint of the third toe inwards; and serves to pull the third toe inwards. 3. *Abductor minimi digiti pedis*, arises from the inside of the root of the metatarsal bone of the little toe, and is inserted into the inside of the root of the first joint of the little toe; and serves to pull the little toe inwards.

The muscle which brings the extremities of the metatarsal bones towards each other, is named *transversalis pedis*. It arises from the under part of the anterior extremity of the metatarsal bone of the great toe, and from the internal os sesamoideum of the first joint, adhering to the adductor pollicis. It is inserted into the under and outer part of the anterior extremity of the metatarsal bone of the little toe, and ligament of the next toe; and its use is to contract the foot, by bringing the great toe and the two outermost toes nearer to each other. The muscles situated on the sole of the foot are covered by a strong tendinous aponeurosis, which is extended from the os calcis to the first joints of all the toes, and serves to preserve the subjacent parts from being compressed in standing and walking.

EXPLANATION of the ANATOMICAL PLATES II. III. and IV.

Plate II. represents a Front and Back View of the FIRST LAYER of the MUSCLES, situated immediately under the common Integuments and tendinous Fasciæ.

FRONT VIEW.

MUSCLES ON THE HEAD AND NECK.—*a*, The anterior fleshy belly of the occipito-frontalis situated on the os frontis; above *a*, the tendinous aponeurosis of the occipito-frontalis covering the upper part of the parietal bones. *b*, Attollens aurem: under it, the tendinous aponeurosis covering the temporal muscle: anterior auris, between *c* and the ear. *c*, Orbicularis palpebrarum; its tendon is seen at the inner canthus, fixed to the nasal process of the superior maxillary bone: Levator labii superioris alæque nasi, seen divided into two portions running down along the side of the nose, and, on the outside of it, the levator anguli oris: next this, the zygomaticus minor: farther outwards, zygomaticus major: on the ala and tip of the nose, the compressor naris. *d*, Depressor anguli oris: and, beneath it, a portion of the depressor labii inferioris. *e*, Orbicularis oris. *f*, Platysma-myoides: behind *f*, the sternocleidomastoideus is seen through the platysma-myoides.

TRUNK. *a*, Pectoralis major: the upper part of it is covered

covered by the origin of the platysma-myoides. *b*, Serratus magnus: the other portions resemble this. *c*, Latissimus dorsi. *d*, Obliquus externus descendens. *e*, Linea femularis. *f*, Linea alba: below *f*, umbilicus: between *e* and *f*, the rectus abdominis: and, at the inferior part of the linea alba, opposite to *g*, the pyramidales appear thro' the tendons of the oblique muscles. *g*, Ring of the external muscle; with the spermatic cord passing through it, and covered by the cremaster muscle.

SUPERIOR EXTREMITY. *a*, Deltoides: above the clavicle, a portion of the trapezius is seen. *b*, Biceps flexor cubiti: at the bending of the arm are seen its tendon going towards the radius; and the part, from which the tendinous aponeurosis that covers the fore-arm, is cut off: on the inside of the biceps, part of the triceps extensor cubiti: and, on the outside, part of the brachialis internus. *c*, Supinator radii longus. *d*, Pronator teres. *e*, Palmaris longus. *f*, Palmaris brevis: on the palm of the hand, the aponeurosis palmaris is seen extended from the annular ligament at the wrist to the roots of the metacarpal bones of the four fingers. *g*, Flexor carpi radialis. *h*, Part of the flexor sublimis perforatus. *i*, Insertion of the flexor carpi ulnaris. *k*, Abductor pollicis.

INFERIOR EXTREMITY. *a*, Tensor vaginæ femoris, the vagina or tendinous fascia being cut off: on the outside of it a portion of the glutæus maximus. *b*, Part of the iliacus internus: on the outside of it, between *b* and *c*, part of the psoas magnus. *c*, Pectinalis. *d*, Triceps longus. *e*, Gracilis. *f*, Sartorius. *g*, Rectus cruris: its tendon is seen inserted into the patella, from which a strong tendon is sent to be fixed to the tubercle of the tibia. *h*, Vastus externus. *i*, Vastus internus. *k*, Tibialis anticus. *l*, Peronæus longus: on the outside of it, a portion of the solæus. *m*, Extensor longus digitorum pedis, with the peronæus tertius, and extensor proprius pollicis pedis. *n*, Gastrocnemius externus, seu gemellus. *o*, Solæus. *p*, Ligamentum tarfi annulare. *q*, Abductor pollicis pedis.

BACK VIEW.

HEAD and NECK. *a*, Part of the occipito-frontalis muscle, with its aponeurosis. *b*, Attollens aurem. *c*, Anterior auris. *d*, Retrahentes auris.

TRUNK. *a*, Trapezius, seu cucularis. *b*, Its tendinous edge joining with its fellow in the nape of the neck, which is called *ligamentum nuchæ seu colli*. *c*, The fleshy belly of the latissimus dorsi. *d*, The tendon of the latissimus dorsi, which arises in common with the serratus posticus inferior. *e*, Part of the obliquus externus abdominis.

SUPERIOR EXTREMITY. *a*, Deltoides. *b*, Infra-spinaus, with a portion of the teres minor and major below it. *c*, Triceps extensor cubiti: its tendon is seen inserted into the head of the ulna, called *olecranon*; and, on the inside of it, the *anconæus*. *d*, Extensor carpi radialis longior, covered by a portion of the supinator radii longus; and, under it, a portion of the extensor carpi radialis brevior. *e*, Extensor digitorum communis manus, which splits into four tendons, and pass with the indicator, under the ligamentum carpi annulare externum, at the extremities of the metacarpal bone, under ligaments proper to themselves; and are lost in a broad tendon, which covers the back of the four fingers. *f*, Extensor ossis metacarpi pollicis manus. *g*, Extensor primi internodii pollicis manus. *h*, Extensor secundi internodii pollicis manus. *i*, Extensor carpi ulnaris. *k*, Part of the flexor carpi ulnaris: under it, part of the flexor profundus perforatus: and, on the inside, part of the flexor sublimis perforatus, which are more distinctly seen on the right fore-arm. Likewise, on the right hand, are seen part of the abductor pollicis manus, abductor minimi digiti manus, and the aponeurosis palmaris.

INFERIOR EXTREMITY. *a*, Glutæus maximus. *b*, Part of the glutæus medius. *c*, Part of the tensor vaginæ femoris. *d*, Vastus externus. *e*, The long head of the biceps flexor cruris: and, beneath it, *f*, Part of the short head. *g*, Semitendinosus: and beneath it, on each side,

a portion of the semimembranosus is seen. *h*, Gracilis: on the outside of it, a portion of the adductor magnus is seen. *i*, A small part of the vastus internus. *k*, Gastrocnemius externus, seu gemellus: and, within its outer head, a portion of the plantaris. *l*, Solæus seu gastrocnemius internus. *m*, Tendo Achillis, with the plantaris. *n*, Peronæus longus. *o*, Peronæus brevis: between it and the tendo Achillis, a portion of the flexor longus digitorum pedis. *p*, Tendons of the extensor longus digitorum pedis, with the peronæus tertius passing under the ligamentum tarfi annulare; and the flexor brevis digitorum pedis is seen beneath them. *q*, Abductor minimi digiti pedis: and above it the tendons of the peronæus longus and brevis, passing under proper ligaments of their own.

Plate III. represents a Front and Back View of the SECOND LAYER of the MUSCLES.

F R O N T V I E W.

MUSCLES on the HEAD and NECK. *a*, Corrugator supercilii. *b*, Temporalis. *c*, Masseter. *d*, Levator anguli oris. *e*, Buccinator. *f*, Orbicularis oris: opposite to the right ala nasi, the portion of this muscle which Albinus names *nasalis labii superioris*. *g*, Depressor labii inferioris. *h*, Sterno-cleido-mastoidæus, which is seen below, arising from the sternum and clavicle, by two heads. *i*, Sterno-hyoidæus: on the outside of it, the omo-hyoidæus: further on, a portion of the hyo-thyroidæus. *k*, Levator scapulæ.

TRUNK. *a*, Subclavius. *b*, Pectoralis minor. *c*, Serratus magnus. *d*, Rectus abdominis, divided into several fleshy portions by its tendinous interfections. *e*, Pyramidalis. *f*, Obliquus ascendens internus. *g*, Spermatic cord, with the origin of the cremaster muscle.

SUPERIOR EXTREMITY. *a*, Biceps flexor cubiti. *b*, Short head of the biceps: beneath the upper part of it, a portion of the coraco-brachialis: beneath the under part, a portion of the brachialis internus. *c*, Long head of the biceps: at the bending of the arm, the tendon of the biceps, and the place where the tendinous aponeurosis was cut from it, are seen. *d*, Extensor carpi radialis longior: beneath it a portion of the extensor carpi radialis brevior. *e*, Flexor sublimis perforatus. *f*, Insertion of the extensor carpi ulnaris. *g*, Extensors of the thumb. *h*, Opponens pollicis: on the inside of it, a portion of the flexor pollicis brevis. *i*, Tendon of the flexor longus pollicis manus, after passing through the flexor brevis pollicis manus. *k*, Abductor minimi digiti manus. *l*, Flexor parvus minimi digiti manus. *m*, Ligamentum carpi annulare.

INFERIOR EXTREMITY. *a*, Iliacus internus: between *a* and *b*, part of the psoas magnus. *b*, Pectinalis. *c*, Triceps longus. *d*, Gracilis. *e*, Rectus cruris cut off near its origin. *f*, Tendon of the rectus cruris cut off above the patella, from which a strong tendon is sent to be inserted into a tubercle of the tibia. *g*, Portion of the glutæus medius: on the inside of it, part of the glutæus minimus. *h*, Vastus internus. *i*, Vastus externus. *k*, Cruræus. *l*, Insertion of the biceps flexor cruris into the fibula. *m*, Tendons of the gracilis and semitendinosus inserted into the tibia. *n*, Solæus. *o*, Peronæus longus. *p*, Extensor longus digitorum, with the peronæus tertius on the outside, and extensor pollicis proprius on the inside. *q*, Solæus. *r*, Flexor longus digitorum. *s*, Tendons of the tibialis posticus and flexor longus digitorum pedis. *t*, Flexor brevis digitorum pedis.

BACK VIEW.

HEAD and NECK. *a*, Temporalis; its tendon is seen passing below the zygoma. *b*, Masseter. *c*, Splenius capitis et colli. *d*, Portion of the complexus. *e*, Levator scapulæ, seu musculus patientiæ.

TRUNK. *a*, Rhomboides major. *b*, Rhomboides minor: and immediately above it, the upper edge of the serratus posticus is seen. *c*, The serratus posticus superior on the right side. *d*, Serratus posticus inferior. *e*, Part of the spinalis dorsi. *f*, Part of the longissimus dorsi. *g*, Part

g, Part of the sacro lumbalis. *h*, Serratus magnus. *i*, The broad tendon by which the latissimus dorsi begins, and from which the tendon of the serratus posticus inferior is inseparable. *k*, Part of the obliquus internus ascendens abdominis. *l*, The sphincter ani, fixed to the point of the os coccygis; at the side of which the coccygeus, and a portion of the levator ani, are seen; and lower down, opposite to *l*, part of the transversalis penis.

SUPERIOR EXTREMITY. *a*, Supra-spinatus. *b*, Infra-spinatus. *c*, Teres minor. *d*, Teres major. *e*, Triceps extensor cubiti. *f*, Its head, called *longus*. *g*, The brevis: and, *h*, A small portion of the third head, named *brachialis externus*. *i*, The tendon of the triceps, inserted into the olecranon. *k*, Part of the brachialis internus. *l*, Anconæus, which seems to be continued from that part of the brachialis externus immediately above it. *m*, Extensor carpi radialis longior; and beneath it, the brevior: both are seen at the wrist, inserted into the metacarpal bones of the fore and middle fingers. *n*, Flexor carpi ulnaris. *o*, Part of the radii brevis. *p*, Extensor ossis metacarpi pollicis manus. *q*, Extensor primi internodii pollicis manus. *r*, Extensor secundi internodii pollicis manus. *s*, Indicator, inserted into the root of the first joint of the forefinger. *t*, One of the three external interossei manus: the other two are distinctly seen without letters. *u*, One of the tendons of the extensors of the fingers cut; and the same is seen in each of the other three fingers, joining with the tendons and aponeuroses of the interossei and lumbricales, and spread upon the back of the fingers. On the right hand, part of the flexors of the fingers, the abductor pollicis and minimi digiti, are seen.

INFERIOR EXTREMITY. *a*, Glutæus medius. *b*, Pyrriformis. *c*, The two muscles called *gemi*, between which the tendon and fleshy belly of the obturator internus passes over the tuberosity of the os ischium, are seen within the pelvis, partly covered by the coccygeus and levator ani. *d*, Quadratus femoris. *e*, Vastus externus. *f, f*, Parts of the triceps magnus. *g*, Long head of the triceps flexor cruris, and beneath it part of the short head is seen. *h*, Semi-tendinosus, and beneath it parts of the semi-membranosus are seen on each side of it. *i*, Gracilis. *k*, A small portion of the vastus internus. *l*, Popliteus. *m*, The fleshy belly of the plantaris; and its long slender tendon is seen passing over the inside of the soleus. *n*, Soleus. *o*, The place where the tendon of the gemellus was cut off; but the flesh of the soleus runs farther down. *p*, Tendo Achillis, with the plantaris. *q*, Peronæus longus, passing at the outer ankle to the sole of the foot; beneath it, the peronæus brevis to the root of the metatarsal bone of the little toe; and, between it and the tendo Achillis, a portion of the flexor longus digitorum pedis. *r*, Tendons of the extensor longus digitorum pedis, with the peronæus tertius; and beneath these, the extensor brevis digitorum pedis. *s*, Flexor brevis minimi digiti pedis.

Plate IV. represents a Front and Back View of the THIRD LAYER of the MUSCLES, with some of the Ligaments, Cartilages, and naked Bones.

FRONT VIEW.

MUSCLES on the HEAD and NECK. *a*, Depressor labii superioris alæque nasi. *b*, Orbicularis oris, after most of the muscles, which are fixed to it, and assist to form it, have been taken away. *c*, Buccinator: above *c*, part of the pterygoideus externus is seen passing behind the coronoid process of the lower jaw. *d*, Levator labii inferioris. *e*, Sterno-thyroideus: immediately above, and seemingly the continuation of it, the hyo-thyroideus. *f*, Scalenus anticus: contiguous to it, on the inside, the scalenus medius: above it, a portion of the trachelo-mastoidæus: between the scalenus anticus, and sterno-thyroideus, and hyo-thyroideus, the rectus capitis anterior major, and longus colli.

TRUNK. *a*, Third row of external intercostal muscles: the rest appear in the same manner between the other ribs.

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b, Third row of internal intercostal muscles: the rest appear between the other ribs. *c*, Transversalis abdominis. *d*, The place from which the inferior part of the tendon of the transversalis, that passes before the rectus and pyramidalis muscles, is cut off: between these portions of each side, the peritonæum is laid bare, and the ligaments of the bladder which were formerly the umbilical arteries and urachus: between this portion and the os pubis, the spermatic cord is seen cut. *e*, The inferior edge of the upper part of the tendon of the transversalis, which passes behind the rectus, and immediately adheres to the peritonæum. *f*, The anterior lamella of the internal oblique, which joined the tendon of the external to pass over the rectus: between *f* and *g*, the posterior lamella of the internal oblique, joining with the tendon of the transversalis, to pass behind the rectus. *g*, The place at the linea alba, from which the tendon of the external oblique, and anterior lamella of the internal, were cut off: at *g*, Umbilicus.

SUPERIOR EXTREMITY. *a*, Subscapularis. *b*, Teres minor. *c*, Coraco-brachialis: the part from which the short head of the biceps flexor cubiti was cut off from it, is seen at its upper end. *d*, Brachialis internus. *e*, Brachialis externus, or third head of the triceps. *f*, Extensor carpi radialis longior; and with it the extensor carpi radialis brevior; both these are distinctly seen in the right hand: between the tendon of the brachialis internus and extensor radialis, the supinator radii brevis is seen. *g*, Flexor longus pollicis manus, with the fleshy portion of it which arises from the internal condyle of the os humeri. *h*, Flexor profundus perforans, which splits into four tendons, which pass under the ligamentum carpi annulare. *i*, Pronator quadratus. *k*, Adductor minimi digiti manus. *l*, One of the lumbricales: the other three appear in the same manner, along the tendons of the flexor profundus: behind these, the internal interossei are seen.

INFERIOR EXTREMITY. *a*, Glutæus minimus. *b*, Iliacus internus: on the inside of it, between *b* and *c*, the psoas magnus. *c*, Obturator externus. *d*, Adductor brevis femoris. *e*, Adductor magnus femoris. *f*, Gracilis, which is seen inserted into the inside of the head of the tibia. *g*, The short head of the biceps flexor cruris. *h*, Peronæus longus. *i*, Peronæus brevis: between these two peronæi and tibia, the tibialis posticus is seen. *k*, Tendon of the tibialis posticus, covering the tendon of the flexor longus digitorum pedis. *l*, Extensor brevis digitorum pedis.

BACK VIEW.

MUSCLES on the HEAD and NECK. *a*, Part of the buccinator. *b*, Complexus. *c*, Trachelo-mastoidæus; on the outside of it, the transversalis colli. *d*, Scalenus medius. *e*, Scalenus posticus.

TRUNK. *a*, Spinalis dorsi; and beneath it, the multifidus spinæ. *b*, Longissimus dorsi, which sends off a fleshy slip to the trachelo-mastoidæus. *c*, Sacro lumbalis, with the cervicalis descendens sent off from it along the side of the neck, and outside of the transversalis colli. *d*, Semi-spinalis dorsi. *e*, Transversalis abdominis. The spaces between the spinous processes of the vertebræ have muscular fasciculi between them, particularly those of the neck: and are named *interspinales colli, dorsi, and lumborum*; but those of the back seem to be tendinous and ligamentous.

SUPERIOR EXTREMITY. *a*, Teres major. *b*, Part of the coraco-brachialis. *c*, Part of the brachialis internus. *d*, The third head of the triceps extensor cubiti, called *brachialis externus*, after the longus and brevis have been cut off. *e*, Extensor radialis longior. *f*, Extensor radialis brevior. *g*, Part of the flexor profundus perforans. *h*, Supinator radii brevis. *i*, Part of the adductor pollicis manus. *k*, One of the three external interossei; the other two may be easily distinguished without letters. *l*, Tendons of the extensors of the fingers, joining with those of the lumbricales and interossei, which form a tendinous expansion on the back of the four fingers. On the right hand,

part of the flexors of the fingers and thumb, part of the adductor pollicis, and the whole of the adductor minimi digiti, are seen.

INFERIOR EXTREMITY. *a*, Glutæus minimus. *b*, Obturator internus; its fleshy belly is seen within the pelvis: beneath *b*, the tendon of the obturator externus. *c*, Semimembranosus. *d*, The short head of the biceps flexor cruris. *e*, Triceps magnus. *f*, Gracilis: in the ham, the origins of the two heads of the gastrocnemius externus and plantaris are seen. *g*, Popliteus. *h*, Tibialis posticus. *i*, Flexor longus digitorum pedis. *k*, Flexor pollicis longus. *l*, Peronæus longus, running down to be inserted into the metatarsal bone of the little toe: beneath it, the peronæus brevis, passing to the sole of the foot. *m*, Extensor brevis digitorum pedis. *n*, Part of the flexor longus digitorum pedis.

MUSCLES of the EYE.

Fig. 1. represents the right Eye-ball, and the six Muscles which move it, taken out of the orbit, with the Optic Nerve. *a*, The eye-ball. *b*, Optic nerve. *c*, Musculus trochlearis, seu obliquus superior. *d*, The trochlea, or pulley, with a piece of the os frontis, through which the tendon of the muscle passes towards the eye-ball. *e*, Obliquus inferior, with a piece of the superior maxillary bone, from whence it arises. *f*, Levator oculi. *g*, Depressor oculi. *h*, Adductor oculi. *i*, Abductor oculi.

MUSCLES of the FOOT.

Fig. 2. represents the first Layer of Muscles on the Sole of the Foot, after the Aponeurosis Plantaris has been taken away. *a*, Abductor pollicis pedis. *bb*, Abductor minimi digiti pedis. *c*, Flexor brevis digitorum pedis, which splits into four tendons, that are perforated by the tendons of the flexor longus digitorum pedis: between these tendons the lumbricales are seen. *d*, Tendon of the flexor pollicis longus: and beneath it, the flexor pollicis brevis. *e*, Transversalis pedis.

Fig. 3. represents the second Layer of Muscles on the Sole of the Foot, after the Abductor Pollicis Pedis, and Abductor Minimi Digiti Pedis, and the Flexor Brevis Digitorum Pedis, have been taken away. *a*, Tendon of the flexor longus digitorum pedis. *bb*, Flexor accessorius, seu massa carnea Jacobi Sylvii. *cccc*, The four lumbricales arising from the tendons of the flexor longus digitorum. *dd*, Tendon of the flexor pollicis longus; which, in its progress, joins the tendon of the flexor longus digitorum pedis. *e*, Tendon of the tibialis anticus. *f*, Tendon of the peronæus longus. *g*, Tendon of the peronæus brevis. *h*, Flexor pollicis brevis, with a portion of the abductor pollicis, on the inside of the great toe: on the outside of *i*, is the adductor pollicis. *k*, Flexor brevis minimi digiti pedis. *l*, A ligament which supports the bones of the tarsus: before *l*, two of the interossei are seen. *m*, Transversalis pedis.

CARTILAGES and LIGAMENTS of the JOINTS, &c.

The condyloid processes of the os occipitis, the glenoid cavities or articular fossulae of the ossa temporum, the eminences next these cavities, and the condyloid processes of the lower jaw, are all covered over with very white and smooth cartilages; and there is likewise an inter-articular or moveable cartilage in each articulation of the lower jaw with the temporal bones. Besides these there are other cartilages of the bones of the head, viz. the cartilaginous septum, and cartilages of the nose, the small cartilaginous pulley in each orbit, the cartilages of the outer ear, and those which are joined to the os hyoides. The ligaments of the bones of the head are, those of the articulation of the lower jaw with the temporal bones; those between the occipital bone and vertebrae of the neck; and those by which the os hyoides is connected to the styloid process.

LIGAMENTS of the LOWER JAW and TEMPORAL BONES.—*Ligamentum capsulare*, are fixed by one extremity round the glenoid or articular fossula and eminence of each

temporal bone; by their middle round the inter-articular cartilage, and by their other extremity round each condyle of the lower jaw, in such a manner as to allow the intermediate cartilage to follow the motions of the condyles, and to change their situation from the glenoid cavities to the tubercles of the zygomatic processes. *Ligamentum laterale maxilla inferioris*, arises from the inner surface of the angle of the lower jaw, and is fixed to the root of the styloid process, and to the posterior margin of the articular cavity of the temporal bone. It assists in keeping the jaw in its proper place.

LIGAMENTS of the OCCIPITAL BONE and VERTEBRÆ of the NECK.—*Ligamenta capsularia*, arise from the edges of the condyloid process of the os occipitis, and are fixed to the edges of the superior oblique processes of the first vertebra. *Ligamentum latum anterius*, arises from the fore-part of the foramen magnum occipitis, and runs down to the anterior arch of the first vertebra of the neck. *Ligamentum latum posterius*, arises from the posterior margin of the foramen magnum occipitis, and is inserted into the upper part of the posterior arch of the first vertebra. *Ligamentum processus odontoidis seu perpendiculare*, arises from the fore-part of the foramen magnum, and runs down to be fixed to the processus dentatus of the second vertebra. It assists in fixing the head to the spine, but is twisted in the rotation. *Ligamenta lateralia*, are two strong ligaments, which run from each side of the processus dentatus to be fixed to the inner side of the first vertebra, and to the edge of the foramen magnum. *Ligamentum cervicale seu nucha*, arises from the spinous process of the os occipitis, and gives origin to part of the trapezius muscle.

The bones of the head, as well as all the other bones of the body, are covered by a particular membrane: but that which covers the cranium is termed *pericranium*, while that surrounding the other bones are called simply *periosteum*. The internal structure of the bones of the head being for the most part cellular, they contain also distinct portions of marrow included in membranous cells lying in the diploë. The synovial glands of the maxillary and occipital articulations have nothing particular to them; they are proportioned to the joints to which they belong, and lie between the capsular ligaments and circumference of the cartilages.

The cartilages of the vertebrae are of two kinds; one proper to each vertebra, the other common to two vertebrae that lie next each other. The first may be termed *cartilages of articulation*; the others, *cartilages of symphysis*. The proper articular cartilages of each vertebra of the spine, are those four which cover the surfaces of the oblique processes. In the first vertebra of the neck, and vertebrae of the loins, these cartilages are thicker than in the rest. The first vertebra of the neck has a cartilaginous covering on the back-part of the anterior arch, corresponding with another on the fore-side of the processus dentatus of the next vertebra; so that each of those two vertebrae has five articular cartilages. The vertebrae of the back, besides the four cartilages of their oblique processes, have others which do not belong to their articulations with each other, viz. those that cover the lateral fossula in the bodies of these vertebrae, and the fossulae of their transverse processes, by both of which they are articulated with the ribs.

The cartilages of symphysis lie between the bodies of the vertebrae, uniting them closely together; their breadth and circumference answering exactly to that of the surfaces to which they are connected; but their height or thickness is different in each class of the vertebrae. The internal structure of these cartilages is different from that of all the other cartilages of the body. When we view their circumferences only, they seem to be one uniform mass, as the others generally are; but, when they are divided by an incision parallel to that surface of the vertebrae to which they are joined, we see they are composed of many cartilaginous concentric lamellae contained within each other. The most external lamellae are fibrous, thickest, and firmest, and separated by considerable intervals: the

internal

internal approach nearer and nearer together, becoming gradually thinner, and of a softer consistence, till at last they are almost of the form of a glairy liquor in the centre. These rings do not form an entire circumference; being turned inwards on the back-part, answering to the fore-part of the passage for the spinal marrow. They lie horizontally between the vertebræ. The interstices of the rings are filled with a mucilaginous substance, less fluid than that of the joints. Each lamina taken separately is very pliable, according to its length; but, taken together, they are not so easily bent, partly because of their circular figure, and partly because of their vicinity and multiplicity. They yield, however, in the inflections of the spine; and their external surface, which in the ordinary situation of the spine is even with the surface of the vertebræ, becomes prominent, or juts out on that side towards which the inflection is made, the cartilages being then compressed by the vertebræ. They likewise yield on all sides, without any inflection of the spine, to the weight of the upper part of the body; but this is done by very small and imperceptible degrees, and especially at the under part of the true vertebræ, and when the body is loaded with an additional weight. They restore themselves afterwards merely by being freed from compression: so that a man is really taller after lying than after he has walked or carried a burden for a length of time; the most natural and simple reason that can be given for the different height of the same person at different times, first observed in England, and afterwards confirmed by Mr. Morand, a member of the Royal Academy of Sciences, being the different state of the intervertebral cartilages. According to Sabatier, &c. the same person is sometimes more than four or five lines, or twelfths of an inch, higher in the morning than he is in the evening.

LIGAMENTS of the VERTEBRÆ.—The vertebræ are strongly connected to each other by different kinds of ligaments; some of which are proper to a certain number of them; others are common to the whole. *Ligamentum transversum vertebræ colli primæ*, arises from the inner side of the first vertebra, and goes across to the other side behind the processus dentatus, which it prevents from wounding the spinal marrow in the rotation of the head. *Ligamentum anticum commune vertebrarum*. One of the most remarkable is a strong ligamentous band, which embraces their convex surface from the upper to the under end of the spine. It begins at the second vertebra of the neck, and passes down as low as the os sacrum, becoming gradually larger and stronger in its descent. *Ligamenta intervertebralia*, are short but strong ligaments, which cross each other obliquely, and are fixed round the edges of the body of each vertebra. These crucial ligaments cover the circumference of the intervertebral cartilages, and adhere closely to them. *Ligamentum posticum commune vertebrarum*, begins at the second vertebra of the neck; and after having sent a considerable process, which passes behind the transverse ligament of the first vertebra, to be fixed to the anterior part of the foramen magnum, it descends on all the other vertebræ, to end at the lower end of the os sacrum. *Ligamenta interspinosa*, are short and firm ligaments, which run from the whole upper edge of the bony bridge and spinous processes of one vertebra, to the corresponding parts of the vertebra next; and thereby joining the different vertebræ together, and dividing the muscles on the right from those on the left side of the spine. *Ligamenta intertransversalia*, are short small ligaments placed between the extremities of all the transverse processes. *Ligamenta capsularia*, are formed of numerous short strong ligamentous fasciculi, arising from and surrounding the oblique processes of all the vertebræ.

STERNUM and RIBS.

The sternum of an adult has commonly sixteen cartilages; fourteen of which are articular, the other two symphyse. Of the articular cartilages, two belong to the articulations of the clavicles; and twelve to those of the

true ribs, from the second to the seventh inclusive. The two symphyse are those between the sternum and the first rib on each side. The cartilago enfiformis is often bony towards the sternum, and more or less cartilaginous at the other end. In very aged persons it has been found entirely ossified, and sometimes wholly cartilaginous even in adults. All the ribs have cartilaginous portions, which differ from each other in length, breadth, incurvation, adhesion, and in their extremities. The cartilages of the false ribs are naturally more slender and pliable than those of the true ribs; the middle or inner substance acquires the consistence of bones in old age; and their extremities sometimes ossify, and are immoveably fixed to the sternum.

LIGAMENTS of the STERNUM, VERTEBRÆ, and RIBS.—*Membrana sterni propria*, is a firm expansion, composed of many tendinous fibres, covering both the external and internal surface of the sternum. On the fore-part of the sternum the external fibres begin at the articulations of the cartilages of the ribs, and run across in a radiated manner to their fellows on the opposite side, while the internal fibres have a longitudinal direction. *Ligamentum cartilaginis enfiformis*, is composed of tendinous fibres similar to the former, arising from the cartilaginous extremity of the seventh rib and corresponding part of the sternum; and which, after descending obliquely, are fixed to the cartilago enfiformis. *Ligamenta capsularia cartilaginum costarum verarum*, arise round the cartilages of the seven true ribs, to be fixed to the articular pits in the sides of the sternum. *Ligamenta costarum ipsarum propria*, are ligaments by which the ribs are joined to each other. *Ligamenta capsularia capitulorum majorum costarum*, are short ligamentous fasciculi which arise round the cartilaginous surface of the head of each rib, and are fixed to the circumference of the small pits in the sides of the bodies of the vertebræ and intervertebral cartilages. *Ligamenta capsularia capitulorum minorum*, arise from the tubercles of the ten uppermost ribs, and are fixed round the articular pit on the point of the transverse processes of the vertebræ of the back. *Ligamenta interna colli costarum*, arise from the upper part of the neck of the ribs, and are fixed to the inferior surface of the transverse processes. *Ligamenta externa colli costarum*, arise from the outer surface of the superior margin of the neck of all the ribs. *Ligamenta duo specialia*, arise by a broad origin from the inferior margin of the last rib, and are fixed to the transverse process of the first and second lumbar vertebræ. The ligamentous expansions of the vertebræ are in place of a periosteum; at least they are blended together both on the inner and outer side of the spine. The sternum and bony portions of the ribs have a periosteum like the other bones. The cartilaginous portions of the ribs are covered by a membrane of the same kind, termed *perichondrium*.

OF THE SUPERIOR EXTREMITIES.

The scapula in many subjects has a small cartilaginous border along its whole basis; which in children is tolerably distinct, but in adults it disappears. The glenoid cavity of this bone is covered with a cartilage, which is thicker towards the circumference than in the middle, and a little raised above the edge of the bone. The small cartilaginous surface of the acromion, is covered with a very thin cartilaginous lamina; but, being transparent, it does not appear very white. The sternal extremity of the clavicle is crufted over with a cartilage which covers its whole triangular surface; besides which it has another moveable inter-articular cartilage, resembling that at the articulation of the lower jaw. The small cartilaginous surface of the scapular extremity of the clavicle, answering to that of the acromion, is a little convex.

LIGAMENTS of the CLAVICLE and SCAPULA.—*Ligamentum interclaviculare*, is a long narrow ligament which goes behind the furca of the sternum, from the internal angle of one clavicle to that of the other. *Ligamenta capsularia antica claviculæ*, are short and strong ligaments arising

ling round the sternal extremity of the clavicle, and from thence passing over the inter-articular cartilage, are inserted round the clavicular cavity of the sternum. *Ligamentum rhomboideum*, arises from the inferior rough surface at the anterior extremity of the clavicle, and, running obliquely, is fixed to the cartilage of the first rib. *Ligamenta capsularia postica*. The articulation of the scapular end of the clavicle with the acromion, is strengthened quite round by thick strong ligaments which go from one bone to the other. *Ligamentum trapezoideum scapulæ*, arises from the internal surface of the coracoid process of the scapula, and ends at the posterior extremity of the clavicle. *Ligamentum conoideum scapulæ*, arises from the root of the coracoid process, and is inserted into the rough protuberance of the posterior extremity of the scapula. *Ligamentum proprium scapulæ anticum*, arises from the external surface of the coracoid process, and is fixed to the posterior margin of the acromion. *Ligamentum proprium scapulæ posticum*, arises from the middle of the superior margin, and terminates at the root of the coracoid process. Under this ligament the vessels and nerves pass to the shoulder.

LIGAMENTS between the SCAPULA and OS HUMERI.—*Ligamentum capsulare humeri*, arises from the whole margin of the glenoid cavity of the scapula, and is fixed round the under end of the neck of the os humeri, loosely inclosing the head of this bone. The upper part of the ligament sends down a sheath between the two tuberosities of the humerus, over the tendon of the long head of the biceps muscle, which it accompanies as far as the fleshy part, and prevents it from sliding out of the groove in which it is placed. The capsular ligament is strengthened by other ligamentous bands, which adhere firmly to its anterior surface.

LIGAMENTS of the JOINT of the ELBOW.—*Ligamentum capsulare*, arises from the lower end of the os humeri, above the edge of the cartilaginous surface, and is fixed to the top of the ulna round the edge of the great sigmoid cavity, including both the apex of the olecranon and that of the coronoid process. It likewise runs over the head of the radius, and is fixed to the coronary ligament quite round. Near the under end of the body of the os humeri, there are two particular intermuscular ligaments, which are long, narrow, and thin. They increase the surface for the origin of muscles, and thereby supply the place of bones. The lower extremity of the os humeri is also joined to the bones of the fore-arm by the two following fasciculi of ligamentous fibres: viz. *Ligamentum brachio-cubitale seu laterale internum*, arises from the fore-part of the internal condyle of the os humeri, and, running down the capsula, is spread out in a radiated manner to be fixed to the inside of the coronoid process of the ulna. *Ligamentum brachio-radiale seu laterale externum*, is disposed much after the same manner; but it is of a greater extent. Through all its passage, it covers the capsular ligament, and is covered by several tendons, adhering closely to both.

LIGAMENTS joining the HEAD of the RADIUS to the ULNA.—*Ligamentum coronarium seu orbiculare*. The head of the radius is joined to that of the ulna, and the following ligament surrounds the head of the radius, reaching from one side of the small lateral sigmoid cavity of the ulna to the other, in an arch which is about three-quarters of a circle. *Ligamentum obliquum*, arises from the tubercle of the ulna, which gives rise to the brachæus internus muscle, and is inserted into the tubercle of the radius.

LIGAMENTS between the BODIES of the RADIUS and ULNA.—*Ligamentum interosseum*, fills up the space between the two bones of the fore-arm. It is fixed by one edge along the sharp angle of the radius, and by the other along that of the ulna. The greater number of the fibres which compose it descend from the radius to the ulna. Some, however, ascend and cross the former obliquely, so as to make it appear as if composed of two planes. Small spaces are left in different parts of it for the passage of blood-vessels; and a large opening is left above, which is occupied by the oblique ligament, &c. The interosseous liga-

ment ties the two bones together, and gives insertion to muscles. In the supination of the hand, it is stretched; and in the pronation, it is relaxed.

LIGAMENTS of the INFERIOR EXTREMITY of the BONES of the FORE ARM.—*Ligamentum capsulare*, arises round the edge of the glenoid cavity of the lower end of the radius and head of the ulna. It is fixed to the cartilaginous edges of the three first bones of the carpus. *Ligamentum capsulare seu falciforme*, arises from the edges of the semilunar cavity, at the under end of the radius, and surrounds the head of the ulna. *Ligamenta duo transversa*. One of these arises from the styloid process at the under end of the radius, and is inserted into the os naviculare. The other arises from the styloid process at the lower end of the ulna, and is fixed to the os cuneiforme and unciniforme.

LIGAMENTS of the CARPUS.—*Ligamenta ossium carpi brevia*, are small short ligaments, running in various directions, and joining the carpal bones; first of the same row, then of the two rows together. *Ligamentum ossium carpi commune capsulare*, arises from the cartilaginous edges of the first row of carpal bones, and is inserted into those of the second row. *Ligamenta articularia*, short firm ligaments, by which the second series of carpal bones are joined to the posterior extremities of metacarpal bones. *Ligamenta interossea metacarpi*, are small ligaments which join the posterior and anterior extremity of the metacarpal bones together.

LIGAMENTS of the BONES of the FINGERS.—*Ligamenta capsularia phalangum digitorum*, arise from the anterior extremities of the metacarpal bones with the posterior extremities of the first phalanx of the fingers. *Ligamenta lateralia phalangum digitorum*, are strong ligaments which lie between the bones of the first phalanx of the fingers. They are fixed at each end to the capsular ligaments. *Ligamentum capsulare pollicis*, arises from the posterior extremity of the first bone of the thumb, and is fixed round the os trapezium of the carpus.

LIGAMENTS of the HAND and FINGERS in situ.—*Ligamentum carpi transversale externum*, arises from the styloid process of the ulna and os pisiforme of the carpus, and ends in the styloid process of the radius. Between this ligament and the bones, the tendons of the extensor muscles of the carpus and fingers pass. *Ligamenta vaginalia*, adhere to the former ligament and bones, and serve as a kind of sheaths to the tendons. *Ligamenta tendinum extensorum transversa*, are short tendinous ligaments, running transversely on the back of the hand, behind the roots of the fingers. *Ligamenta palmaria transversa*, are fixed to the anterior extremities of the metacarpal bones, from which they run transversely. *Ligamenta vaginalia tendinum flexorum*, arise from the internal transverse ligament of the wrist, and terminate with the tendons of the musculus perforans. *Ligamenta vaginalia seu cruciata phalangum*, run in a circular and crucial direction over the former vaginæ and tendons, and are fixed to the ridges on the concave side of the bones of the fingers. *Ligamentum tendinum flexorum accessoria*, are small but firm tendinous substances, which arise from the first and second phalanx of the fingers. All the bones of the superior extremities are covered with their periosteum, and the quantity of marrow corresponds with the shape of the bone. All the joints have likewise synovial substances; but they are small when compared with those in the inferior extremities. The most considerable are placed in the cavities at the under end of the os humeri, for lodging the coronoid process and olecranon of the ulna, in the flexion and extension of the fore-arm.

OF THE PELVIS, AND INFERIOR EXTREMITIES.

The cartilages of the ossa innominata are not so numerous as one might imagine on examining the skeleton. The true cartilages of the ossa innominata are five in number; three common, and two proper. The first and principal common cartilage is that which makes the symphysis of the

the ossa pubis. The two other common cartilages join the ossa ilium to the os sacrum, but are thinner than that of the ossa pubis. The proper cartilages are those that line the acetabula. The circumference of the acetabulum has a border of a particular kind; the substance of which is neither wholly cartilaginous, nor wholly ligamentous; but it may be rather placed among the ligaments. No part of the os femoris is covered with cartilage, excepting the uniform convexity of its head; and here the cartilage runs as far as the union between the head and neck of the bone. The trochanters have no true cartilage; what looks like it being only the remains of tendinous insertions.

LIGAMENTS of the PELVIS.—*Ligamenta ileo-sacra*, are strong ligaments arising from the posterior part of the spine of the os ilium, and, descending obliquely, are fixed to the first, third, and fourth, spurious transverse processes of the os sacrum. *Ligamenta pelvis transversalia superior et inferior*, are two ligaments arising from the posterior spinous process of the os ilium; the superior is fixed to the transverse process of the last vertebra of the loins; the inferior is fixed to the first transverse process of the os sacrum. *Ligamenta sacro-sciatica*, one broad and external, the other small and internal. The external arises from the anterior and external edge of the false transverse processes of the os sacrum. From thence it descends obliquely towards the tuberosity of the os ischium, and is inserted immediately below the sinus, which lies between the tuberosity and spine of that bone. The internal sacro-sciatic ligament adheres closely to the inside of the posterior portion of the former. It arises internally from the edge of the inferior part of the fourth false transverse process, and from the whole side of the os sacrum, and from the basis of the upper part of the os coccygis. By these two ligaments two openings are formed; a large one, with the superior sciatic sinus, through which the pyriform muscle, the posterior crural vessels, and the sciatic nerve, pass out of the pelvis; and a small one, for the passage of the internal obturator muscle. *Ligamentum obturans foraminis ovalis*. The obturator ligament fills up all the foramen thyroideum, except the oblique notch at its upper part for the passage of the obturator vessels and nerves. This ligament not only assists in supporting the parts contained in the pelvis, but also gives origin to the two obturator muscles. *Ligamentum inguinale, seu Poupartii, seu Fallopii*, the inguinal ligament, is chiefly the under end of the tendon of the external oblique muscle of the abdomen. It is fixed by one end to the anterior superior spinous process of the os ilium, and is stretched over to be fixed by its other end to the spine of the os pubis. Under this ligament the femoral vessels and anterior crural nerve go out of the pelvis. *Ligamentum capsulare coccygis*, arises from the upper end of the os coccygis, and is inserted round the under end of the os sacrum. *Ligamenta longitudinalia coccygis*, small ligaments arising from the inner surface of the os coccygis, and terminating in the os sacrum. They fix the two bones firmly together.

LIGAMENTS between the PELVIS and HEAD of the OS FEMORIS.—The capsular ligament is the most considerable, largest, and strongest, of all the articular ligaments of the human body. It arises quite round the outer edge of a thick strong cartilago-ligamentous border, on the brim of the acetabulum, and from thence largely furrounds the whole head and superior portion of the neck of the os femoris, and is closely inserted to the lower portion of the neck that is between its basis and the middle narrow part. *Ligamentum teres seu rotundum*. This ligament is not round, as the name expresses; it resembles a flat cord, being composed of a bundle of fibres closely interwoven; one end of it is in a manner divided into two flat bands, which are fixed to the inner corners of the notch of the acetabulum. From the insertion it runs obliquely backwards and a little upwards, between the synovial gland within the acetabulum and the cartilaginous convexity at the head of the os femoris, and ends in the upper part of the small femular notch.

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LIGAMENTS within the JOINT.—*Ligamenta cruciata*. One of these, called *posterius*, is fixed to the internal superficial impression in the notch between the condyles of the femur; and, running almost straight down, is fixed by its other end to the notch in the head of the tibia. The other, called *anterior*, is fixed by one end to the external impression in the notch of the os femoris; and is fixed by the other end to the head of the tibia. These two ligaments cross each other when we turn the point of the foot inwards, and they separate from each other when the foot is turned outwards. They prevent the leg from being bent forwards on the thigh, and from rolling too much inwards. *Ligamentum alare majus et minus*: are two broad ligaments arising from the inner sides of the capsular ligament, and are fixed to the sides of the patella, and to the fatty substance placed there.

LIGAMENTS at the JOINT of the KNEE.—The internal is fixed to the femur under the tuberosity, the fibres spread out in descending, and terminate at the upper and inner part of the tibia. The external is narrower and shorter. It is fixed above to the external tuberosity of the femur, and descends to embrace the anterior part of the head of the fibula, where it enlarges a little, though its fibres are not radiated like those of the external ligament. *Ligamentum posticum*, has an irregular form. It descends from the posterior, inferior, and external, part, of the outer condyle of the femur; and, having crossed the posterior part of the articulation, it terminates in the posterior, superior, and internal part, of the tibia. The capsular ligament is fixed quite round the inferior extremity of the os femoris, at a small distance above the anterior, lateral, and posterior, parts of the cartilage; internally, it adheres to the femular cartilages, and sends off a very fine vagina over the ligaments within the joint. *Ligamenta cartilaginea*, are two small ligaments which join the femular cartilages to each other, and likewise to the os femoris and tibia. *Ligamentum patellæ*, is a very strong ligament which arises from the point of the patella, and is fixed to the upper and fore part of the tibia.

LIGAMENTS of the FIBULA.—*Ligamentum capsulare extremitatis superioris*, is a very strong ligament, which runs from the head of the fibula to be fixed to the external condyle of the tibia. *Ligamentum interosseum*, fills up the space between the tibia and the fibula. One side of it is fixed to the posterior external angle of the tibia, the other to the internal angle of the fibula. *Ligamentum extremitatis inferioris*, consists of four short strong ligaments, two of which are anterior and two posterior; they arise from the malleolus externus of the fibula, and are inserted into the under and outer part of the tibia.

LIGAMENTS of the INFERIOR EXTREMITY of the LEG.—*Ligamentum fibulæ anticum*, arises from the fore-part of the malleolus externus of the fibula, and is fixed to the upper and outer part of the astragalus. *Ligamentum fibulæ medium*, arises from the point of the malleolus externus, and is fixed to the outside of the os calcis. *Ligamentum fibulæ posticum*, arises from the under and back part of the malleolus externus, and is bent obliquely backwards and fixed to the outer and back part of the astragalus. *Ligamentum tibiæ deltoideum*, arises from the malleolus internus, and is fixed to the astragalus and os naviculare. *Ligamentum capsulare*, arises from the whole edge of the articular cavity of the tibia, and is fixed entirely round the astragalus.

LIGAMENTS of the BASES of the METATARSAL BONES.—*Ligamentum capsulare*, joins the metatarsal bone of the great toe to the os unciniforme internum. *Ligamenta articulatoria*, join the posterior extremities of the metatarsal to the anterior edges of the tarsal bones. On account of their different situations, they have the name of *ligamenta plantaria, pedis dorsalia, lateralia*. *Ligamenta transversa dorso pedis*, are three in number, and are situated on the upper part of the foot, and join the bases of all the metatarsal bones together, excepting that which belongs to the great toe. *Ligamenta transversa plantæ* are likewise three;

but placed in the sole; and lie partly in the interstices of the bones. *Ligamenta interossea metatarsi*, like the former, are also three in number, but run immediately from the side of one bone to that of the bone next it, filling up the interstitial spaces.

LIGAMENTS of the Toes.—*Ligamenta capsularia*, arises from the posterior extremities of the first phalanx of the bones of the toes, and are fixed to the anterior extremities of the metatarsal bones. *Ligamenta lateralia*, lie at the sides of the second and third joint of each of the toes; they arise from the sides of the bases, and are fixed to the sides of the heads of the bones of each of these joints. All these ligaments, in the same manner as in the hand, are covered and strengthened on the dorsum pedis, by an expansion of the tendons of the extensor muscles, and in the sole by the sheaths of the tendons of the flexor muscles.

LIGAMENTS of the Foot and Toes in situ.—*Ligamentum vaginale tibiae*. This strong ligament is part of the tendinous sheath that covers the muscles on the fore-part of the leg; one side of it is fixed to the anterior angle at the lower part of the tibia, the other side is fixed to the outer part of the fibula. *Ligamentum transversum tarfi seu cruciatum*. This is a double ligament; one part arises in the outer part of the foot above the malleolus externus of the fibula, the other from the process of the os calcis. They serve to keep the tendons of the muscles in their places. *Ligamentum tendinum peroneorum*, arises from the fore-part of the os calcis, and is fixed to the outer side of an eminence of this bone. *Ligamentum lacinatum*, arises from the edge of the malleolus internus, and covers the tendons, vessels, and nerves, running in the hollow of the os calcis. *Ligamentum vaginale extensoris pollicis*, surrounds the tendon of this muscle. *Ligamentum vaginale flexoris proprii pollicis*, surrounds the tendon of the flexor longus pollicis in the hollow of the os calcis. *Ligamenta vaginalia tendinum flexorum*, are ligamentous sheaths surrounding the tendons of the flexor muscles of the toes, and are similar to those of the flexors of the fingers. *Ligamenta accessoria tendinum flexorum*, are short, but strong, ligaments, like those on the fingers, arising from the phalanges of the toes. *Ligamentum tendinum extensorum transversa*, are small ligaments running between the tendons of these muscles, and serving to bind them together, and to keep them in their places.

OF THE COMMON INTEGUMENTS.

ALL the parts of the human body are invested by several common and universal coverings, to which anatomists give the name of *integuments*. There have been many disputes about the number of these integuments. The ancients reckoned up five, viz. the *epidermis*, *skin*, *membrana adiposa*, *panniculus carnosus*, and *membrana muscularum communis*. The three first of these coverings are truly common or universal, that is, extended over all parts of the body. The two other coverings are not universal, but confined to particular parts of the body. The moderns divide the integuments into *cuticula*, *rete mucosum cutis vera*, and *corpus adiposum*.

The outside of the skin is covered by a thin transparent insensible pellicle, closely joined to it, which is called *epidermis*, *cuticula*, or *scarf-skin*. The substance of the cuticle appears to be very uniform on the side next the skin, and to be composed on the other side of a great number of very fine small squamous laminae, without any appearance of fibrous or vascular texture, unless we take into account the numerous small vessels by which it is connected to the parts under it. This substance is very solid and compact, but yet capable of being extended and thickened, as we see by steeping it in water, and by the blisters raised on the skin by vesicatories or any other means; and from thence it would seem that it is of a spongy texture. It yields very much in swellings, but not so much as the skin without breaking or cracking. It is not readily destroyed by putrefaction. Hard and reiterated frictions loosen it

insensibly, and presently afterwards a new stratum arises, which thrusts the first outward, and may itself be loosened and thrust outward by other strata.

The cuticle adheres very closely to the cutaneous papillae under it; but it may be separated by boiling, or steeping for a long time in cold water. It is not impossible to separate it with the knife; but this management teaches us nothing of its structure. It adheres still closer to the corpus mucosum, which is easily raised along with it; and they seem to be true portions or continuations of each other. The colour of the cuticle is naturally white; and its apparent colour is owing to that of the corpus mucosum. For, if we examine the European and African, we find the cuticle to be nearly of the same colour in both, whereas their corpus mucosum is very different. The cuticle covers the skin through its whole extent, excepting at the nails. It is marked with the same furrows and lozenges as the skin, and has the same openings and pores, and may be said to cover not only the whole external part of the body, but to line many of the large passages, as the alimentary canal, the lungs, vagina, urethra, &c. In these passages, however, it is somewhat different. The cuticle on the external parts of the body gives passages to the ducts of the sebaceous glands, while that lining the cavities already mentioned is pierced with the ducts of the mucous follicles.

When we examine narrowly the small passages through which the sebaceous matter of the skin passes, the cuticle seems to enter these, in order to complete the secretory tubes. The follicles of the hairs have likewise the same productions of the cuticle, and it seems to give a kind of covering to the hairs themselves. Lastly, the almost imperceptible ducts of the cutaneous pores are lined by it. If the skin be macerated for a long while in water, the cuticle, with its elongations, may be separated from it. By this observation we may explain how blisters may remain for a long time on the skin without giving passage through these holes to the matter which they contain; which holes one would think ought to be increased by this dilatation and tension of the cuticle. But, when the cuticle is separated from the skin, it carries along with it part of these cutaneous fibres; which, being compressed by the matter contained in the blister, shut the pores of the separated cuticle like so many valves; and it is probable, that some of these small portions, being detached, are the substances which have been taken for valves of the cutaneous tubes.

With respect to its origin, some authors have supposed it to be formed by a moisture exhaled from the whole surface of the body, which gradually hardens when it is exposed to the air; but the foetus in utero, where no air is admitted, is a proof against this opinion; and it grows readily under plasters applied to any part of the body. Leuwenhoeck supposed its formation to be owing to the expansion of the extremities of the excretory vessels, which are found every where upon the surface of the true skin. Ruyfch attributed its origin to the nervous papillae of the skin; and Heister thinks it probable that it may be owing both to the papillae and the excretory vessels. Morgagni, on the other hand, contends, that it is nothing more than the surface of the cutis, hardened and rendered insensible by the liquor amnii in the uterus, or by the pressure of the air. In fact, we know little about its origin; but the regeneration of it is very evident, sudden, and surprising; for, let it be destroyed ever so often, it still grows again.

Under the cuticle, we meet with a substance of a greyish colour, which has been thought to represent a net-work; hence it has the name of *corpus reticulare*, or *mucosum*. It is of a soft, mucilaginous, and viscid, nature; and fills up the interstices of the fibres running between the cutis vera and cuticula. After raising the cuticle in a negro, where it is thickest and most distinct, this substance appears of a black colour, and is composed of two layers. It is this that chiefly gives the colour to the skin; for it is black in the African; white, brown, or yellowish, in the European.

The origin of this mucous substance has not hitherto been sufficiently explained; nor has it been fully determined what purposes it serves in the human body. Haller thinks it probable, that it is composed of a humour transuding from the surface of the cutis vera. The reason why it is black in the negro has been supposed to be for serving as a defence against the external heat, by preventing the rays of the sun from penetrating his body; but the matter still lies hid in obscurity.

The *cutis vera*, or *skin* properly so called, is a substance of very large extent, made up of several kinds of fibres, closely connected together, and running in various directions, being composed of the extremities of numerous vessels and nerves. This texture is what we commonly call *leather*; and it makes, as it were, the body of the skin. It is not easily torn; may be elongated in all directions, and afterwards recovers itself, as we see in fat persons, in women with child, and in swellings; and it is thicker and more compact in some places than in others. Its thickness and compactness are not, however, always proportional: for, on the posterior parts of the body it is thicker and more lax than on the fore-parts; and on the palms of the hands, and soles of the feet, it is both very thick and very solid. It is generally more difficult to be pierced by pointed instruments in the belly than in the back. The outer surface of this substance is furnished with small eminences, which anatomists have thought fit to call *papillæ*. They appear through its whole surface like small granulations; and seem to be calculated to receive the impressions of touch, being the most easily observed where the sense of feeling is the most delicate, as in the points of the fingers and palms of the hands; and are supposed by many to be the capillary filaments of the cutaneous nerves, which terminate by small radiated pencils: but they must be allowed to be formed like the other parts of the cutis; only the nervous fibrillæ will be found to be more numerous in them than in other parts. These *papillæ* differ very much in figure and disposition; and they may be distinguished into several kinds. The greatest part of them is flat, of different breadths; and separated by sulci, which form a kind of irregular lozenges. The pyramidal figure ascribed to them is not natural; and appears only when they are contracted by cold, by diseases, by boiling, or by some other artificial preparation, which alters their ordinary structure.

The *papillæ* of the palm of the hand, of the sole of the foot, and of the fingers and toes, are higher than on the other parts of the body; but they are likewise smaller, closely united together, and placed as it were end-wise with respect to each other, in particular rows, which represent on the skin all kinds of lines, straight, crooked, waving, spiral, &c. These several lines are often distinctly visible in those parts of the palm of the hand which are next the first phalanges of the fingers. The red part of the lips is made up of *papillæ*, representing very fine hairs or villi closely united together. There is another particular kind under the nails; the *papillæ* being there more pointed, or in a manner conical, and turned obliquely toward the ends of the fingers. Those which are found in the hairy scalp, scrotum, &c. are still of other kinds.

In inflammations, we observe a reticular texture of capillary vessels, more or less extended on the surface of the skin; and curious anatomists demonstrate the same thing by fine injections, which may be looked upon as artificial inflammations. Something similar to this has been injected lately by Mr. Baynham of London, who thought it *rete mucosum*; and afterwards by Mr. Cruikshank, who calls it *cuticula quarta*. But neither of these methods prove, that, in the natural state, these vessels are blood-vessels; that is, that they contain the red portion of the blood. It is more probable that this vascular texture is only a continuation or production of the very small capillaries of the arteries and veins; which, in the natural state, transmit only the serous part of the blood, while the red part continues its course through wider ramifications, which more

properly retain the name of *blood-vessels*. This vascular texture is of various forms and figures in the different parts of the body. It is not the same in the face as it is elsewhere; neither is it alike on all the parts of the face, as may be discovered by the most ordinary microscopes; and from hence we might perhaps be enabled to give a reason why one part of the body turns red more easily than another. The skin has several considerable openings, some of which have particular names; such as, the fissure of the palpebræ, the nares, the mouth, the external foramen of the ears, the anus, and openings of the parts of generation.

Besides these, it is perforated by an infinite number of small holes, called *pores*, which are of two kinds. Some are more or less perceivable by the naked eye; such as the orifices of the milky ducts of the mammae, the orifices of the excretory canals of the cutaneous glands, and the passage of the hairs. The other pores are imperceptible to the naked eye, but visible through a microscope; and their existence is likewise proved by the cutaneous transpiration, and by the effects of topical applications; and from these two phenomena, they have been divided into arterial and venal pores. We ought likewise to observe the adhesions and folds of the skin. It is every where united to the corpus adiposum; but it adheres to it much more closely in some parts than in others, as in the palm of the hand, sole of the foot, elbow, and knee. Some plicæ or folds in the skin depend on the structure of the membrana adiposa or cellularis, as those in the neck and buttocks: others do not depend on that membrane, such as the rugæ in the forehead, palpebræ, &c. which are formed by cutaneous muscles, and disposed more or less in a contrary direction to these muscles. These folds increase with age. There is, besides, a particular kind of folds in the skin of the elbow, knee, and condyles of the fingers and toes; which are owing neither to the conformation of the membrana adiposa, nor to any muscle. Lastly, there is a kind of plicæ, or rather lines, which cross the palm of the hand, sole of the foot, and corresponding sides of the fingers and toes, in different directions. These serve for employment to fortune-tellers; whose pretended art is contrary to religion, and despised by all men of sense.

In different parts of the body, we meet with small glands or follicles of an oval form, and seated chiefly under the skin in the corpus adiposum. They are composed of convoluted vessels; but in some parts of the body they appear to be formed of small cylindrical tubes, or simple follicles, continued from the ends of the arteries, and discharging, by small excretory ducts, a fat and oily matter, that serves to lubricate and moisten the surface of the skin. When the fluid they secrete has acquired a certain degree of thickness, it approaches to the colour and consistence of suet: and from this appearance they have derived the name of *sebaceous glands*. They are found chiefly on the nose, ears, axillæ, likewise round the nipple, and about the external parts of generation in both sexes. Besides the sebaceous glands, anatomical writers mention other small spherical bodies placed every where over the surface of the body, in much greater abundance than those just mentioned, and named *miliary*. They are said to have excretory ducts that open on the surface of the cuticle, and distil the sweat and matter of insensible perspiration; but, after all that has been said about them, it is certain there are no distinct glands that can be traced by the knife.

It is chiefly and properly the filamentary substance, called the *body of the skin*, which is the universal integument of the body, and the basis of all the other cutaneous parts; each of which has its particular uses. The skin is able to resist external injuries to a certain degree and such impressions, frictions, strokes, &c. to which the human body is often liable, as would hurt, wound, and disorder, the parts of which it is composed, if they were not defended by the skin. The *papillæ* are the organs of feeling, and contribute to an universal evacuation, called *insensible transpiration*. They likewise serve to transmit from without in-

wards,

wards, the subtle particles or impressions of some things applied to the skin. The first of these three uses depends on the extremities of the nerves; the second, on the arterial productions; and the third, on the origin of the absorbent system. The cutaneous glands secrete an oily humour of different consistences. But, without the epidermis, both papillæ and glands would be disturbed in their functions; on which great disorders must ensue. The epidermis serves to keep the pencils or nervous filaments of the papillæ in an even situation, and without confusion; and it likewise moderates the impressions of external objects. Particular as well as general feeling is more or less perfect in proportion to the thinness of the epidermis; callosities in which weaken, and sometimes destroy, both. Another use of the epidermis is, to regulate the cutaneous evacuations already mentioned; the most considerable of which is insensible transpiration.

The last universal integument of the human body, is the *membrana adiposa* or *corpus adiposum*. This is not, however, a single membrane, but a congeries of a great number of membranous laminae, joined irregularly to each other at different distances, so as to form numerous interstices of different capacities, which communicate with each other. These interstices have been named *cellulae*, and the substance they compose the *cellular substance*. The thickness of the cellular substance is not the same all over the body, and depends on the number of laminae of which it consists. It adheres very closely to the skin; runs in between the muscles in general, and between their several fibres in particular; and communicates with the membranes which line the inside of the thorax and abdomen. This structure is demonstrated every day by butchers, in blowing up their meat when newly killed; in doing which, they not only swell the *membrana adiposa*, but the air insinuates itself likewise in the interstices of the muscles, and penetrates even to the viscera, producing a kind of artificial emphysema. These cellular interstices are so many little bags or satchels, filled with an unctuous or oily juice, more or less liquid, which is called fat; the different consistence of which depends not only on that of the oily substance, but on the size, extent, and sub-division, of the cells. It is generally known, that the illustrious Malpighi took a great deal of pains about this substance; that in birds and frogs, the viscera and vessels of which are transparent, he thought he saw a kind of ductus adiposi; and that, by pressing these ducts, he observed oily drops to run distinctly into the small ramifications of the mesenteric veins; such ducts, however, have not been seen by later anatomists.

The manufacture of soap, the composition of some of the ointments, and the different mixtures of oils with saline and acid liquors, give us some idea, at least, of the formation of the fat in the human body; but the organ which separates it from the mass of blood, which ought to be the subject of our present enquiry, is not yet sufficiently known. Fat is more fluid in living than in dead bodies. It melts with the heat of the fingers in handling it; and its fluidity is in part obstructed by the sacculi which contain it. The method to take it entirely out of these bags is, to set the whole over a fire in a proper vessel; for then the bags burst, and swim in clusters in a true oily fluid. This substance increases in quantity by rest and good living; and, on the contrary, diminishes by hard labour and a spare diet. Why nourishment should have this effect, is easily conceived; and it is likewise easy to see, that an idle sedentary life must render the fat less fluid, and consequently more liable to block the passages of insensible transpiration, through which it would otherwise run off. Hard labour dissolves it, and consequently fits it for passing out of the body, with the other matter of insensible transpiration. Some authors are of opinion, that it returns into the mass of blood by the lymphatics; and that it can, for some certain time, supply the want of nourishment. By this, they think, the long abstinence of some animals may be explained; but it would appear, that the

mere decrease of cutaneous transpiration, occasioned by the continual rest and inaction of these animals, has a great share in this effect.

The proportional differences, in the thickness of this *membrana adiposa*, are determined, and may be observed, to be regular in some parts of the body, where either beauty or use require it. Thus we find it in great quantities where the interstices of the muscles would otherwise have left disagreeable hollow or void places; but the skin being filled, and as it were stuffed with fat, is raised, and an agreeable form given to the whole body. In some parts of the body the fat serves for a cushion, pillow, or mattress; as on the buttocks, where the laminae and cells are very numerous. In other parts, this membrane has few or no laminae, and consequently little or no fat; as on the forehead, elbows, &c. In some places it seems to be braced down by a kind of natural contraction in form of a fold; as in that fold which separates the basis of the chin from the neck, and in that which distinguishes the buttocks from the rest of the thigh. We observe it likewise to be entirely sunk, or as it were perforated by a kind of dimple or fossula, as in the navel of fat persons. These depressions and folds are never obliterated, let the person be ever so fat; because they are natural, and depend on the particular conformation of the *membrana adiposa*, the laminae of which are wanting at these places. The fat is likewise of great use to the muscles in preserving the flexibility necessary for their actions, and in preventing or lessening their mutual frictions. Lastly, the fat, as a fine oily substance in its natural state, may be some defence against the cold, which we find makes more impression on lean than on fat persons. It is for this reason, that, to guard themselves against the excessive colds of hard winters, and to prevent chilblains, travellers rub the extremities of their bodies, and especially their feet, with spirituous oils, &c. This mass of fat, which makes an universal integument of the body, is different from that which is found in the abdomen, thorax, canal of the spina dorsa, articulations of the bones, and in the bones themselves. But the difference of all these particular masses of fat consists chiefly in the thickness or fineness of the pellicles, in the largeness or smallness of the cells, and in the consistence, fluidity, and subtilty, of the oily matter.

Some authors think the *nails* are productions of the cutaneous papillæ; and others, that they are a continuation of the epidermis. This last opinion agrees with experiments made by maceration; by means of which the epidermis may be separated entire from the hands and feet, like a glove or sock. In this experiment we see the nails part from the papillæ, and go along with the epidermis, to which they remain united like a kind of appendix; and yet their substance and structure appears to be very different from that of the epidermis: but like it, they are also insensible, and renewable after having been cut, or after having fallen off. Their substance is like that of horn, and they are composed of several planes of longitudinal fibres folded together. These strata begin with a square root intermixed with the periosteum a little before the last joints, and end at the extremity of each finger; they are nearly all of an equal thickness, but of different lengths. The external plane or stratum is the longest, and the rest decrease gradually, the innermost being the shortest; so that the nail increases in thickness from its union with the epidermis where it is thinnest, to the end of the finger where it is thickest. The graduated extremities or roots of all the fibres of which these planes consist, are hollowed for the reception of the same number of very small oblique papillæ, which are continuations of the true skin: which, having reached the root of the nail, forms a semilunar fold in which the root is lodged. After this semilunar fold, the skin is continued on the whole inner surface of the nail, the papillæ insinuating themselves in the manner already said. The fold of the skin is accompanied by the epidermis to the root of the nail exteriorly, to which it adheres very closely. Three parts are generally

generally distinguished in the nail; the root, body, and extremity. The root is white, and in form of a crescent; and the greatest part of it is hid under the semilunar fold already mentioned. The crescent and the fold lie in contrary directions to each other. The body of the nail is naturally arched, transparent, and appears of the colour of the cutaneous papillæ which lie under it. The extremity of the nail does not adhere to any thing, and still continues to grow as often as it is cut. The principal use of the nails is to strengthen the ends of the fingers and toes, and to hinder them from being inverted towards the convex side of the hand or foot, when we handle or press any thing hard. For, in the hand, the strongest and most frequent impressions are made on the side of the palm; and, in the foot, on the sole; and therefore the nails serve rather for buttresses than for shields.

The hairs belong as much to the integuments as the nails. The roots or bulbs lie toward that side of the skin which is next the membrana adiposa. The trunk or beginning of the stem perforates the skin, and the rest of the stem advances beyond the outer surface of the skin, to a certain distance, which is very various in different parts of the body. When the different hairs are examined by a microscope, we find the roots more or less oval, the largest extremity either being turned towards, or fixed in, the corpus adiposum. This oval root is covered by a whitish strong membrane, in some measure elastic; and it is connected either to the skin, to the corpus adiposum, or to both, by a great number of very fine vessels and nervous filaments. Within the root, we observe a kind of glue, some very fine filaments of which advance toward the small extremity, where they unite and form the stem, which passes through this small extremity to the skin. As the stem passes through the root, the outer membrane is elongated in form of a tube, which closely invests the stem, and is entirely united to it. The stem having reached the surface of the skin, pierces the bottom of a small fossula between the papillæ, or sometimes a particular papilla; and there it meets the epidermis, which seems to be inverted round it, and to unite with it entirely. A sort of unctuous matter transudes through the sides of the fossula, which is bestowed on the stem, and accompanies it more or less, as it runs out from the skin.

Hairs are scattered almost over the whole surface of the body, the palms of the hand and soles of the feet excepted. They differ in length, thickness, and solidity, in the different parts of the body. Those on the head, are called in English by the general name of *hairs*; those which are disposed archwise above the eyes, *supercilia* or the *eyebrows*; those on the edges of the palpebræ, *cilia* or the *eye-lashes*; and those which surround the mouth, and cover the chin, the *beard*. In other parts of the body, they have no particular names; and their different lengths, thicknesses, &c. in all these parts, are sufficiently known. Their natural figure seems to be rather cylindrical than angular, which is chiefly accidental. Their colour is probably the same with that of the glue, or medullary matter of the root, the different consistence of which makes the hairs more or less hard, flexible, &c. Their straight or crooked direction must depend on that of the holes through which the stems pass. The hairs grow continually, and are renewed again after being cut, by a protrusion of their medullary substance from the skin outwards under a production of the cuticle. When they are destitute of this medulla in old people, they dry up, split, and fall off. They seem to perspire through their extremities, and possibly through their whole surface; as we may conclude from the constant force of protrusion in their medulla, which in the plica polonica wants a boundary to terminate it.

Besides the integuments which have been already described, the ancients reckoned the panniculus carnosus, and membrana communis musculorum. The panniculus carnosus is found in quadrupeds, but not in men, whose cutaneous muscles are of a very small extent, except that which is called *platysma myoides* in particular; but even

that muscle cannot in any tolerable sense be reckoned a common integument. There is no common membrane of the muscles, which covers the body like an integument; it being no more than particular expansions of the membranes of some muscles, or aponeurotic expansions from others. The elongations from the lamina of the membrana adiposa or cellularis, may likewise have given rise to this mistake, especially in such places where this membrane is closely united to the proper membrane of the muscles.

The sense of *feeling* is to be understood in a two-fold manner. Every change of the nerves, produced by the heat, cold, roughness, smoothness, weight, moisture, or dryness, of external substances applied to any part of the body, is commonly called feeling. In this sense, feeling is ascribed to almost all parts of the human body; to some more, to others less, as in different places of the body the nerves are more numerous and bare, or covered with more tender membranes; and thus even pain, pleasure, hunger, thirst, anguish, itching, and the other sensations, belong to the sense of feeling. In a more peculiar sense, feeling is said to be the change arising in the mind from external bodies applied to the skin, more especially at the ends of the fingers. For, by the fingers, we more accurately distinguish the qualities of tangible substances than by other parts of our body.

The papillæ, regularly disposed in the spiral folds at the ends of the fingers, on the inside of the hand, may, by the attention of the mind, become erect or elevated; and, being in this state gently pressed or rubbed against a tangible substance, they receive an impression from that substance into their nervous fabric, which is thence conveyed, by the trunks of the nerves, to the brain. This is what we call the *touch*, whereby we become sensible chiefly of the roughness of objects. Some persons have this sense so acute as to be able to distinguish colours by touching the surface only. By this sense we perceive heat in those bodies which exceed the heat of our fingers; and weight, when the body presses more than is usual. Humidity we judge of by the presence of water; softness, by a yielding of the object; hardness, from a yielding of the finger; figure, from the limits, or rough circumscribed surface; distance, from a rude calculation or estimate made by experience, to which the length of the arm serves as a measure. The touch serves to correct the mistakes of our other senses; but yet it sometimes errs itself, and then the other senses shew themselves to be true guides to the animal without touch.

The corpus mucosum moderates the action of the object touched, and preserves the softness and sound state of the papillæ. The cuticle excludes the air from withering and destroying the skin; qualifies the impressions of bodies, so that they may be only sufficient to affect the touch, without causing pain. When, therefore, the cuticle is become too thick by use, the sense of feeling is either lost or lessened; and, if it be too thin and soft, the touch becomes painful. The hairs serve to defend the cuticle from abrasion; to preserve and increase the heat; to cover what ought to be concealed; to render more irritable the membranes of those parts, which ought to be defended against the injuries of insects; and perhaps to exhale some useless vapours or oil. The nails serve to guard the organs of feeling, that the papillæ and ends of the fingers may not be bent back by the resistance of tangible objects: at the same time they increase our power of grasping large objects, and assist in handling minute objects. In brute animals, they generally serve as weapons of offence, and might be of the same use to man, if they were not cut off.

One most important office of the skin is, to exhale from the body a large quantity of humours, and to reſorb vapours from the air. The skin is replete with an infinite number of small arteries, either coiled up into papillæ, or passing directly through it, which afford a passage to the exhaling vapour; and, lest this vapour should be collected, as it is in some diseases, between the skin and the cuticle, there are pores in the cuticle corresponding with the exha-

ling arteries of the skin, through which it freely passes. These exhaling vessels or arteries, are easily demonstrated by an injection of water or isinglass into the arteries, which sweat out from all parts of the skin, in an infinite number of small drops; and these substances being transfused under the cuticle, rendered impervious by death, raise it up into a blister. In a living person, this exhalation is many ways demonstrable. A clean looking-glass placed against the warm and naked skin, is quickly obscured by the moist vapour. In subterraneous caverns, where the air is more dense, it is evidently seen to fly off from the whole surface of the body, like a thick cloud.

Whenever the motion of the blood is increased, while at the same time the skin is hot and relaxed, the small cutaneous pores, instead of an invisible vapour, discharge sweat, consisting of minute but visible drops, which run together into larger drops by joining with others of the same kind. The hottest parts are most subject to sweat, as the head, breast, and foldings of the skin. The experiment before-mentioned, of injecting the arteries, the simplicity of nature, and the apparent cutaneous and pulmonary exhalation, sufficiently persuade us, that the perspirable matter and sweat are discharged through one and the same kind of vessels, and that they differ only by the quantity and celerity of the matter. The humour of the sebaceous glands and the subcutaneous oil, which being more plentifully secreted, and diluted with the arterial juice discharged with the sweat, are of an oily and yellow consistence, and chiefly give smell and colour to the sweat. Hence we find the sweat more fetid in the armpits, groins, and other parts, where those glandules are most numerous or abundant. Both blood and small sand have been known to proceed from the skin along with the sweat.

The nature and quantity of the perspirable matter may be investigated by experiments, and by considering its analogy to the pulmonary exhalation. What flies off from the lungs in this exhalation is chiefly water, as appears from experiments, by which the breath, being condensed in large vessels, forms into watery drops. That the perspirable matter is also chiefly water, is demonstrated by its obscuring a glass on which it is received; by obstructed perspiration producing a diuresis or diarrhoea; by the speedy passage of liquors, drunk warm, through the skin if the body be kept warm, or through the kidneys if the body be cold; and by several other phenomena. The water of these vapours is chiefly from what we drink, but is in part supplied from what is inhaled by the skin. The particular smell of the aliments may be sometimes plainly perceived in the perspiration. That there are, besides water, some volatile alkaline particles, is evident, as well from the nature of our blood, as from the considerable mischiefs which follow an obstructed perspiration. This volatile alkaline matter arises from the finer particles of blood, attenuated by perpetual heat and triture, and changed into an acrimonious nature. These afford the scent which is closely followed by dogs, who would not know their masters unless something of a peculiar nature perspired from each person.

The quantity of our perspiring moisture is very large, whether we consider the extent of the organ by which it is separated; the abundance of vapours derived from the lungs only; or barely take a review of the experiments made by Sanctorius. This indetigable man concluded, that five pounds out of eight of the aliment was discharged in a healthy person by the insensible perspiration alone, independent of the visible sweat, and other excretions. In colder climates, the quantity perspired was found to be $\frac{4}{5}$ out of 8. But the cutaneous exhalation is even much larger than this; since it not only throws off a quantity of the aliment, but likewise what is added to the blood by inhalation, which entering, often in a very considerable quantity, is thus again expelled. But different dispositions of the air, and of the human body, cause great variations in these proportions. In warm countries, in the summer

months, and in young persons using much exercise, more goes off from the body by perspiration, and less by the urine; while in cold climates, during the temperate or winter seasons, in aged or inactive persons, more goes off by the urine than by the insensible discharge. In temperate countries, making a computation throughout the whole year, something more is perspired than what passes off by urine; and, joining together all the experiments made in different countries, both excretions are almost alike. The difference of time after feeding also in some measure varies the quantity perspired; but in general it is most copious when the greater part of the digested nourishment is conveyed into the blood, and there attenuated so as to be fit for exhalation. It is naturally diminished in sleep, even in the warmer climates; but it is increased by the heat of bed-clothes.

In general, a plentiful and uniform perspiration, with strength of body, are good signs of health. According to writers on this subject, if the perspiration be increased by the weakness of the body, it is more hurtful than if it were altogether obstructed. It is a sign of health, because it denotes a free pervious disposition of the vessels throughout the whole body, together with a complete digestion of the nourishment, the greater part of which is perfectly attenuated into a vapour. When it is diminished, it indicates either a constriction of the skin, a weakness of the heart, or an imperfect digestion of the aliments. Perhaps in too great a perspiration the nervous spirits themselves are evaporated. This discharge is, by moderate exercise, increased to six times that of an idle person, even to an half or whole pound in an hour. It is likewise increased by the vessels being strong and pervious; by warm, watery, and vinous, drinks; by animal food of an easy digestion; by a heavy, temperate, or moderately-warm, air; and lastly by joy and a tranquil state of mind. The contrary of these either lessen or suppress the perspiration; as a thick skin, a moist air, or a cold and dry one; rest; more frequent bathing than usual; a supervening diarrhoea; and, lastly, a disagreeable nervous affection of the mind. The continuance of life, however, does not depend on a scrupulous exactness in the quantity of this discharge, which is so easily increased or diminished by slight causes. It is shut up by pains in many Indian nations; and it is inconsiderable in many animals without any sensible injury. When suppressed, it is extremely hurtful, producing fevers of the worst kind. The mischiefs arising from its suppression, depend on the putrescent quality of the particles which are retained along with it.

The sweat is evidently of a saline nature; as appears from the taste; from the minute crystallizations on the clothes of people who work in glass-houses; and from distillation, which shews the sweat to be of an alkaline nature. Hence it is, that by this discharge the most malignant matter of many diseases is thrown off from the body. But, in reality, sweat is always a preternatural or morbid discharge, from which a person ought always to be free; unless by violent exercise, or other accidents, his constitution is for a short time thrown into a diseased state. Nor is it unfrequent for sweats to do considerable mischief in acute diseases, by wasting the watery parts, thickening the rest of the blood, and at the same time rendering the salts more acrimonious. By a too violent motion of the blood, the sweat is rendered extremely fetid; and is sometimes even red, or mixed with blood itself; and, being electrified, it is sometimes lucid. The uses of perspiration are, to free the blood from its redundant water, and throw out those particles, which, by repeated circulations, have become alkaline or otherwise acrimonious; and possibly to exhale therewith an extremely volatile oil, prepared from the same blood. Perspiration likewise qualifies and softens the cuticle, which is a necessary medium extended before the tender sensible papillæ.

Besides the exhalent vessels before-mentioned, the skin is full of small vessels, which inhale or absorb thin vapours from the air, either perpetually, or at least when it is not
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very cold; more especially when the air is damp, the body unexercised, the mind oppressed with grief, or both under conditions contrary to those which increase perspiration before-mentioned. These veins, says Haller, are demonstrated by anatomical injections, which, if thin or watery, sweat through them as through the arteries: but, according to later physiologists, absorption is performed solely by the lymphatic vessels. That absorption takes place, is sufficiently proved by the manifest operation of medicines, pervading the air, or applied to the skin; such as the vapours of mercury, turpentine, saffron, waters of baths, mercurial plasters, tobacco, coloquintida, opium, cantharides, arsenic, with the fatal effects of contagious or other poisons entering through the skin; as in the venereal infection. Another proof of absorption by the skin is, that animals live in hot moist climates without drink, and yet discharge a considerable quantity of humours both by perspiration and urine. Lastly, absorption has been proved in some diseases where a much greater quantity of urine has been discharged than the quantity of drink taken in. It is difficult to ascertain the quantity of this inhaled matter in animals; in plants it appears, from well-authenticated experiments, to be very considerable, especially during the night. These cutaneous vessels, both exhaling and inhaling, are capable of contraction and relaxation by the power of the nerves. The truth of this appears from the effects of the passions of the mind; which, if joyful, increase the circulation, and relax the exhaling vessels, so as to yield easier to the impulse of the blood; from whence, with a shortening of the nerves, there follows a redness, moisture, and turgescence, of the skin. Those passions, on the contrary, which are sorrowful, and retard the circulation, contract the exhaling vessels; as appears from the dryness and corrugation of the skin, like a *goose-skin*, after-frights; and from a diarrhoea being caused by fear. And the same affections seem to open and increase the power of the inhaling vessels, whence the venereal or pestilential contagions are easily contracted by fear.

Of the DIFFERENT VISCERA and ORGANS.

Of the HEAD.

THE *head* is generally considered as one of the three principal cavities of the human body. On its outside are situated the seats and bases of several very complex particular organs; whereas on the inside it contains only one, namely the *brain*, which is indeed the primum mobile of the whole animal economy. The mechanism of this organ is very little known; and the structure of its different parts, even of those with which we are supposed to be most acquainted, is very difficult to be demonstrated.

The *brain* is that mass which fills the cavity of the cranium, and which is immediately surrounded by two membranes, called *meninges* by the Greeks, and *matres* by other ancients, because they were commonly of opinion, that these membranes were the origin, and, as it were, the mother, of all the other membranes of the body. This general mass is divided into three particular portions; the cerebrum or *brain* properly so called, the cerebellum, and medulla oblongata. To these three parts contained within the cranium, a fourth is added, which fills the great canal of the *spina dorsalis*, and is known by the name of *medulla spinalis*, being a continuation of the medulla oblongata. The meninges, or membranes, are two in number; one of which is very strong, and lies contiguous to the cranium; the other is very thin, and immediately touches the brain. The first is named *dura mater*, the second *pia mater*. This last is again divided into two; the external lamina being termed *arachnoides*, the internal retaining the common name of *pia mater*.

The *dura mater* incloses the brain and all its appendages. It lines the inside of the cranium, and supplies the place of an internal periosteum, being spread in holes and depressions, and covering all the eminences in such a manner, as to prevent their being hurtful to the brain. It sends off several processes; three of which form particular

septa, that divide the brain into certain parts. One of them is superior, representing a kind of mediastinum between the two great lobes of the brain. The second is in a middle situation like a diaphragm, between the cerebrum and cerebellum. The third is inferior between the lobes of the cerebellum. The superior septum is longitudinal, in form of a scythe, whence it is termed the *fals of the dura mater*; and it may likewise be called *septum sagittale*, *verticale*, or *mediastinum cerebri*. The middle septum is transverse, and might be called the *floor of the cerebrum*, the *diaphragm of the brain*, *tentorium cerebelli*. The inferior septum is very small, and runs down between the lobes of the cerebellum; on which account it may be termed either simply *septum cerebelli*, or *septum occipitale minus*, the middle partition being looked upon as the *septum occipitale majus*. The *dura mater* contains in its duplicature several particular canals, into which the venous blood, not only of that membrane, but of the whole brain, is carried. These canals are termed *sinuses*; and some of them are disposed in pairs, others in uneven numbers; that is, some of them are placed alone in a middle situation; others are disposed laterally on each side of the brain. All these sinuses communicate with each other, and with the great lateral sinuses, by which they discharge themselves into the internal jugular veins, which are only continuations of these lateral sinuses. They likewise unload themselves, partly into the vertebral veins, which communicate with the small lateral or inferior occipital sinuses; and partly into the external jugular veins, by the orbital sinuses, which communicate with the *venae angulares*, *frontales*, *nasales*, *maxillares*, &c. as the lateral sinuses likewise communicate with the *venae occipitales*, &c. Thus the blood, which is carried to the *dura mater*, &c. by the external and internal carotid, and by the vertebral arteries, is returned to the heart by the external and internal jugular and vertebral veins; so that the blood, if obstructed in one place, finds, in consequence of these communications, a passage at another, though perhaps not with the same ease. This observation is of consequence, in relation not only to obstructions, but to the different situations of the head.

It has been thought, that the arteries of the *dura mater* discharged themselves immediately into the sinuses; because injections made by the arteries, or a hog's bristle thrust into them, have been found to pass into these sinuses. But, on a more close examination, it has been discovered, that the injections passed from the arteries into the veins, and from thence into the sinuses; and that the hog's bristle pierced the sides of the artery, which are very thin near the sinuses. This mistake gave rise to another, namely, that the *dura mater* had no veins; and what confirmed it was, that the arteries of the *dura mater* cover the veins so entirely, that the edges of the veins are hardly perceivable on either side of the arteries. There are, however, some places where the veins, being broader than the arteries, their two edges are seen on each side of the arteries like capillary vessels. These veins are, for the most part, branches of these sinuses, and the small trunks of some of them open into the head of the *vena jugularis interna*. The prominent fibres which appear intersecting each other in different manners on the inside of the *dura mater*, especially near the *fals* and transverse septum, and which have been taken for a kind of fleshy fibres, seem to be only ligamentary and elastic. The universal adhesion of this membrane to the cranium, proves that it can have no particular motion, and consequently, that such fleshy or muscular fibres would be altogether useless. This adhesion was plainly demonstrated by Vesalius, Riolan, &c. long before Roonhuyzen.

The *pia mater* is a much softer and finer membrane than the former, being exceedingly delicate, transparent, and vascular; and is connected to the *dura mater* only by the veins which open into the sinuses. It is composed of two laminae, of which the external one is named *tunica arachnoides*, from its resemblance to a cobweb. They adhere closely to each other at the upper part of the brain; but

are easily separable at the basis, and through the whole length of the spinal marrow.

The *cerebrum* is a kind of medullary mass, of a moderate consistence, and of a greyish colour on the outer surface, filling all the superior portion of the cavity of the cranium, or that portion which lies above the transverse septum. The upper part of the cerebrum is of an oval figure, like half an egg cut lengthwise, or rather like two quarters of an egg cut lengthwise, and parted a little from each other. It is flatter on the lower part, each lateral half of which is divided into three eminences, which correspond with the cavities at the base of the cranium. The cerebrum is divided into two lateral portions, separated by the falx, or great longitudinal septum, of the dura mater. They are generally termed *hemispheres*, but they are more like quarters of an oblong spheroid. Each of these portions is divided into two extremities, one anterior and one posterior, which are termed the *lobes of the cerebrum*, between which there is a large inferior protuberance which goes by the same name; so that in each hemisphere there are three lobes, one anterior, one middle, and one posterior. The substance of the cerebrum is of two kinds, distinguished by two different colours; one part of it being of a greyish or ash colour; the other, which is somewhat firmer than the former, is remarkably white, but redder in the fœtus. The ash-coloured substance lies chiefly on the outer part of the cerebrum like a kind of cortex, from whence it has been named *substantia corticalis*, or *cineæ*. The white substance occupies the inner part, and is named *substantia medullaris*, or simply *substantia alba*. This abounds in greater quantity than the other, and in many places is perforated with red arteries. If we separate gently the two lateral parts or hemispheres of the cerebrum, we see a longitudinal portion of a white convex body, which is named *corpus callosum*. The surface of it is covered by the pia mater, which runs in between the lateral portions of this body and the lower edge of each hemisphere. Along the middle of its surface, from one end to the other, a kind of raphe is formed, by a particular intertexture of fibres crossing each other. This raphe is made more perceivable by two small medullary cords, which accompany it on each side, and adhere closely to the transverse fibres. The corpus callosum becomes afterwards continuous on each side with the medullary substance; which, through all the remaining parts of its extent, is entirely united with the cortical substance, and, together with the corpus callosum, forms a medullary arch or vault of an oblong or oval figure. Under this arch are two lateral cavities, separated by a transparent medullary septum. These cavities are generally named the *anterior superior ventricles of the cerebrum*, to distinguish them from two other smaller cavities which are situated more backward; but the name of *lateral or great ventricles*, given them by Steno, is more proper than either of the other two. The transparent partition, or *septum lucidum*, as it is commonly called, lies directly under the raphe or suture of the corpus callosum, of which it is a continuation and a kind of duplicature. It is united, by its lower part, to the anterior portion of that particular medullary body, improperly called the *fornix*, with three pillars, because of some resemblance it is thought to bear to the arches of ancient vaults. It is, in reality, nothing but the corpus callosum; the lower side of which is like a hollow ceiling with three angles, one anterior, and two posterior; and three edges, two lateral, and one posterior. The lateral edges are each terminated by a large semicylindrical border, like two arches, which, uniting at the anterior angle, form by their union what is called the *anterior pillar of the fornix*; and, as they run backward separately toward the two posterior angles, they have then the name of the *posterior pillars*. The anterior pillar being double, is larger than either of the posterior; and the marks of this duplicity always remain. Immediately below the basis of this pillar, we observe a large, white, short, medullary, rope, stretched transversely between the

two hemispheres, and commonly called the *anterior commissure of the cerebrum*. The posterior pillars are bent downward; and at their outsides they have each a small, thin, flat, collateral, border, to which the name of *corpora fimbriata* is applied. The posterior pillars also unite with two medullary protuberances, called *pedes hippocampi*. The inferior surface of the triangular ceiling, which lies between these arches, is full of transverse prominent medullary lines; for which reason the ancients called it *psaloides* and *lyra*, comparing it to a stringed instrument, something like what is now called a dulcimer. Under the fornix, and immediately behind its anterior crura, there is a hole of considerable size, by which the two lateral ventricles communicate; and another passage leads down from this, under the different appellations of *foramen commune arterius*, *vulva*, *iter ad infundibulum*, but more properly *iter ad tertium ventriculum*. The fornix being cut off and inverted, we see first of all a vascular web, called *plexus chorooides*, and several eminences more or less covered by the expansion of that plexus. There are four pairs of eminences which follow each other very regularly, two large and two small. The first two great eminences are named *corpora striata*; and the second, *thalami nervorum optico-rum*. The four small eminences are closely united together, the anterior being called *nates*, and the posterior *testes*; but it would be better to call them simply *anterior* and *posterior tubercles*. Immediately before these tubercles there is a single eminence, called *glandula pinealis*. Immediately under the union or beginning of the thalami nervorum optico-rum, lies a particular cavity called the *third ventricle* of the cerebrum. It opens backwards into the passage called *iter ad quartum ventriculum*. Between the basis of the anterior pillar of the fornix, and the anterior part of the union of the optic thalami, lies a small medullary canal, named *infundibulum*. It runs down towards the basis of the cerebrum, gradually contracting, and terminates by a small membranous and straight canal, in a softish body situated in the sella turcica, named *glandula pituitaria*. This pituitary gland is a small spongy body lodged in the sella turcica, between the sphenoidal folds of the dura mater. It is a singular kind of substance, and seems to be neither medullary nor glandular. On the outside it is partly greyish and partly reddish, but white within. The tubercles are four in number, two anterior and two posterior. They are transversely oblong, the anterior being a little more rounded, and broader or larger from before backward, than the posterior; their surface is white, and their inner substance greyish. The names of *nates* and *testes*, given by the ancients to these tubercles, are not very proper, there being little resemblance between them and the things from which the names are taken. Some of the moderns, with perhaps still less propriety, have called them *tubercula quadrigemina*. Directly under the place where the tubercles of one side are united to the tubercles of the other side, lies the *iter ad quartum ventriculum*, which communicates, by its anterior opening, with the third ventricle, under the thalami nervorum optico-rum, and, by its posterior opening, with the fourth ventricle, which belongs to the cerebellum. Where the convex parts of the two anterior tubercles join these posterior convex parts of the thalami nervorum optico-rum, an interstice or opening is left between these four convexities; but it does not communicate with the third ventricle, for the bottom of it is shut up by the pia mater. The name of *anus* is applied to it. The *glandula pinealis* is a small soft greyish body, about the size of an ordinary pea, irregularly round, and sometimes of the figure of a pine-apple, situated behind the thalami nervorum optico-rum above the tubercula quadrigemina. It is fixed like a small button to the lower part of the thalami, by two very white medullary pedunculi, which, at the gland, are very near each other, but separate almost transversely toward the thalami. It seems to be mostly of a cortical substance, except near the footstalks, where it is somewhat medullary. This gland

gland has been often found to contain gravel. Below the glandula pinealis there is a medullary transverse cord, called the *posterior commissure of the hemispheres of the cerebrum*.

The *cerebellum* is contained under the transverse septum of the dura mater, in the under and back part of the cranium. It consists, like the cerebrum, of two substances. It has no circumsolutions on its surface; but, instead of them, numerous sulci, which are deep, and disposed in such a manner as to form thin flat strata, more or less horizontal, between which the internal lamina of the pia mater infinuates itself by a number of septa equal to that of the strata. Under the transverse septum, it is covered by a vascular texture, which communicates with the plexus choroides. It has two middle eminences, called *appendices vermiformes*, from their resemblance to the rings of an earth-worm. Besides the division of the cerebellum into lateral portions, or into two lobes, each of these lobes seems to be likewise sub-divided into three protuberances; one anterior, one middle or lateral, and one posterior. When we separate the two lateral lobes, we discover the posterior portion of the medulla oblongata; and, in the posterior surface of this portion, from the tubercula quadrigenina, we observe an oblong cavity, which is called the *fourth ventricle*; this terminates backward, like the point of a writing pen. Hence the under end of it is called *calamus scriptorius*. At the beginning of this cavity we meet with a thin medullary lamina, which constitutes a valve between that canal and the fourth ventricle. It is lined by a thin membrane, and seems often to be distinguished into two lateral parts, by a kind of small groove, from the valvular lamina to the point of the calamus scriptorius. This membrane is a continuation of that part of the pia mater which lines the small canal, the third ventricle, infundibulum, and the two great ventricles. To be able to see the fourth ventricle in its natural state, in which it is narrowest, it must be laid open while the cerebellum remains in the cranium. On each side of this ventricle, the medullary substance forms a trunk which expands itself in form of laminae through the cortical strata. But here we find the medullary bearing a less proportion to the cortical than it does in the cerebrum. We discover these medullary laminae according to their breadth, by cutting the cerebellum in slices almost parallel to the basis of the cerebrum; but, if we cut one lobe of the cerebellum vertically, the medullary substance will appear to be dispersed in ramifications through the cortical substance. These ramifications have been named *arbor vitæ*; and the two trunks, from whence these different laminae arise, are called *pedunculi cerebelli*.

The *medulla oblongata* is a medullary substance, situated in the middle part of the bases of the cerebrum and cerebellum, without any discontinuation, between the lateral parts of both these bases; and is justly esteemed to be a third general part of the whole mass of the brain, or as the common production, or united elongation, of the whole medullary substance of the cerebrum and cerebellum. The lower side of the medulla oblongata, in an inverted situation, presents to our view several parts, which are in general either medullary productions, trunks of nerves, or trunks of blood-vessels. The chief medullary productions are these; the large or anterior branches of the medulla oblongata, which have likewise been named *crura anteriora*, *femora*, and *brachia medullæ oblongatæ*, and *pedunculi cerebri*. The transverse protuberance, called likewise *processus annularis* or *pons Varolii*. The small or posterior branches, called *pedunculi cerebelli*, or *crura posteriora medullæ oblongatæ*. The extremity or cauda of the medulla oblongata, with two pairs of tubercles; one of which is named *corpora olivaria*, the other *corpora pyramidalia*; and to all these productions we must add a production of the infundibulum and two medullary papillæ. The great branches of the medulla oblongata are two very considerable medullary fasciculi. These fasciculi are flat, much broader before than behind; their surfaces being composed of several longitudinal and distinctly prominent medullary fibres.

Their anterior extremities seem to be lost at the lower part of the corpora striata; and, it is for that reason, that they are esteemed the pedunculi of the cerebrum. The transverse annular protuberance is a medullary production, which seems at first sight to surround the posterior extremities of the great branches; but the medullary substance of the protuberance is in reality intimately mixed with that of the two former. Variolus, an ancient Italian author, viewing these parts in an inverted situation, compared the two branches to two rivers, and the protuberance to a bridge over them both; and from thence it has the name of *pons Varolii*. When we cut into the substance of the pons, we find much cortical substance within it, and this formed into striæ, which run in various directions. The small branches of the medulla oblongata are lateral productions of the transverse protuberance, which by their roots seem to encompass that medullary portion in which the fourth ventricle or calamus scriptorius is formed. They form in the lobes of the cerebellum, on each side, those medullary expansions, a vertical section of which shews the white ramifications commonly called *arbor vitæ*; and they may be justly styled *pedunculi cerebelli*. The extremity is no more than the medulla oblongata contracted in its passage backward to the anterior edge of the foramen magnum of the os occipitis, where it terminates in the medulla spinalis; and, in this part of it, several things are to be taken notice of. We see, first of all, four eminences, two named *corpora olivaria*, and the other two *corpora pyramidalia*. Immediately afterwards, it is divided into two lateral portions by two narrow grooves, one on the upper side, the other on the lower. They both run into the substance of the medulla, as between two cylinders, flattened on that side by which they are joined together. When we separate these ridges with the fingers, we observe a crucial intertexture of several small medullary cords, which go obliquely from the substance of one lateral portion into the substance of the other. M. Petit, member of the Royal Academy of Sciences, and doctor of physic, is the author of this discovery, by which we are enabled to explain several phenomena, both in physiology and pathology. The corpora olivaria and pyramidalia are whitish eminences, situated longitudinally near each other, on the lower side of the extremity or cauda, immediately behind the transverse or annular protuberances. The corpora pyramidalia are in the middle; so that the interspace between them, which is only a kind of superficial groove, answers to the inferior groove of the following portion. The corpora olivaria are two lateral eminences situated at the outside of the former, and are thus termed by Willis, Duverney, Haller, &c. but Winslow reverses the names. These four eminences are situated on the lower half of the medulla; which observation we here repeat, to make it be remembered, that, in all the figures and demonstrations, these parts are represented as superior, which, in their natural situation, are inferior. Thus these eminences are under the fourth ventricle, and under the pedunculi cerebelli. The tubercula mammillaria, which are situated very near the production of the infundibulum, have been taken for glands; probably because of their greyish inner substance, which, however, does not seem to be different from that of several other eminences of the medulla oblongata. And, for that reason, we choose rather to call them, from their figure, *tubercula mammillaria*, than *papillæ medullares*. These tubercles seem to have some immediate relation to the roots or bases of the anterior pillar of the fornix; so that we might call them, as M. Santorini has done, *the bulbs of these roots*, though they appear to be likewise a part of a continuation of other portions of the cortical and medullary substance, of a particular texture. The beak or tube of the infundibulum is a very thin production from the sides of that cavity; and it is strengthened by a particular coat given to it by the pia mater. It is bent a little from behind forward, toward the glandula pituitaria, and afterwards expands again round this gland. The membrana arachnoides, or external lamina of the pia mater, appears

to be very distinctly separated from the internal lamina, in the interstices between all these eminences on the lower side of the medulla oblongata. From this common portion of the cerebrum and cerebellum, arise almost all the nerves which go out of the cranium, through the different foramina perforating its base. It likewise produces the medulla spinalis; and may justly be said to be the first origin or primitive source of all the nerves which go out through the spina dors, and consequently of all the nerves of the human body.

The *medulla spinalis* is only an elongation of the extremity of the medulla oblongata; and it has its name from its being contained in the bony canal of the spina dors. It is consequently a continuation or common appendix of the cerebrum and cerebellum, as well because of the two substances of which it is composed, as because of the membranes by which it is invested. The spinal marrow consists of a cortical and medullary substance, as the cerebrum and cerebellum; but with this difference, that the ash-coloured substance lies within the other; and, in a transverse section of this medulla, the inner substance appears to be of the form of a horse-shoe, the convex side being turned forward and the extremities backward. The body of the medulla spinalis runs down to the bottom of the first vertebra of the loins, where it terminates in a point. The size of it is proportionable to that of the bony canal, so that it is larger in the vertebræ of the neck than in those of the back.

From a general view of the nerves and blood-vessels belonging to the brain, it appears that a very great quantity of blood, derived from trunks that are near the heart, is, at every pulsation, sent to this organ: Dr. Haller says a sixth part, Dr. Monro, a tenth part of the whole circulating mass. Hence it is probable, that the strongest parts of the blood, and such as are most retentive of motion, go to the head. Is not this evident from the effects of mercurials exerting themselves almost in the head only? from the sudden force and action of inebriating spirits upon the head? from the short stupor which camphor excites? from the heat, redness, and sweat, which happen oftener in the face than other parts of the body? to which add, the more easy eruption of volatile and contagious pustules in the face? Dr. Wrisberg, however, observes, that all these arguments are not of the same force; for mercury, applied in different ways to the body, produces its effects not in the head alone; since it occasions in some patients a diaphoresis, in others a diarrhœa, and in others it acts as a diuretic.

The *veins* of the brain are not disposed in the same manner with those in other parts of the body. For they have no valves, nor do they run together in company with the arteries, nor have their trunks the structure which is commonly observed in the other veins. The great quantity of blood which goes to the brain, the greater impulse with which it is sent into the carotid arteries, the security of this part from every kind of pressure by a strong bony fence, the slower motion of the blood through the abdominal viscera and lower extremities, and the perpetual exercise of the brain and senses, all determine a copious flux of blood to these parts; some other causes also serve to fill the head largely with blood. Hence it is that a redness of the face, a turgescence, a sparkling of the eyes, with a pain of the head, a pulsation or throbbing of the arteries, and a bleeding at the nose, are produced by violent exercises or motions of the body. Hence, therefore, it is evident, that if the veins were of a thin structure, and round shape, in the brain, they would unavoidably be in greater danger in rupturing, (to which, even in their present state, they are often liable,) and consequently apoplexies would be much more frequent. To avoid this inconvenience, therefore, nature has given a different figure to the veins carrying the blood from the brain, by which they are more easily and largely dilatable, because they make an unequal resistance: their texture is likewise very firm, and more difficultly ruptured, especially in the larger

sinuses, which perform the office of trunks; but, as to the sinuses of the lesser sort, they are either round, half cylindrical, or of an irregular figure. Besides this, nature has guarded the sinuses by cross beams, or fræna, internally, made of strong membranes, and detached from the right to the left side of the bottom of the sinus, which, in greater distensions, they draw towards a more acute angle, strengthening and guarding it from a rupture. She has likewise furnished these veins with numerous anastomoses, by which they communicate with one another, with the external veins of the head, and with those of the spinal marrow; and by this contrivance, they are capable of evacuating themselves more easily whenever they are overcharged with blood.

Some writers have doubted, Whether a part of the arterial blood is not poured into the sinuses of the brain; and whether the sinuses have not a pulsation excited from that blood? That they have no pulsation, Dr. Haller says, is past a doubt; because the dura mater every where adheres firmly to the skull, but much more firmly in those parts which are the seats of the sinuses. But Dr. Monro observes, that whilst the heart is performing its systole, the arteries here, as elsewhere, may be dilating; and, in the mean time, a quantity of blood, equal to that which is dilating them, is passing out of the head by the veins. Indeed the sinuses receive liquors injected by the arteries; but whether they transude through the small exhaling arterial vessels, or whether they first make a complete circle through the veins, as indeed is much more probable, we are not yet furnished with experiments enough to determine. The veins form innumerable anastomoses with one another, that the blood may return with the greatest ease from the head, the repletion of which is very dangerous. The brain is also more easily evacuated in the time of inspiration, for it then subsides, as we see when the skull is opened, but swells during the time of expiration. Hence, blowing the nose, sneezing, and coughing, are dangerous to those whose brain is swelled by retained blood.

Whether lymphatic vessels are to be seen in the brain, is questioned by some writers. Dr. Haller thought it probable that no lymphatic vessels are in the brain, because no conglobate glands are found there; and that the superfluous moisture is absorbed by the red veins. But, according to most of the present physiologists, lymphatic vessels take up the superfluous fluids of the brain, as well as of the other parts of the body, although they cannot be distinctly shewn. "Scarcely in any viscus," says Dr. Wrisberg, "has the existence of lymphatic vessels been oftener asserted, and again denied, than in the brain. Although, indeed, I am fully certain, that a group of lymphatic glands is no where found without lymphatic vessels, I could not, however, assert that, where glands do not appear, lymphatic vessels are wanting. By analogy drawn from the whole body, and all the viscera, I am led to think that the brain is not destitute of its aqueous vessels, and that they run in particular upon the surface, not in the middle of its substance, although I myself have never seen any other than those going on the choroid plexus towards the sensorium, and on the inner surface of the dura mater, in the course of the superior longitudinal sinus. The industrious and celebrated Sommering confirms the observations of King, Collins, and Pacchioni, who saw lymphatics upon the pia mater. I would ask, May they be joined with the glands of Pacchioni? May these corpuscles supply the place of lymphatic glands?"

It now remains for us to speak of the encephalon itself. Upon the surface of the brain lies the cortex, the fabric of which has been a long time controverted; but it is now sufficiently evident, from anatomical injections, that the greater part of it consists of mere vessels, which are every way inserted from the small branches of the pia mater, detached like little roots into the cortical substance. These vessels, in their natural state, convey a juice much thinner than blood; although, in some diseases, and by strangling, they often, especially in brutes and birds, receive even the red

red parts of the blood. The remaining part of the cortex, which is not filled by any injection, is probably either an assemblage of veins, or of yet more tender vessels; for no dissimilar parts are apparent in the cortex, whilst it is in an entire or natural state; and hence we are not permitted to conclude that part of it is tubular, and part solid. As to glandules making the fabric of the brain, that notion has been discarded by universal consent, as not being founded on the least probability.

The nerves of the brain, as well as of the spinal marrow, divide into branches like the blood-vessels, but in acute angles, and often in a course manifestly retrograde, they generally, but not always, gradually become softer, and less bulky, as they recede from the brain, till at length their ultimate extremities, which are seldom visible, seem to terminate in a pulp, by depositing the firm integuments with which they were covered, as we observe in the optic nerve. The recti-linear course of the fibres, continued from the brain itself, is never broken off by the division or splitting of a nerve into smaller threads; but the fibres themselves recede from each other by an opening of the cellular substance that tied them together. This appears from the disorders which are determined not to all, but only to some single parts of the body, by injuries of the brain; as a loss of the voice, deafness, dumbness, and palsies of particular muscles. The nerves are connected in their course by the cellular substance to the adjacent parts, but have hardly any elasticity; whence they do not fly back after being cut, but only expel, by the contraction of their integuments, the soft medulla which they include. Though they be ever so much irritated, they are neither contracted, nor rendered shorter during the muscular motion which they produce. A great many nerves, says Haller, are sent into the muscles; many of them go to the skin; fewer to the viscera, and very few to the lungs. Wrisberg, however, observes, that more nerves manifestly enter the organs of sense than the muscles; and that the lungs are supplied with more nerves than the spleen, uterus, and other viscera. Haller also asserts, that no nerves go to the dura and pia mater, arachnoides, tendons, capsules, and ligaments. That these parts have few nerves is certain; but that nerves can be traced into some of them, especially into ligaments, cannot now be denied.

Thus much we are taught by anatomy concerning the brain and nerves; it now remains that we explain the physiological uses of these parts. Every nerve that is irritated by any cause produces a sharp sense of pain. To feel or perceive is to have the mind changed or affected by a change or affection of the body. It is the medullary part of the nerve that feels. If the nerve was endowed with any peculiar sense, that sense perishes when the nerve is compressed or cut through; the senses of the whole body are lost by a compression of the brain, and a pressure of the spinal marrow deprives only those parts which are below it of sensation. If a pressure be made on the brain where particular nerves arise, then only those senses depending on these nerves are lost. Those parts of the body that are furnished with nerves, are the only parts endued with sensation, which is greater in proportion to the quantity of nerves sent to the parts, of which we have examples in the eye and the penis; those have less sensibility which receive few nerves, as the viscera; and those which have fewest nerves, as the dura mater, tendons, ligaments, secundines, bones, and cartilages, have little or no sensation in the sound state. It is therefore evident, that all sensation arises from the impression of an active substance on some nerve of the human body; and that the same is then represented to the mind by means of that nerve's connection with the brain. It seems to be false, that the mind perceives immediately by means of the sensoria and branches of the nerves. For this opinion is refuted by the pains felt after amputation, by the cessation of all pain when the nerve is compressed, and by defects or faults of the senses in consequence of diseases of the brain. And that the effect of the senses is preserved in the brain, is

evident from the loss of memory which follows an injury or compression of the brain; and also from the delirium which happens in some diseases, and the stupor and sleepiness which happen in others.

Another office of the nerves is to excite motions, even the most violent, in the muscles. When a nerve is irritated, every muscle to which it goes is immediately convulsed; or, if it sends branches to several muscles, they are all convulsed at the same time. This happens both during the life of the animal, and a little after its death, while all the parts remain moist. By a great irritation other muscles, besides those to which it sends branches, are thrown into convulsions, and afterwards the whole body. Nor is it necessary that the nerve should be whole; for even when it is cut, an irritation of it will excite similar motions in the muscles. On the other hand, when a nerve is compressed or tied, a palsy follows; that is, the muscles which have their nerves from it lie unmoved, when they are commanded by the will to act; but they recover their motion when the compression is removed, provided the nerve has received no hurt.

But the medulla of the brain being vellicated, or irritated deeply in its crura, dreadful convulsions ensue throughout the whole body; and this effect is universally produced, what part of the brain soever be irritated; whether it be the brain itself, the cerebellum, or the corpus callosum. The same consequences also follow, if the spinal marrow be irritated. But if the encephalon itself be compressed in any part whatever, there follows thence a loss of sense and motion in that part of the body whose nerves come from the affected or compressed quarter of the brain. This fact is proved by experiments made in diseases of the brain, where the origin of particular nerves have been compressed; thus the voice, the power of deglutition, the motion of an arm or a leg, are lost, if the origin of the nerves, on which these faculties and motions depend, be compressed. This is still more evident in irritations or compressions of the spinal marrow, which produce respectively convulsions or palsies of those parts that receive nerves from or below the place injured. If any large portion of the brain be compressed by an extravasation of blood, by a collection of water, by a schirrus, or by an impacted bone, or by any mechanical cause whatever, then, in proportion to the violence of the compression, there will follow either a partial or a total loss of the power of motion, those organs obedient to the will being affected in consequence of a slighter compression; but all the organs, if the pressure be great. The effects above recited cease when the cause is removed. It may be proper to add, that, if the spinal marrow be hurt in the neck, death immediately follows, probably because the nerves of the heart chiefly arise from that part.

From these considerations, we cannot doubt that the cause of all motion in the human body arises from the brain, and its annexed cerebellum and spinal marrow; and that it thence proceeds through the nerves to all the muscular parts of the body. Besides, the cause of this motion cannot reside in the parts themselves, because otherwise the moving cause would continue to act after being separated from the brain; nor would it be increased by irritating the brain, or weakened by a compression of it. Is there in the brain any principal part, in which the origin of all motion and the end of all the sensations reside, and where the soul has its seat? Is this opinion proved by the frequent observation, that the senses are sometimes entire, and that motion likewise remains, though the brain be materially injured? Is the seat of the soul in the corpus callosum? Is this opinion shewn by the greater fatality of wounds or diseases in the corpus callosum? Is this body sufficiently connected with the nerves? Are there any experiments which prove that from thence the fifth, seventh, and other, nerves arise? Doth not the same, or even greater, mortality of wounds in the medulla spinalis, prove the same thing? Yet this is not the seat of the soul, since though it is compressed, or even destroyed, the person will survive

survive a long time with the perfect use of all his mental faculties. Lastly, this opinion is opposed by numerous facts: birds have no corpus callosum, and wounds in that body are not more mortal than those in other parts of the brain, as appears from undoubted experiments.

The prerogative of exciting vital motions, is not more peculiar to the cerebellum than to the other parts of the encephalon; nor does it sufficiently appear, that the vital and animal functions are distinct: for the cerebellum does not produce the nerves of the heart and of the other vital organs, and the brain those which go to the organs of sense and voluntary motion. From the cerebellum the fifth nerve is most evidently produced; but that goes to the tongue, pterygoid, buccinator, temporal and frontal muscles, to the ear, the eye, the nostrils; parts which are either moved by the will, or destined for sense. Again, the same nerve, like the eighth, sends vital branches to the heart and lungs, animal and voluntary ones to the larynx, and sensitive ones to the stomach. Again, it is not even true that disorders of the cerebellum bring on so certain and speedy death as is generally imagined; for some experiments, even of our own making, shew that it has born wounds and schirrh, without taking away life. Lastly, it is not much different from the brain, only that it is softer and more tender; and we have often known wounds of the cerebellum cured. The power, however, of this part, in exciting convulsions, is somewhat greater than that of the brain.

We must inquire experimentally concerning the seat of the soul. In the first place it must be in the head, and not in the spinal marrow: for, though this is obstructed, the constancy of the mind remains the same. Again, from the experiment of convulsions arising when the inmost parts of the brain are irritated, it appears to be seated, not in the cortex, but in the medulla; and, by a probable conjecture, in the crura of the medulla, the corpora striata, thalami, pons, medulla oblongata, and cerebellum. And again, by another not absurd conjecture, it is perhaps seated at the origin of every nerve, as the first origin of all the nerves taken together make up the sensorium commune. Are the sensations of the mind represented there, or do the voluntary and necessary motions arise in that place? This seems very probable; for it is scarcely possible, that the origin of motion can lie below that of the nerve, since the nerve is similar throughout its whole length. The origin of motion cannot be in the arteries, which have neither the faculty of sensation nor that of voluntary motion. It therefore follows, that the seat of the soul must be where the nerve first begins its formation or origin.

We come now to explain the manner in which the nerves become the organs of sense or motion, which, lying hid in the ultimate elementary fabric of the medullary fibres, seem to be placed above the reach both of sense and reason. We shall nevertheless endeavour to make this as plain as experiments will enable us. And first, it is demonstrated, that the sensation does not come through the membranes from the sentient organ to the brain, nor that motion is sent through the coverings from the brain into the muscle; for the brain itself lies deeper than these membranes, and receives the impressions of sense, and, when hurt, throws the muscles into convulsions. Moreover it is certain, that the nerves arise from the medulla of the brain; for, by ocular inspection, we see that to be the case in all the nerves of the brain, more especially in the olfactory, optic, fourth, and seventh, pair of nerves, which continue their medullary fabric a long way before they put on the covering of the pia mater.

We must therefore next inquire what this medulla is. It is a very soft substance; its composition is fibrous, as appears from innumerable arguments: its fibres are visible in the corpus callosum, in the striatum, in the thalami of the optic nerves, and spinal marrow; and still more evidently in the brains of fish, and especially in their thalami optici; but in no part of the human brain does the fibrous nature of the medulla more evidently appear than in the

fornix, especially when immersed in some of the acids. Again, that the fibres of the brain are continuous with those of the nerves, so as to form one extended and open continuation, appears very evidently in the seventh, fourth, and fifth, pair of nerves. There is a great deal of oil in the medulla, upwards of a tenth part of its whole weight. But here a controversy begins concerning the nature of these fibres, a congeries of which composes the substance of the medulla and of the nerves. That this is a mere solid thread, and only watered by a vapour exhalant into the cellular fabric which surrounds the nervous fibres, has been asserted by many of the moderns; but that, when it is struck by a sensible body, a vibration is excited, which is then conveyed to the brain. But the phenomena of wounded nerves will not allow us to imagine the nervous fibres to be solid: for, if irritation causes a nerve to shake, (in a manner somewhat similar to an elastic cord, which trembles when it is taken hold of,) the nerve ought to be made of hard fibres, and tied by their extremities to hard bodies: they ought also to be tense; for neither soft cords, nor such as are not tense, or such as are not well fastened, are ever observed to tremulate. But all the nerves at their origin, are medullary, and very soft, and exceedingly far from any kind of tension. Where they pass through channels, and are well guarded, they retain the same soft texture, and are not covered with membranes; as the intercostal nerves, and the second nerves of the fifth pair. Some also are soft throughout their whole length, whatever their size be. For example, the soft olfactory and acoustic nerves, from which last we would most readily expect a tremor produced by sound. Again, though the nerves are hard, they are softened in the viscera, muscles, and sensoria, before they exert their operations. The nervous fibres, being neither firmly fixed at each end, nor tense, cannot therefore tremulate like a tight stretched cord. Another argument against their tremulation is, that, through their whole length, the nerves are firmly attached to the solid parts by the cellular fabric. An example of this fact is seen in those very material nerves, the nerves of the heart, which are tied to the great arteries and pericardium. Finally, that the nerves are destitute of all elasticity, is demonstrated by experiments, in which the nerves cut across neither shorten, nor draw back their divided ends to the solid parts; but are rather more elongated by their laxity, and expel their medulla in form of a protuberance. Again, the extreme softness of the medulla in the brain, with all the phenomena of pain and convulsion, leave no room to suspect any sort of tension concerned in the effects or operations produced by the nerves. Add to this, that the force of an irritated nerve is never propagated upward, so as to convulse the muscles that are seated above the place of irritation. This is a consequence altogether disagreeing with elasticity; for an elastic cord propagates its tremors every way, from the point of percussion to both extremities. But, if neither phenomena of sense nor motion can be explained from the nature of elasticity, the most probable supposition that remains is, that there is a liquor sent from the brain, which, descending through the nerves, flows out at their extremities; the motion of which liquor, quickened by irritation, operates only according to the direction in which it flows through the nerve; so that convulsions cannot thereby ascend upwards, because of the resistance made by the fresh afflux of the fluid from the brain. But the same liquid, being put in motion in an organ of sense, can carry that sensation upwards to the brain; since it is resisted by no sensitive torrent coming from the brain in a contrary direction. It is therefore probable, that the nervous fibres, and those of the medulla of the brain, which are of the same nature, are hollow. The objections against this doctrine are so few, and at the same time so frivolous, that they need not be mentioned. If they are tubes, it is very probable that they have their humours from the arteries of the brain.

There are many doubts concerning the nature of this nervous liquid. Several of the moderns will have it to be

be extremely elastic, of an ethereal or of an electrical nature; the ancients supposed it to be incompressible and watery, but of a lymphatic or albuminous nature. Indeed, it is not to be denied that we have many arguments against admitting either of these opinions. An electrical matter is doubtless very powerful, and fit for motion; but then it is not confinable within the nerves, since it penetrates throughout the whole animal to which it is communicated, exerting its force upon the flesh and fat, as well upon the nerves. In a living animal, the nerves only, or such parts as have nerves running through them, are affected by irritation; and therefore this liquid must be of a nature that will make it flow through, and be contained within, the narrow tubes of the nerves. And a ligature on the nerve takes away sense and motion, but cannot stop the motion of a torrent of electrical matter.

A watery and albuminous matter is common to most of the juices in the human body, and may therefore be readily granted to the juice of the nerves. The nervous fluid may probably be similar to the water exhaled into the ventricles of the brain; and this opinion is strengthened by the flux of a gelatinous or lymphatic juice from the brain of fishes, and nerves of large animals, when cut. But, are these properties sufficient to explain the wonderful force of convulsed nerves, observable in the dissections of living animals, even of the smallest insects? or to account for the great strength of mad and hysterical people? Is not this difficulty somewhat lessened from the hydrostatical experiments of attraction in small tubes; which, although it may explain the strength and motion, is nevertheless inconsistent with the celerity?

The nervous liquor, then, which is the instrument of sense and motion, must be exceedingly moveable, in order to carry the impressions of sense, or the commands of the will, to the places of their destination, without any remarkable delay; nor can it receive its motions only from the heart. Moreover, it is very thin and invisible, and destitute of all taste and smell; yet separable from the aliments. It is carefully to be distinguished from that visible viscid liquor, exhaling from the vessels in the intervals between the nervous cords. That this liquor moves through tubes rather than through a spongy solid, we are persuaded, from its celerity, and from the analogy of all the fluids of the body, fat only excepted, running through their proper vessels.

On the whole, therefore, it certainly appears, that, by the vessels of the cortex, some kind of fluid is infused into the tubes of the medulla; which fluid is continued through the extremely small tubes of the nerves to their extremities, and is the cause both of sense and motion. But there will be a twofold motion in that humour; the one slow and constant, from the heart; the other not continual, but exceedingly swift, which is excited either by sense, or any other cause of motion arising in the brain. The same nerves most evidently preside over both sense and motion; as we cannot admit a distinction between the two systems of motory and sensitive nerves. If sense sometimes remain after motion is destroyed, this seems to be because much more strength is required for the latter. Dying people hear and see when they are incapable of motion.

OF THE EYE.

The eyes consist of hard and soft parts. The hard parts are the bones which form the *orbis*. The soft parts are of several kinds; the most essential of which is the globe or ball of the eye; the others are partly external and partly internal. The external parts are the supercilia or eye-brows, the palpebræ or eye-lids, the caruncula lachrymalis, and the puncta lachrymalia; and the internal parts are the muscles, fat, lachrymal gland, nerves, and blood-vessels. The coats of the globe of the eye are of three kinds. Some of them form chiefly the shell of the globe; others are additional, being fixed only to a part of the globe; and others are capsular, which contain the humours. The coats which form the globe of the eye

are, the *sclerotica* or *cornea*, the *choroides*, and the *retina*. The additional coats are two; one called *tendinosa* or *albuginea*, which forms the white of the eye; and the other *conjunctiva*. The capsular tunics are likewise two, the *vitreæ* and the *crystallina*. The humours are three; the aqueous, vitreous, and crystalline. The first may properly enough be called a *humour*, and is contained in a space formed in the interstices of the anterior portion of the coats. The second, or vitreous humour, is contained in a particular membranous capsula, and fills above three-fourths of the shell or cavity of the globe of the eye. It has been named *vitreous*, from its supposed resemblance to melted glass; but it is really more like the white of a new-laid egg. The crystalline humour is so called from its resemblance to crystal, and is often named simply the *crystalline*. It is rather a gummy mass than a humour, of a lenticular form, more convex on the back than on the fore-side, and contained in a fine membrane called *membrana* or *capsula crystallina*.

The most external, the thickest, and strongest, coat of the eye, is the *sclerotica* or *cornea*, and it invests all the other parts of which the globe is composed. It is divided into two portions, one called *cornea opaca* or *sclerotica*, the other *cornea lucida*, which is only a small segment of the sphere situated anteriorly. The next coat of the globe of the eye is the *choroides*, which is of a blackish colour, more or less inclined to red, and adheres, by means of a great number of small vessels to the *sclerotica*, from the insertion of the optic nerve all the way to the cornea, where it leaves the circumference of the globe, and turns inward, to form a number of little processes termed *ciliary*, which are situated at the edge of the crystalline lens. At the interior edge of the *choroides* we find the *iris* composed of two laminae; the posterior of which, being of the colour of a grape, was called *uvea* by the ancients. In the middle of the iris there is a hole termed *pupil*; this, in a fœtus, is covered with a membrane called *pupillaris*, which generally disappears about the seventh month; or between the seventh and ninth month, according to Wrisberg.

The last coat proper to the eye is of a very different texture from that of the other two. It is white, soft, and tender, and, in a manner, medullary, or like a kind of paste spread upon a fine reticular web; it lines the bottom of the eye, and is a continuation of the optic nerve. Some authors, as Zinn, affirm, that it terminates at the ciliary circle; others, as Dr. Haller, represent the whole, or a part of it, as extended to the lens, and even as giving a covering to that humour; but Dr. Monro observes, that it ends some way behind the ciliary circle.

The vitreous humour is a clear and very liquid gelatinous fluid, contained in a fine transparent capsula, called *tunica vitrea*. It fills the greatest part of the globe of the eye, that is, almost all that space which answers to the extent of the retina, except a small portion behind the *uvea*, where it forms a fossula, in which the crystalline lens is lodged. The crystalline is a small lenticular body, of a firm consistence, and transparent like crystal. It is contained in a transparent membranous capsula, and lodged in the anterior fossula of the vitreous humour. It is very improperly called a *humour*, because it may be handled and moulded into different shapes by the fingers, and sometimes almost dissolved by different reiterated compressions, especially when taken out of the capsula. The aqueous humour is a very limpid fluid, resembling a kind of lymph or serum, with a very small degree of viscosity; but, in the fœtus, and a short time after birth, it is of a reddish colour. It fills the space between the cornea and iris, that between the iris and the crystalline, and the hole of the pupilla. These two spaces are called the *chambers of the aqueous humour*, and they are distinguished into the anterior and posterior.

The *tunica albuginea*, commonly called the *white of the eye*, and which appears on all the anterior convex side of the globe, from the cornea to the beginning of the posterior side, is formed chiefly by the tendinous expansion of the

the four recti muscles. This expansion adheres very close to the sclerotica, and makes it appear very white and shining; whereas the rest of it is of a dull whitish colour. It is very thin near the edge of the cornea; in which it seems to be lost, terminating very uniformly.

The supercilia, or eye-brows, peculiar to the human species, are the two hairy arches situated at the lower part of the forehead, between the top of the nose and temples, in the same direction with the bony arches which form the superior edges of the orbits. The skin in which they are fixed does not seem to be much thicker than that of the rest of the forehead; but the membrana adiposa is thicker than on the neighbouring parts. The supercilia have motions common to them with those of the skin of the forehead, and of the hairy scalp. By these motions the eye-brows are lifted up; the skin of the forehead is wrinkled more or less regularly and transversely; and the hair and almost the whole scalp is moved, but not in the same degree in all persons; for some people by this motion alone can move their hat, and even throw it off their head. The eye-brows have likewise particular motions which contract the skin above the nose; and all these different motions are performed by the occipital, frontal, and superciliary, muscles.

The palpebræ are a kind of veils or curtains placed transversely above and below the anterior portion of the globe of the eye, and accordingly there are two eye-lids to each eye, the one superior and the other inferior. They both unite at each side of the globe, and the places of their union are termed *angles*, one large and internal, which is next the nose, the other small and external, which is next the temples. The palpebræ are made up of common and proper parts. The common parts are the skin, epidermis, and membrana adiposa. The proper parts are the muscles, the tarsi, the puncta or foramina lachrymalis, the membrana conjunctiva, the glandula lachrymalis, and the particular ligaments which sustain the tarsi. The tarsi and their ligaments are in some measure the basis of all these parts. They consist of thin cartilages, forming the principal part of the edge of each palpebra, and they are broader at the middle than at the extremities. Those of the superior palpebræ are a little more than a quarter of an inch in breadth; but in the lower palpebræ they are not above the sixth part of an inch, and their extremities next the temples are more slender than those next the nose.

The membrana conjunctiva is a thin membrane, one portion of which lines the inner surface of the palpebræ, that is, of the tarsi and their broad ligaments. At the edge of the orbit it has a fold, and is continued from thence on the anterior half of the globe of the eye, adhering to the tunica albuginea; so that the palpebræ and the fore-part of the globe of the eye are covered by one and the same membrane, which does not appear to be a continuation of the pericranium, but has some connection with the broad ligaments of the tarsi. The name of *conjunctiva* is commonly given only to that part which covers the globe, the other being called simply the *internal membrane of the palpebræ*; but we may very well name the one *membra oculi conjunctiva*, and the other *membrana palpebrarum conjunctiva*.

The lachrymal gland, the use of which, till of late years, was not known, is yellowish, and of the number of those called *conglomerate glands*. It lies under that depression observable in the arch of the orbit near the temples, and laterally above the globe of the eye. It is a little flattened, and divided, as it were, into two lobes; one of which lies towards the insertion of the musculus levator, the other towards the abductor. It adheres very closely to the fat which surrounds the muscles and posterior convexity of the eye, and it was formerly named *glandula innominata*.

The flat edge of each palpebra is adorned with a row of hairs called *cilia*, or the *eye-lashes*. Those belonging to the superior palpebra are bent upward, and are longer than those of the lower palpebra which are bent downward. These rows are placed next the skin, and are not single, but irregularly double or triple. The hairs are

longer near the middle of the palpebræ than toward the extremities; and, for about a quarter of an inch from the inner angle, they are quite wanting. Along the same border of the palpebræ, we see a row of small holes, which may be named *foramina* or *puncta ciliaria*. They are the orifices of the same number of small oblong glands which lie in the sulci, channels, or grooves, on the inner surface of the tarsus. These little glands are of a whitish colour; and, when examined through a single microscope, they appear like bunches of grapes, those of each bunch communicating together; and, when they are squeezed between two nails, a sebaceous matter, like soft wax, is discharged through the puncta ciliaria.

The puncta lachrymalia are two small holes in the edge of each palpebra, opposite to each other, so that they meet when the eye is shut. Round the orifice of these points, we observe a whitish circle, which seems to be a cartilaginous appendix of the tarsus, and which keeps the orifice always open. These two oblique circles are so disposed, that, when the eye is but slightly shut, they touch each other only toward the skin, and not toward the globe of the eye.

The caruncula lachrymalis is a small reddish granulated oblong body, situated precisely between the internal angle of the palpebræ and globe of the eye, but it is not fleshy, as its name would insinuate. The substance of it seems to be wholly glandular; and it appears through a single microscope in the same manner as the other conglomerate glands. We discover on the globe of the eye, near this glandular body, a semilunar fold formed by the conjunctiva, the concave side of which is turned to the uvea, and the convex side to the nose. This fold, which has the name of *membrana semilunaris*, appears most when the eye is turned toward the nose; it is shaped like a crescent, the two points of which answer to the puncta lachrymalia, and conduct the tears into the puncta.

The muscles which move the palpebræ are commonly reckoned to be two. In man, the superior palpebra has much more motion than the inferior. The small simple motions, called *twinkling*, which frequently happen, tho' not equally often in all subjects, are performed by the alternate contraction of the levator palpebræ and orbicularis.

The external carotid artery, and the temporal and frontal arteries, give several ramifications to the integuments which surround the eye; the internal carotid, having entered the cranium, sends off a considerable branch called the *ocular*, which accompanies the optic nerve, to be distributed to the muscles and globe of the eye, to the levator palpebræ, to the fat, glandula lachrymalis, membrana conjunctiva, caruncula lachrymalis, &c. The veins of all these parts answer nearly to the arteries; those of the globe of the eye are called *vasa vorticosa*. The internal veins unload themselves, partly into the internal jugular vein, by the sinus cavernosi; and partly into the external jugular vein, by the vena angularis, or maxillaris externa, the maxillaris interna, temporalis, &c.

Besides the optic nerve, the globe of the eye receives several small ones, which run on each side along and about the optic nerve, from its entry into the orbit to its insertion in the globe. These small nerves, which run from behind forward, between the sclerotica and the choroides, have formerly been taken for particular ligaments by anatomists of considerable eminence, but are now known under the name of *ciliary nerves*.

The eye being the organ of vision, the greater part of it is composed of pellucid humours capable of refracting the rays of light. The complexity of this organ is necessary for the defence of its tender parts; and the diversity of the several humours, together with the various offices which this curious machine performs, necessarily required a very compound instrument. The perpetual attrition of the eye-lids ascending and descending against the globe of the eye, is prevented by the *tears*; which preserve also the tenderness of the membranes and of the cornea, and serve to wash out any insects or other sharp corpuscles.

corpuscles. These form a saline pellucid liquor that may be evaporated, and never ceases to be poured over the anterior surface of the eye; but never runs over the cheeks, unless collected, by a foreign cause, in larger than usual quantity. This liquor is exhaled partly from the arteries of the conjunctiva, and partly proceeds from the lachrymal gland. The separation of the tears is increased by the more frequent contraction of the orbicular muscle, either from irritation, or some sorrowful passion; by which means the tears are urged over, and wash the whole surface of the eye and conjunctiva.

Among the coats of the eye, the iris is the only one possessing motion. Though it has little sensation, and is not endowed with any mechanical irritability; yet, in a living man, quadruped, or bird, it is contracted on every greater degree of light, and is dilated on every smaller one; hence it is rendered broader for viewing distant objects, and narrower for viewing such as are near. The cause of this dilatation seems to be a remission of the powers resisting the aqueous humour; an argument of which is the dilatation of the pupil, occasioned by debility, or succeeding syncope and death.

Before we can attain any satisfactory knowledge of the properties of the eye, it will be necessary to say something of the nature of light. Light is an extremely subtle fluid, penetrating with facility bodies of the closest texture, and greatest density, in a rectilinear direction, with the amazing velocity of ten millions of miles in a minute. Every luminous body has the peculiar property of sending forth rays of light in every possible direction, which, falling on the surfaces of surrounding objects, are reflected thence to our eyes. Rays of light falling perpendicularly on the surface of a transparent body, pass through the body without changing their direction; but rays falling obliquely on the surface pass through the body with a change of their direction nearer to the perpendicular; and this change of direction is called *refraction*.

The rays of light, whether direct or reflected, fall upon the tunica cornea of the eye, so as to form a very sharp cone between the lucid point and the membrane upon which they are spread; the basis of which cone will be the surface of the cornea, and the apex the radiant point; yet so that all rays may, without any sensible error, be reckoned parallel with each other. Among these, there are some rays reflected back from the cornea, without ever penetrating the surface; namely, all such as fall upon that membrane in a greater angle than that of forty degrees. Others, which enter the cornea at very large angles, but less than the former, and fall in betwixt the iris and the sides of the crystalline lens, are focussed or lost in the black paint that lines the iris and the ciliary processes; but those rays only fall upon the surface of the lens which enter the cornea at small angles, not much distant from the perpendicular, or, at most, not exceeding twenty-eight degrees. By this means, all those rays are excluded which the refracting power of the humours of the eye could not be able to concentrate or bring together upon the retina; without which they would paint the object too large and confusedly. The rays falling on the cornea are therefore refracted, and pass through the aqueous humour in a more parallel, or perhaps converging, direction, by which contrivance a greater number of rays fall on the crystalline than if they had not previously passed through the cornea and the aqueous humour. But since the necessary offices of human life require a distinct object to be painted upon the retina, not only by the rays which come from one certain distance, but likewise by rays which come from very different parts more or less distant; it has therefore been thought that a necessary change, produced by its own causes, is made on the eye. Others have supposed the lens moveable by the powers before-mentioned. This art of seeing distinctly at different distances is said to be learned by experience, it being unknown to those who have been lately couched. It is also said, that, in an artificial eye, the use and necessity of this motion may be

plainly perceived. The point of distinct vision is in that part of the retina where the given object is painted in the least compass possible. The powers causing the visual rays to unite on the retina, are often very different in the two eyes of the same person, the one being long-sighted and the other short-sighted.

These, and other commonly received opinions, are taught by mathematicians, who more readily perceive the necessity of these changes. But yet there is no power in the human eye which can either move the crystalline humour out of its place, or compress it. Besides, we do not perceive this faculty in ourselves; for we move a book nearer to our eyes when it is too far off, so as to appear confused, which we should have no occasion to do, if by changing the internal figure of the eye we could correct the fault of the distance. And, through a small hole, we perceive an object single only in the point of distinct vision, but double in every other. Perhaps the contraction of the pupil may enable to see near objects more distinctly. This contraction, however, is not in all people sufficient for the purpose. There are several people, especially such as lead a sedentary life, and such as are employed in examining minute objects, whose cornea is too convex and dense, whose crystalline lens is too gibbous and solid, and whose eye is lengthened by the incumbent weight of the humours, and perhaps the humours themselves are too dense; and in the same person the eye may probably have all these defects joined together. People labouring under one or more of these inconveniences have an iris that is sensible in a very small degree of light, which circumstance makes them twinkle with the eye-lids when they are in a strong light, and they are called *myopes* or short-sighted. In these, the point of distinct vision is very near to the eye, commonly from one to seven inches from the cornea; but they see remoter objects more obscurely, without being able to distinguish their parts. The reason of this is evident; since, from the fore-mentioned causes, there is a greater refracting power of the humours, by which the distant, and consequently parallel, rays are obliged to meet in their focus before the retina, from whence spreading again, they fall upon the retina in many points. The remedy for this fault in the sight is to correct it in its beginning, by looking at distant rather than near and minute objects; by the use of concave glasses, or by viewing things through a small hole, by which the light is weakened. When the disorder is confirmed, the remedy is a concave lens, which takes off a degree of the refracting power in the humours, cornea, and crystalline lens, in proportion as it is more concave; by which means the focus of rays from remote objects is removed farther behind the cornea, so as to fall upon the retina.

The other disorder of the sight, contrary to the former, troubles people who often look at very distant objects, and is more especially familiar and incurable in old people. In such, the cornea and crystalline lens are flatter, and the humours of the eye have a less refracting power. Hence near objects, whose rays fall very diverging upon the cornea, appear confused; because the converging or refracting powers of the eye are not sufficient to bring the rays together in a focus upon the retina; but the rays go on scattered beyond the retina, and throw the point of their pencil behind the eye, from whence vision is confused. The point of distinct vision among *presbyopi*, or old or long-sighted people, is from the distance of fifteen inches to three feet. Such persons are relieved by looking through a black tube held before the eye; by the use of which the retina grows tenderer, and the rays come to the eye in a parallel direction. The remedy here is a convex lens, which causes the rays to converge and unite together sooner in a focus, that it may not fall behind the eye, but upon the retina. The medium between the short and long sighted eye is the best, by which a person can see distinctly enough objects that are both near and remote; and of this kind we reckon an eye that is able to read distinctly at the distance of one foot. But a good eye requires other necessary

cessary conditions, such as a perfect clearness of the humours; a due mobility of the eye itself, and its parts; a sensibility of the pupil; and a retina neither too prurient nor too callous.

The mind only receives a representation of the image of the object by the eye, impressed on the retina, and transferred to the common sensory or seat of the soul. Several circumstances relative to vision are not determined by the instrumentality of the eye, but are perceived by the mind from mere experience; and sometimes the mind interprets the representation to be very different from that which the eye gives to her. The magnitude of an object, for instance, is not determined by the eye, but by the optical angle, which is formed by lines supposed to be drawn from the extremities of the object to the cornea. Hence near objects seem large, and those at a distance small. On this circumstance also the power of microscopes depends, which magnify in proportion to the difference between the focal length of the magnifier and the distance of distinct vision. Objects, by the means of this instrument, not only appear larger, but brighter and more distinct, and hence the mind thinks them nearer.

Distance we cannot perceive; and if a blind man, who never saw, should by any means be restored to sight, he would imagine every thing he saw to touch his eyes. Even we, who are accustomed to judge by sight, make many fallacious conjectures concerning the distance of objects. We judge of the distance of an object from the diminution of its known bulk; from its diminished brightness; from the faintness of its image, by which we are less capable of distinguishing its parts; and, lastly, from the number of bodies, whose distance is known, that are interposed between us and the object. The visible situation of the parts of an object, is judged by the mind to be the same with that which these parts naturally have in the object, and not the inverted position in which they are painted upon the retina. The faculty of correcting this inversion seems to be innate; for new-born animals always see objects upright; and men who have been born with cataracts are observed, upon couching the cataracts, to see every thing in its natural situation, without the use of any feeling, or previous experiences. The mind is often imposed on by the continuance of the sensation after it has been conveyed to the mind, by which means objects, although instantly removed, continue to be seen for about a second. Hence proceeds the idea of a fiery circle from the circumrotation of a lucid body; and hence also proceeds the continuance of the shining image of the sun, and sometimes of other bodies, after they have been viewed by the eye.

Why do we see only one object with two eyes? because, when the impressions of two objects are similar, the sensation becomes single. Even without the concurrence of optic nerves, insects who have numerous eyes perceive objects single. Hence the images of two objects excite only one sensation, when they fall upon the same point of the retina; but two sensations arise from one object, when the images fall upon different parts of the retina. Whence proceed diurnal and nocturnal blindness? The former is common to many nations living in the warmest climates, under the brightest sun, and to old men. The other happens in inflamed eyes, and to young men of a hot temperament, who are endowed with eyes vastly sensible. Whence do animals see in the dark? From a large dilatable pupil, and tender retina; and a shining choroides, which reflects the light very strongly. Why are we blind when brought out of a strong light into a weak one? Because the optic nerve, having suffered the action of stronger rays of light, is incapable of being moved by those that are weaker. Whence have we a pain, by passing suddenly from a dark place into the light? Because the pupil, being widely dilated in the dark, suddenly admits too great a quantity of light before it can contract; whereby the tender retina, which is easily affected by a small light, feels, for a time, an impression too sharp and strong. Whether do we see

with one eye, or with both? Most frequently with one, and more especially the right eye. But, when both are employed together, we see more objects, and more plainly; and we also distinguish more points of the same object, and judge better of their distances.

OF THE NOSE.

The parts of which the nose is composed, may be divided in two different ways, viz. from their situation, into external and internal parts; and, from their structure, into hard and soft parts. The external parts are the root of the nose, the arch, the back or spine of the nose, the sides, the tip of the nose, the alæ, the external nares, and the part under the septum. The internal parts are the internal nares, the septum narium, the circumvolutions, the conchæ superiores, or ossa spongiosa superiora, conchæ inferiores, the posterior openings of the internal nares, the sinus frontales, sinus maxillares, sinus sphenoidales, the ductus lachrymales, and ductus palatini. The firm or hard parts are mostly bony, and the rest cartilaginous. The soft parts are the integuments, muscles, sacculus lachrymalis, membrana pituitaria, vessels, nerves, &c. The internal nares, or the two cavities of the nose, comprehend the whole space between the external nares and posterior openings, immediately above the arch of the palate, from whence these cavities reach upward as far as the lamina cribrosa of the os ethmoides, where they communicate forward with the sinus frontales, and backward with the sinus sphenoidales. Laterally, these cavities are bounded on the inside by the septum narium; and, on the outside, or that next the cheek, by the conchæ or ossa spongiosa, between which they communicate with the sinus maxillaris. The external nose is covered by the common integuments, the skin, epidermis, and fat. The parts which cover the tip of the nose and alæ narium, are pierced with the ducts of a great number of glandulæ sebaceæ. All these bony and cartilaginous parts have likewise the common periosteum or perichondrium.

The membrana pituitaria is that which lines the whole internal nares, the ossa spongiosa, the sides of the septum narium, and, by an uninterrupted continuation, the inner surface of the sinus frontales and maxillares, and of the ductus lachrymales, palatini, and sphenoidales. It is termed *pituitaria*, because, through the greatest part of its large extent, it serves to separate from the arterial blood a mucilaginous lymph, called *pituita* by the ancients, which, in its natural state, is nearly liquid; but it is subject to very great changes, becoming sometimes glutinous, sometimes limpid, &c. neither is it separated in equal quantities thro' the whole membrane. The lachrymal sacculus is an oblong membranous bag, into which the serous fluid is discharged from the eye, through the puncta lachrymalia, and from which the same fluid passes to the lower part of the internal nares. The ductus incisorii, or naso-palatini of Steno, are two canals which go from the bottom of the internal nares, cross the arch of the palate, and open behind the first or largest dentes incisorii. In fresh subjects they are not so apparent, especially in human subjects; but in sheep and oxen they are easily discoverable.

In animals which smell acutely, the parts of the nose are remarkably large; but the formation of the human head into a roundish figure, has given to the organ of smelling only a small extent of surface; but nature has made the internal parts of the nose hollow, and variously complicated in a surprising manner, to enlarge the faculty of smelling, because tasting noxious food might in many instances be highly dangerous. We can by this sense, independent of taste, discover the noxious quality of aliments, especially such as are putrid, and consequently peculiarly hurtful to the human frame; and at the same time that it directs us to avoid what is dangerous, it enables us to discern what is grateful and wholesome. This use of smelling in choosing food, is more observable in brutes than in men; yet men left to themselves, and who are undebauched by a variety of scents; possess this fagacious

cious faculty in a very eminent degree. The powers and virtues of medicinal plants are hardly to be better known than by the testimony of tasting and smelling. Hence it is, that in all animals those organs are placed together; and hence the smelling is stronger, and the organs larger, in those animals which seek their prey at a considerable distance, or are to reject malignant plants from among those fit for food.

The sense of smelling is performed by means of a soft pulpy membrane, full of pores and small vessels, which lines the whole internal cavity of the nostrils; it is thicker upon the septum and principal convolutions, but thinner in the sinuses. The nerves of the nose, being almost naked, require a defence from the air, which is continually drawn through the nostrils, and blown out again by respiration. Nature has therefore supplied this part, which is the organ of smelling, with a thick insipid mucus, very fluid in its first separation, but, by the air, condensing into a thick, dry, and more consistent, crust. By this mucus the nerves are defended from drying and from pain. It is poured out from many small arteries, and deposited partly into numerous cylindrical ducts, and partly into round visible cryptæ or cells, scattered all over the nostrils. It flows out all over the surface of the olfactory membrane, which is anointed with it on all sides. This mucus is accumulated in the night-time; but, in the day, it either flows spontaneously, or may be more powerfully expelled by blowing the nose. By becoming dry and harsh, it irritates the very sensible nerves of the membrane, whence a sneezing is excited for its removal. The tears descend, by a channel proper to themselves, into the cavity of the nose, by which they moisten and dilute the mucus.

The air, filled with the subtle and invisible effluvia of bodies, consisting of their volatile, oily, and saline, particles, is, by the powers of respiration, urged through the nose, and applied to the almost naked, and constantly soft, olfactory nerves, in which a kind of feeling is excited, which we call *smelling*; and by this sense we distinguish several kinds of oils and salts, by different scents or odours, which are difficultly redneible to classes, and difficultly recalled to memory. This scent serves to admonish us of pernicious putrefaction; of violent acrimony; or of a mild and soapy quality in bodies. As salt, joined with an oil, is the object of taste; and a volatile oil, added to salts, serves to excite smells, we may perceive the affinity of these two senses, which affinity seemed to be the more necessary on account of these senses mutually and jointly assisting each other in performing their offices. Volatile particles are chiefly distinguished by smell, and fixed ones by taste; perhaps because the thick mucous cuticle, spread over the tongue, intercepts the action of the more subtle saline effluvia from acting upon the taste, which yet easily affect the softer and less covered nerves of the internal nose.

The power of odours is strong and quick, because minute particles of matter are immediately applied to naked nerves situated very near the brain. Hence the force of poisonous vapours, and hence also the quality certain odours possess, of recovering people from faintings, or after drowning. Hence also that violent sneezing which often arises from acrid particles, and a diarrhoea from the smell of some medicines; hence the power of particular antipathies. Hence also the pernicious effects of excessive sneezing, more especially in producing blindness, which may, in some measure, also be more easily brought on by the consent of the nerves that are exceedingly numerous in the neighbouring organs. Among the various parts of the nose, the septum, and more especially the os turbinatum, have a considerable share in the organ of smelling, since these parts are multiplied in quick-scented animals. In dogs, and other quadrupeds, they are prodigiously lengthened, and beautifully formed into spiral laminæ; in fishes they are elegantly formed, like the teeth of a comb.

OF THE EAR.

Anatomists commonly divide or distinguish the ear into external and internal. The greatest part of the external

ear consists of a large cartilage, very artificially framed, which is the basis of all the other parts of which this portion of the ear is composed. The internal ear consists chiefly of several bony pieces, partly formed in the substance of the os temporis, and especially in that portion of it called *apophysis petrosa*; and partly separated from, but contained in, a particular cavity of that bone. Two portions are distinguished in the external ear; one large and solid, called *pinnæ*, which is the superior, and by much the greater, part; the other small and soft, called the *lobe*, which makes the lower part. The fore-side of the ear is divided into eminences and cavities. The eminences are four in number, called *helix*, *antihelix*, *tragus*, and *antitragus*. The helix is the large folded border or circumference of the great portion of the ear. The antihelix is the large oblong eminence, surrounded by the helix. The tragus is the small anterior protuberance below the anterior extremity of the helix. The antitragus is the posterior tubercle, below the inferior extremity of the antihelix. The cavities on the fore-side are four in number: the hollow of the helix; the depression at the superior extremity of the antihelix, called *fossa navicularis*; the concha, or great double cavity; and the meatus, situated at the lower part of the bottom of the concha. The lobe of the ear, or that soft portion which lies under the tragus, antitragus, and meatus auditorius, is made up of nothing but skin and cellular substance. The meatus auditorius is partly bony and partly cartilaginous. The skin which covers the cartilage contains a great number of small glands, which continually discharge an oily whitish humour, collected chiefly near the adhesions of the ear to the head, and under the fold of the helix; and these glands are of the sebaceous kind. The skin, which lines the meatus auditorius, contains another kind of glands, of a yellowish colour. These glands are disposed in such a manner as to leave reticular spaces between them, and they penetrate a little way into the substance of the skin. They are called *glandulæ ceruminosæ*, because they discharge that matter which is named *cerumen*, or the *wax* of the ear.

The bony part of the organ of hearing may be divided into four general parts: 1. The meatus auditorius externus; 2. The tympanum; 3. The labyrinth; 4. The meatus auditorius internus. It may likewise be divided into immoveable or containing parts, which take in all the four already mentioned; and moveable or contained parts, which are four little bones lodged in the tympanum, called *incus*, *malleus*, *stapes*, and *os orbiculare* or *lenticulare*. The external auditory passage begins by the external auditory hole, the edge of which is rough and prominent; but, backward toward the mastoid process, it appears very much sloped.

The tympanum, or drum of the ear, is a cavity somewhat spherical, or rather hemispherical, the bottom of it being turned inward. The tympanum contains several little bones, called the *bones of the ear*. They are generally four in number, denominated from something to which they are thought to bear a resemblance, viz. *incus*, *malleus*, *stapes*, and *os orbiculare* or *lenticulare*. The *incus*, or anvil, resembles, in some measure, one of the anterior dentes molares, with its roots at a great distance from each other. It may be divided into a body, and two branches or legs; one of the legs is long, the other short. The *malleus*, or hammer, is a long bone, with a large head, a small neck, a handle, and two processes; one in the neck, the other in the handle. The *stapes* is a small bone, very well denominated from the resemblance it bears to a stirrup. It is divided into the head, legs, and basis. The head is placed upon a short flatted neck. The two legs form an arch like that of a stirrup; in the concave side of which is a groove that runs through their whole length. The basis resembles that of a stirrup, both in its oval shape and union with the legs, but it is not perforated. The *os orbiculare*, or lenticular bone, is the smallest bone in the body. It lies between the head of the *stapes* and extremity of the long leg of the *incus*, being articulated

with each of these. These four little bones appear to have been unknown to the Greek anatomists.

The labyrinth is divided into three parts; the anterior, middle, and posterior. The middle portion is termed *vestibulum*, the anterior *cochlea*, and the posterior *labyrinth in particular*; which comprehends the three femicircular canals. The cochlea lies forward and inward toward the extremity of the pars petrosa; the femicircular canals backward and outward toward the basis of the process; and the vestibulum between the other two.

The soft parts of the internal ear are chiefly the membrana tympani, the periosteum of the tympanum, and of the ossicula auditus, labyrinth, and of all its cavities, the membrana mastoidea interna, the muscles of the ossicula, the parts which complete the formation of the Eustachian tube, the arteries, veins, and nerves.

The periosteum of the tympanum, or barrel of the ear, produces that of the small bones; and it may be made visible by means of anatomical injections, which discover capillary vessels very distinctly ramified on the surface of the ossicula. It is likewise continued over the two fenestrae, and enters the Eustachian tube, where it is lost in the inner membrane of that duct.

As the sense of hearing perceives the elastic tremors or impulses of the air, so we observe the sensitive organ of the ear to be composed in a different manner from that of any of the other senses. The sonorous waves of the elastic air, being driven into the cartilaginous funnel of our ear, are repelled and collected together, by alternate reflections from its elastic sides, into the cavity of the concha, whence they proceed through the auditory passage; where their force is increased by being contracted into so narrow a compass. They are likewise increased by new sounds from the percussion of the elastic cartilages and hard bones, which mix imperceptibly with the primitive sounds. The bottom or end of the auditory passage is terminated internally by the *membrana tympani*; which Dr. Haller says is not naturally perforated, as far as he has been able to discover; and that the transmission of tobacco-smoke from the mouth through the ear is fabulous. Authors in general agree with him now in the former of these opinions; but that an accidental opening has sometimes happened, and that the smoke of tobacco has been blown through it during life, is certain. Upon the surface of this membrane, and more especially upon its conical cavity pointing inward, the sonorous waves strike, after they have received their last reflections from the auditory passage, by which the elastic fabric of this membrane is forced into oscillation. The membrane is stretched over the *tympanum*, containing the little bones to which the small muscles of the internal ear are fixed. By means of the tensor of the malleus, the membrane of the tympanum is the better disposed to hear weak sounds; and the other muscle serves to moderate those that are too violent, by drawing the malleus from the incus; by which means the propagation of the sonorous tremors is interrupted. If the membrane of the tympanum be broken, or the bones of hearing dislocated, the person becomes at first hard of hearing, and afterwards perfectly deaf. There have been instances, however, where the membrana tympani has been partly destroyed, and yet the person has retained the sense of hearing, though less distinctly than before. The malleus returns the tremors impressed upon the membrane of the tympanum to the incus, which sends it inwards to the next bones. The *stapes*, aptly enough so called from its figure, lies inclined, and is covered by its own muscle, which seems to draw the stapes, that it may lie higher up, under the back-part of the fenestra ovalis, and pass out of it before. Thus the nervous pulp of the vestibulum is pressed by the basis of the stapes, and by the air of the tympanum; and the *Eustachian tube*, by the action of the circumjacent muscles, may be compressed and closed, and probably a little relaxed and opened again, by the circumflex muscle of the moveable palate. By this canal the inspired air enters into the tympanum,

to be changed or renewed; and it also serves to convey the mucus that covers the little bones and the tympanum. Nor is it at all improbable that the air enters by this tube, to support the tympanum when it is pressed inward by the more violent sounds; for sounds themselves, received into the mouth, are this way conveyed to the organ of hearing. In inspiration, the air presses the membrane of the tympanum outward; and thence proceeds that clashing or whispering noise, by which the hearing is obscured, in yawning; for then the air entering more abundantly through the cavity of the tube, to the tympanum, resists the tremors of the external air.

From what has been said, it appears that the elastic waves or tremors of the air come through the outer ear and auditory passage, to the membrane of the tympanum; which being injured, and not repaired, the hearing is in a great measure destroyed. This seems to be stretched, for hearing weak sounds, by the muscles of the malleus. From this membrane the sound is conveyed through the small bones to the vestibulum; for, these bones being destroyed, the hearing is again abolished. The bony sides of the vestibulum, by their tremulation, agitate the small quantity of aqueous fluid surrounding the nervous pulp. It seems to be struck by the nervous pulp suspended in the vestibulum, and that tremor seems to be continued through the continuous pulp of the cochlea and femicircular canals. Of more than this we are not certain; but, by undoubted experiments, tremors, and even elastic sounds, communicate themselves by the internal Eustachian tube, and thro' all the bones of the skull, so as to impress their force upon the auditory nerve.

The distinction of sounds proceeds from the celerity of the tremors excited in the hearing nerve, according as they succeed each other more swiftly or slowly. It is not necessary that the mind should number them; it is sufficient that the perceive their numbers to be different, and that this difference excites a variation in the thoughts and ideas thence arising. Does the harmony or agreeableness of sounds arise from the number of parts sounding together in unison? and does the mind number the degrees of consonance, so as to please herself in the majority of them? These are questions denied by the most expert musicians, who make it appear that there is an agreeableness, and that very considerable, in sounds approaching the least to a consonance, and which are in a proportion very difficult to determine. Why do sounds often become too sharp for the ear? Because our auditory nerves seem to be so strained upon the spiral plates, as to be in danger of breaking. Thus, drinking-glasses are broken by sharp sounds; and the hearing is sometimes almost lost for a while by the violently-thrill whistlings of the inhabitants of the Canaries.

OF THE MOUTH.

The cheeks and lips form the sides and entry of the cavity of the mouth. The substance which forms the red border of the lips is very different from the rest of the skin, being a collection of very fine, long, villous, papillae, closely connected together, and covered by a fine membrane, which seems to be both a continuation of the epidermis, and of that pellicle which covers the glandular membrane of the cavity of the mouth. This substance is extremely sensible, and very painful when the outer membrane is by any accident destroyed. The substance of the gums is also of a very singular structure, resembling, in some measure, the texture of a hat, supposed to be very compact and elastic. It is not immediately fixed to the bones of the jaws, but by the intervention of the periosteum, with which it is perfectly united; and it is covered by a fine strong even membrane, which sticks very close to the substance of the gums; and seems to be a continuation of that thin membrane which goes to the lips and cheeks, and of that which goes to the tongue.

The *palate* is that arch or cavity of the mouth surrounded anteriorly by the alveolar edge and teeth of the upper jaw, and reaching from thence to the great opening of the

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the pharynx. The arch is partly solid and immoveable, and partly soft and moveable. The solid portion is that which is bounded by the teeth, being formed by the two ossa maxillaria and two ossa palati. The soft portion lies behind the other, and runs backward like a veil fixed to the edge of the ossa palati, being formed partly by the common membrane of the whole arch, and partly by several muscular fasciculi, &c. The membrane that covers all this cavity, is continued with the membrane of the nares, upon the inner surface of the pharynx. It is very thick set with small glands, known under the name of *palatine*, the orifices of which are not so sensible as in the pharynx, and especially in the rugæ of its superior portion. This membrane, together with that of the posterior nares, forms, by an uninterrupted continuation, the anterior and posterior surface of the soft portion of the palate, or velum palati, so that the muscular fasciculi of this portion lie in the duplicature of a glandular membrane. The velum or valvula palati, terminates below by a loose floating edge, representing an arch situated transversely above the basis or root of the tongue. The highest portion or top of this arch sustains a small, soft, and irregularly-conical, glandular body, fixed by its basis to the arch, and its apex, which hangs down without adhering to any thing, is called *uvula*; on each side of which there are two muscular half-arches, called *columnæ septi palati*. The septum palati serves to conduct the lachrymal lymph, and that which is continually collected on the arch of the palate, into the pharynx. It serves for a valve to hinder what we swallow, and especially what we drink, from returning by the nose.

The tongue is a soft fleshy body, which fills all that part of the cavity of the mouth that is surrounded by the alveolar border and teeth of the lower jaw, and extends still farther back. The tongue is divided into the basis and point; the upper and under sides; and the lateral portions or edges. The basis is the posterior and thickest part; the point, the anterior and thinnest part. The upper side is not quite flat, but a little convex, and divided into two lateral halves, by a shallow depressed line, called *linca linguae mediana*.

All the upper side of the tongue is covered by a thick membrane of a papillary texture, upon which lies another very fine membrane like a kind of epidermis, which is likewise continued over the lower side, but without papillæ. Under the epidermis, on the surface of the tongue, we find the corpus mucosum thicker but more moist than in other parts of the body. Three sorts of papillæ may be distinguished in the upper side of the tongue; capitate, semi-lenticulares, and villosæ. Those of the first kind are the largest, and are of a lenticular form, having round heads with short stems. They lie on the basis of the tongue in small superficial fossule.

The tongue is the organ of that sense called the *taste*; and, by certain experiments, it appears that the power of taste is exercised by the tongue chiefly, although it is not confined to the tongue alone. For, on whatever part of the mouth, palate, or cheek, we apply a sapid body, we do not perceive the sense of pain, but of taste; and from some bodies, as arum, pepper, &c. the sensation produced will be stronger and more distinct in these parts than any where else. The sensation which is sometimes excited in the stomach, œsophagus, and fauces, by the regurgitation of the aliments, seems also to belong to the tongue, to which the sapid vapours are sent back, uncommonly acrid and penetrating; and even that sense which is sometimes occasioned in the stomach, œsophagus, and fauces, from a rising of the aliments, seems also to be owing to the tongue, to which the tasteable vapours are conveyed.

The *papillæ* of the tongue, which are larger and softer than those of the skin, and perpetually moist, perform the office of touch more exquisitely than the small and dry cutaneous papillæ. The papillæ of the tongue being raised a little protuberant to perform the office of taste, are affected in a particular manner by salts dissolved in water,

or saliva, and applied against their tips or summits; which being distinguished by the mind, and referred to certain classes, are called *tastes*, either sour, sweet, acerb, bitter, saline, urinous, spirituous, aromatic, or pungent and acrid, insipid, putrid, and others resulting partly from pure salts, and in part from an intermixture of the subtile, animal, or vegetable, oils, variously compounding and changing each other.

Does the diversity of tastes arise from the different figures which are natural to salts? Is the cubical figure of sea-salt the reason of its having a different taste from nitre that is prismatical, or from other salts of a different form? We answer, that this does not seem probable; for, even tasteless crystals have their particular configurations; and the taste arising from very different salts, and differently qualified objects of this sense, are too much alike each other, and at the same time too inconstant or changeable, to allow such a theory; as, for example, in nitre. The mechanical reason, therefore, of the diversity of tastes, seems to reside in the intrinsic fabric of the elements of sapid bodies, which do not fall under the scrutiny of our senses. But the nature or disposition of the covering with which the papillæ are clothed, together with that of the juices, and of the aliments lodged in the stomach, have a considerable share in determining the sense of taste; inasmuch, that the same flavour does not equally please or affect the organs in all ages alike, nor in persons of all temperaments; nor even in the same person at different times, and in different states of health or disease. In general, whatever contains less salt than the saliva itself, seems insipid.

Nature designed the difference of tastes to be felt by the tongue, that we might know and distinguish such foods as are most salutary; for, in general, there is not any one kind of wholesome aliment that is of a disagreeable taste; nor are there any ill-tasted substances that are fit for our nourishment. By excess, indeed, the most wholesome food becomes prejudicial. Nature has invited us to take necessary food, as well by the pain called hunger, as by the pleasure arising from the sense of taste. But brute animals, who have not like us, the advantage of learning from each other by instruction, have the faculty of distinguishing flavours more accurately, by which they are admonished cautiously to avoid poisonous or unwholesome food; and therefore it is that, in herbivorous cattle, to which a great diversity of noxious plants is offered among their food, the tongue is of a more exquisite texture, and furnished with larger and longer papillæ, than in man, to whom they are less necessary.

The *larynx* forms the protuberance in the upper and anterior part of the neck, called commonly *pomum Adami*. This is larger and more prominent in men than in women. It consists chiefly of five cartilages; the names of which are these: Cartilago-thyroides, which is the anterior and largest; cricoides the inferior, and basis of the rest; two arytenoides, the posterior and smallest; and the epiglottis, which is above all the rest. These cartilages are connected together by ligaments, and they have likewise muscles, glands, membranes, &c. The larynx serves particularly to admit and let out the air in respiration; and the solidity of the pieces of which it is composed, hinders not only external objects, but also any hard thing which we swallow, from disordering this passage. The glottis, being a narrow slit, modifies the air which we breathe; and, as it is very easily dilated and contracted, it forms the different tones of the voice, chiefly by means of the different muscles inserted in the cartilaginous arytenoides, to which the other muscles of the larynx, both proper and common, are assistants. The facility of varying and changing the tone of the voice depends on the flexibility of the cartilages of the larynx, and decreases in proportion as we advance in age; because these cartilages gradually harden and ossify, though not equally soon in all persons. Hence the larynx is the principal organ of the voice; for, that being injured, the air passes through the wind-pipe without yielding any sound; but when it is driven from the lungs.

lungs in expiration through the trachea into the larynx, and through the glottis into the mouth, it produces voice, speech, and singing. The strength of the voice is proportional to the quantity of air blown out, together with the narrowness of the glottis; and, therefore, a large pair of lungs easily dilatable, an ample cartilaginous and elastic larynx and wind-pipe, a free echo of the nostrils, and a powerful expiration, all conduce to this effect. *Singing* is when the voice, modulated through various degrees of acuteness and gravity, is expelled through the larynx, while it is trembling and suspended between two contrary powers; and herein lies the principal difference between the chanting of simple notes and the expression of words. *Speech* is performed by the larynx at rest, or held in the same place, with tones of voice differing but little in acuteness and gravity; but then the voice is variously changed or modulated by the organs of the mouth. *Singing* has a variation in the tone or cadence of the voice, together with a modulation of it by the organs of the mouth at the same time.

The *pharynx* is a muscular and glandular bag; the outer surface of which is closely joined to the inner surface of all the space which is at the bottom of the mouth, behind the posterior nares, uvula, and larynx, and which reaches from the cuneiform process of the os occipitis all the way to the œsophagus, which is a continuation of the pharynx.

The *salivary glands* furnish that fluid by which the mouth and tongue are continually moistened in their natural state; and they may be enumerated in the following manner: glandulæ parotides, glandulæ maxillares, glandulæ sublinguales, glandulæ molares, glandulæ buccales, glandulæ labiales, glandulæ linguales, amygdalæ, glandulæ palatinæ, glandulæ uvulæ, glandulæ arytenoidæ, glandulæ thyroidæ. All the inside of the cheeks, near the mouth, is entirely full of small glandulous bodies, called *glandulæ buccales*, which open by small holes or orifices through the inner membrane of the mouth. The membrane which covers the inside of the lips, which is a continuation of that on the cheeks, is likewise perforated by a great number of small holes, which answer to the same number of small glands, called *glandulæ labiales*. We might likewise reckon among the salivary glands those of the superior portion of the pharynx, and also the follicles of the membrana pituitaria of the nares, and of the sinuses which communicate with them.

Such hard and tough foods as consist of long parallel fibres, or are covered with a bony shell or cartilaginous skin, generally require mastication to divide them into less cohering parts, that they may more easily yield their nourishment to the dissolving powers of the stomach. The more diligently they are subdivided in the mouth, the more relishing and agreeable they become to the stomach; and the nearer they approach to the nature of a fluid, the more easily are they digested or assimilated. Most animals, therefore, are provided with teeth extremely hard; and, as the materials of our food are various in their texture and firmness, nature has accordingly furnished us with teeth variously figured. The office of the incisores is only, in the softer foods, to cut those which are tougher than the rest into smaller portions; such as the fibres and membranes of animals and vegetables, with the brittle seeds and kernels of fruits. The canine teeth lacerate tough aliments, and hold fast such as require long trituration by the grinders. By the motion of the jaw in mastication, the salivary glands are compressed, so as to discharge their juices into the mouth in great plenty; and the food being ground between the teeth, and intermixed with the watery saliva and air, is broken down into a soft juicy pulp, replete with elastic air; the food afterwards undergoes a farther dissolution from the warmth of the parts causing the air to expand, and, by its elasticity, burst asunder the particles of the food, between which it is included and confined. In this act of mastication, the oily, aqueous, and saline, parts of the food are intermixed the one with the other; the

smell and taste of different ingredients are lost in one, which, by the dilution of the saline parts with saliva, renders the food flavourable; but such particles as are more volatile and penetrating, being directly absorbed by the bibulous vessels of the tongue and cheeks, enter straight into the blood-vessels and nerves, so as to cause an immediate recruit of the whole faculties.

OF THE THORAX.

By the thorax we commonly understand all that part of the body which answers to the extent of the sternum, ribs, and vertebrae of the back, both outwardly and inwardly. It is divided into the anterior part, called commonly the *breast*; the posterior part, called the *back*; and the lateral parts, called the *right and left sides*. The external parts of the thorax, besides the skin and membrana adiposa, are principally the mammae; and the muscles which cover the ribs, and fill the spaces between them. The internal parts are contained in the large cavity of that portion of the trunk which the ancients called the *middle venter*, but the moderns name it simply the *cavity of the breast*. This cavity is lined by a membrane named *pleura*, which forms the mediastinum; and contains the heart and lungs, with the vessels, &c. which go in or from them: through it, likewise, the œsophagus passes to the stomach; and part of the nerves are contained in it which go the contents of the abdomen.

The name of *mamma*, or *breasts*, is given to two eminences, more or less round, situated in the anterior, and a little towards the lateral parts of the thorax. Their size and figure vary in the different sexes and different ages. The body of the mamma is partly glandular, and partly consists of fat; or it is a gland of the conglomerate kind, surrounded on all sides with cellular substance and fat. The glandular part is divided into little masses, separated also by fat, and again subdivided into small granules, from which the lactiferous ducts arise. The cellular pellucula support a great many blood-vessels, lymphatics, and serous or lactiferous ducts, together with small glandular molecules.

The *areola*, or coloured circle or disk round the papilla or nipple, is formed by the skin; the inner surface of which sustains a great number of small glandular molecules, of that kind which Morgagni calls *glandulæ sebaceæ*. These tubercles are perforated by small holes, through which a kind of sebaceous matter, more or less liquid, is poured out, to defend the areola and nipple. The texture of the nipple is spongy, elastic, and liable to divers changes of consistence, being sometimes harder, sometimes more flaccid. It seems to consist chiefly of ligamentary fasciculi, gently folded, or curled; among which, those near the circumference of the nipple seem to have a transverse or annular disposition, which, however, is not uniform. This disposition or direction seems to be owing to the elastic folds; and, from this simple structure, it is easy to explain how infants, in sucking, and women in drawing the teats of cows, bring out the milk. For the excretory tubes, being wrinkled in the same manner as the fasciculi, do, by these wrinkles or folds, as by so many valves, hinder the milk contained in the ducts from flowing out; but, when the nipple is drawn and elongated, the tubes lose their folds, and the passage becomes straight. Those who understand the principles of the air-pump, will more readily conceive the manner in which the child draws out the milk.

The *pleura* is a membrane which adheres to the inner surface of the ribs, sternum, and convex side of the diaphragm. It is of a very firm texture, and is supplied with blood-vessels and nerves, in all which it resembles the peritonæum. Each side of the thorax has its particular pleura, entirely distinct from the other, and making, as it were, two great bladders, situated laterally with respect to each other in the great cavity of the breast, in such a manner as to form a double septum or partition, running between the vertebrae and the sternum. This particular duplicature is termed *mediastinum*; the two laminae of which are closely united together; but, in the middle, and towards the lower part

of the fore-side, they are separated by the pericardium and heart. A little more backward, they are parted in a tubular form by the œsophagus, to which they serve as a covering; and, in the most posterior part, a triangular space is left between the vertebræ and the two pleuræ from above downward, which is filled chiefly by the aorta. The pleura is connected to the membranous portion of the sternum, ribs, and muscles; to the diaphragm, pericardium, thymus, and vessels; and, in a word, to whatever lies near its convex side. The pleura serves in general for an inner integument to the cavity of the thorax. The mediastinum cuts off all communication between the two cavities, and hinders one lung from pressing on the other when we lie on one side. It likewise forms receptacles for the heart, pericardium, œsophagus, &c.

The œsophagus is a canal partly muscular and partly membranous; which commences at the inferior part of the pharynx, and descends along the neck and back-part of the thorax, into the abdomen. While it lies in the neck, it is placed between the middle and left part of the cervical vertebræ behind the left part of the trachea; in the thorax it is situated between the layers of the posterior mediastinum, and descends to the fourth or fifth vertebræ of the back, in the same direction which it had above; there it inclines a little from left to right, till it reaches the ninth rib, to make way for the aorta; afterwards it inclines from right to left, and from behind forward, to get through the diaphragm into the upper orifice of the stomach. It is made up of several coats, almost in the same manner as the stomach, of which it is the continuation. The first coat, while in the thorax, is formed only by the duplicature of the posterior part of the mediastinum, and is wanting above the thorax and in the neck, where the outer coat of the œsophagus is only a continuation of the cellular substance belonging to the neighbouring parts. The second coat is muscular, being made up of several strata of fleshy fibres. The outermost are mostly longitudinal, and their quantity is much greater than that on the rest of the alimentary canal; but they are not all continued from one end of the œsophagus to the other. The third is termed the *nervous coat*, and is like that of the stomach and intestines. It is differently folded or plaited, according to its length, being much wider than the muscular coat; and it is surrounded by a whitish, soft, fine, filamentary substance, like a kind of cotton, which, when steeped in water, swells and grows thicker. The fourth or innermost coat resembles, in some measure, that of the intestines; except that, instead of the villi, it has small and very short papillæ. It is folded lengthwise like the third coat; so that the œsophagus, when cut across, represents one tube within another. Through the pores of this coat a viscid lymph is continually discharged.

The *thymus* is an oblong, soft, glandular, body, round on the upper part, and divided below into two or three great lobes, of which that towards the left side is the longest. It lies between the duplicature of the superior and anterior portion of the mediastinum, and the great vessels of the heart. Among the various opinions about the use of this substance, some have thought it served only to fill a part of the thorax of the fœtus in the collapsed state of the lungs, because its size decreases after the lungs are dilated. Its particular inward structure and secretions are not as yet sufficiently known, so as to enable us to determine its uses; which, however, seem to be designed more for the fœtus than for adults.

The *pericardium* is made up of three laminæ, the middle and chief of which is composed of very fine tendinous filaments, which are best seen in old persons; they are closely interwoven, and cross each other in different directions. The internal lamina seems to be a continuation of the outer coat of the heart, auricles, and great vessels. It is perforated by an infinite number of very small holes, through which a serous fluid continually transudes, in the same manner as in the peritoneum; there being no glands for this purpose, as some have supposed. This fluid, being

gradually collected after death, makes what is called *aqua pericardii*, which is found in considerable quantities in opening dead bodies while they remain fresh.

OF THE HEART.

The heart is a muscular body, situated in the cavity of the thorax, on the anterior part of the diaphragm, between the two laminæ of the mediastinum. It is nearly of a conical figure, flattened on the sides, round at the top, and oval at the basis. Accordingly we consider in the heart, the basis; apex; two edges, the one right and the other left; and two sides, one of which is generally flat and inferior, the other more convex and superior. The heart is hollow within, and divided by a septum which runs between the edges into two cavities, called *ventriculi*; one of which is thick and solid; the other thin and soft. The latter is termed the *right ventricle*, the other the *left*. The right ventricle opens into the right auricle, and into the trunk of the pulmonary artery; the left into the left auricle, and into the great trunk of the aorta. At the edges of these orifices are several moveable pelliculæ, called *valves*; of which some are turned inward towards the cavity of the ventricles, called *triglochinæ*, or *tricuspidæ*; others are turned towards the great vessels, called *femilunares*, or *sigmoidales*. The valvulæ tricuspidæ of the left ventricle are likewise termed *mitrales*.

The fleshy or muscular fibres, of which the heart is made up, are disposed in a very singular manner, especially those of the right or anterior ventricle; being either bent into arches, or folded into angles. The fibres which are folded into angles are longer than those which are only bent into arches. The middle of these arches, and the angles of the folds, are turned towards the apex of the heart, and the extremities of the fibres towards the basis. These fibres differ not only in length, but in their directions, which are very oblique in all, but much more so in the long or folded fibres than in the short ones, which are simply bent. The tubes which cross each other transversely are much more numerous than those which cross longitudinally; which ought to be taken notice of, that we may rectify the false notions that have been entertained concerning the motion of the heart, namely, that it is performed by a contortion or twisting like that of a screw, or that the heart is shortened in the time of contraction, and lengthened in dilatation.

The valves at the orifices of the ventricles are of two kinds: one kind allows the blood to enter the heart, and hinders it from going out the same way; the other kind allows the blood to go out of the heart, but hinders it from returning. The valves of the first kind terminate the auriculæ; and those of the second lie in the openings of the great arteries. The first are termed *femilunar* or *sigmoidal valves*; the others, *triglochinæ*, *tricuspidal*, or *mitral*. The femilunar valves are six in number, three belonging to each ventricle, situated at the mouths of the great arteries; and they may be properly enough named *valvulæ arteriales*. Their concave sides are turned towards the cavity of the arteries, and their convex sides approach each other. In examining them with a microscope, we find fleshy fibres lying in the duplicature of the membranes of which they are composed. The great artery that goes out from the left ventricle, is termed *aorta*. As it goes out, it turns a little towards the right, and then bends obliquely backward, to form what is called *aorta descendens*. The trunk of the artery which goes out from the right ventricle is called *arteria pulmonaris*. This trunk, as it is naturally situated in the thorax, runs first of all directly upward for a small space; then divides laterally into two principal branches, which are attached to the lungs.

The auricles are muscular bags situated at the basis of the heart, and their capacities are in proportion to those of their respective ventricles; one towards the right ventricle, the other towards the left, and joined together by an inner septum and external communicating fibres, much in the same manner with the ventricles; one of them being

named the *right auricle*, the other the *left*. They open into the orifices of each ventricle, called *auricular orifices*; and they are tendinous at their opening, in the same manner as the ventricles. The right auricle is larger than the left; and it has two other openings united into one, and formed by two large veins which meet and terminate there, almost in a direct line, called *vena cava superior* and *inferior*. At the mouth of the inferior cava we find a membrane in form of a crescent, described by Eustachius, and named from him. The left auricle is a kind of muscular bag or reservoir, of a considerable thickness, and unequally square, into which the four *venæ pulmonares* open, and which has a distinct appendix belonging to it, like a third small auricle. This bag is very even on both surfaces, and is therefore called *sinus venosus*; but, to distinguish it from the one on the right side, it is called *sinus venosus sinister*.

Besides the great common vessels, the heart has vessels peculiar to itself, called the *coronary arteries* and *veins*, because they in some measure crown the basis of the heart. The coronary arteries, which are two in number, go out from the beginning of the aorta, and afterwards spread themselves round the basis of the heart, to the substance of which they send numerous ramifications. The coronary veins are distributed exteriorly, much in the same manner. The largest opens into the posterior inferior part of the right auricle, by an orifice which is furnished with a valve, first described by Eustachius. Besides the coronary veins, the heart has other anterior veins, called *venæ innominate*. Some of them go into the right auricle, others end in the right ventricle; and there are other veins still smaller, which are found in the substance of the heart, and which terminate in the right sinus and auricle. The nerves of the heart, are from the par vagum and great sympathetics: these form the cardiac plexus, which sends off branches to the pericardium, to the roots of the great vessels, and are spent at last on the different parts of the heart.

The heart lies almost transversely on the diaphragm, the greatest part of it being in the left cavity of the thorax, and the apex being turned towards the bony extremity of the sixth true rib. The basis is towards the right cavity; and both auricles, especially the right, rest on the diaphragm; but the situation of the heart during life changes a little, according to the state of respiration, and to the position of the body.

The heart, and the parts belonging to it, are the principal instruments of the circulation of the blood. The two ventricles ought to be considered as two syringes, so closely joined together as to make but one body, and furnished with suckers placed in contrary directions to each other, so that by drawing one of them a fluid is let in, and forced out again by the other. When the fleshy fibres of the ventricles are contracted, the two cavities are lessened in an equal and direct manner; and the fleshy fibres do the office of suckers, by pressing upon the blood contained in the ventricles; which blood being thus forced towards the basis of the heart, presses the tricuspidal valves against each other, opens the semilunares, and rushes with impetuosity through the arteries and their ramifications, as through so many elastic tubes. The blood, thus pushed out, enters the capillary vessels, and is from thence forced to return by the veins to the auricles, which, like retirements, or antichambers, receive and lodge the blood returned by the veins during the time of a new contraction. This contraction of the heart is termed *systole*. The contraction or systole of the ventricles ceases immediately, by the relaxation of their fleshy fibres; and, in that time, the auricles which contain the venal blood, being contracted, force the blood through the tricuspidal valves into the ventricles, the sides of which are thereby dilated, and their cavities enlarged. This dilatation is termed *diastole*. In this manner does the heart, by the alternate systole and diastole of its ventricles and auricles, push the blood thro' the arteries to all the parts of the body, and receive it again by the veins. This is called the *circulation of the blood*, which is carried on in three different manners. The first

and most universal kind of circulation is that by which almost all the arteries of the body are filled by the systole of the heart, and the greatest part of the veins evacuated by the diastole. The second kind of circulation is through the coronary vessels of the heart, the arteries of which are filled with blood during the diastole of the ventricles, and the veins emptied during the systole. The third kind of circulation is that of the left ventricle of the heart; thro' the venal ducts of which a small quantity of blood passes, without going through the lungs, which is the course of all the remaining mass of blood.

There resides in the heart a kind of desire to be stimulated, so that, even when it is almost dead, wrinkles radiating from a point appear in many places, and trembling motions are propagated through different parts of its surface. Again, the heart, when torn out and cold, on being pricked, inflated, or irritated, contracts itself; and its fibres, when dissected, corrugate themselves orbicularly, when there is neither nerve nor artery to bring it supplies of any kind. This irritability is greater, and remains longer in the heart, than in any other part of the body; for, by stimulating the heart, its motion may be renewed at a time when that of no other muscle can. The heart of the fœtus is most irritable, as well as larger in proportion, than in adults, and most tenacious of its motion, even in the cold. The motion of the heart appears to be innate, coming neither from the brain nor the soul; it remains even when the heart is removed from the body, and it can neither be increased nor retarded by the will. It is, therefore, evident, that the stimulus occasioned by the venous blood driven into the heart, causes it to contract. This contraction is convulsive, made with great celerity, and a manifest corrugation of the fibres. The blood, thus impelled from the sides towards the axis of the contracting heart, endeavours to escape in that direction, and, by rushing like a wedge between the valves, presses their loose edges against the sides of the pulmonary artery, so as to run freely out of the heart. The blood now received into the pulmonary artery circulates through the lungs; for, when it has once entered the pulmonary artery, it cannot return to the heart; because its valves are of such dimensions, that, when distended, they perfectly shut up the opening at the heart; and they are so strong that they resist a much greater force than the contraction of the pulmonary artery. The *pulmonary veins* run into larger branches, which at last terminate in four trunks; to which it has been customary to affix a name in the singular, by calling them the *pulmonary vein*. These enter the cavity of the pericardium, from whence they receive an external covering, and are then inserted into the corners of the left or posterior sinus, which is called the *pulmonary sinus*. In this course the upper veins descend, and the lower ones ascend. In this left sinus the blood waits for the heart's relaxation, when it is driven into the left ventricle, in the same manner as the right auricle impelled its blood into the right ventricle. Thus the same blood is now arrived into the left ventricle, which was a little before sent from the *venæ cavæ* into the right auricle. This course of the blood, from one side of the heart to the other, through the lungs, is called the *pulmonary* or *lesser circulation*, and was known to many of the ancients. Again, this left ventricle being excited to motion by the impelled blood, from the same irritable nature already mentioned, contracts, and drives its contained blood with a violent motion in the direction of its axis, the tip or cone of the heart being at the same time drawn nearer to its basis. And since the apparatus of the mitral valves is here the same as in the tricuspid, the blood now expanding the ring from whence they arise removes that valve which lay against the mouth of the aorta, and opens a way for itself into the artery. After the contraction of the heart, follows its relaxation or diastole, in which it becomes empty, lax, and soft, recovers its former length, the ventricles recede from the septum, and the basis from the apex. But, while it is in this state, the blood in the auricles, having been, as it were, in a state of expectation, rushes

rushes through the openings of the valves of the veins, dilates the opposite sides of the heart, and increases all its dimensions. After the auricles have freed themselves of the blood they contained, they are in like manner relaxed, and their opposite sides remove from each other. The blood then collected in the *venæ cavæ* and pulmonary veins fills the auricles by the contraction of the veins; renders them long, broad, and thick, like the ventricles; and even distends and fills the dentated processes of the crested margin. These motions of the right and left auricle, with the right and left ventricle, are not performed in that succession in which, for the sake of method, we have here described them; for both the auricles are contracted, while both the ventricles are relaxed: so that the contraction of the auricles precedes the contraction of the ventricles. This fact is ascertained by experiments on dying animals, and on animals with cold blood. Those who have inadvertently taught otherwise, have not taken the advantage of making a sufficient number of experiments on living animals. That the auricle, near death, makes frequent palpitations before the ventricle of the heart performs one contraction, is certainly true. The auricle, with its sinus, forms one cavity; and both are filled and both emptied in the same instant.

It may be asked, Why the heart is not wearied, or becomes painful, by so rapid, long continued, uninterrupted, and violent, a motion? The heart contracts, in a healthy person, about 5000 times in an hour, and never ceases its alternate contractions and dilatations from the first beginning of its existence till death? Why, then, does it not, like other muscles, become tired, in a very few hours, by such violent motions? How is its strength preserved? Different answers have been given to these questions by different professors, founded either on a compression of the cardiac nerves between the large arteries, or on an alternate repletion of the coronary arteries and cavities of the heart, &c. But to Dr. Haller the simplicity of nature in this matter is very conspicuous. When the auricle is relaxed, it is directly filled by the muscular force of the continuous great vein; and the heart contracts when it is irritated by the blood being driven into it from the auricle, and thus empties itself of the blood. Being freed from the stimulus, it immediately relaxes or relaxes itself. The heart being now relaxed, the auricle is, in like manner, irritated by its contained blood, and, by contracting, fills the heart again; while the incessant actions of the heart and arteries continually urge new blood into the right sinus and auricle. That this is the true cause of the heart's motions is proved from actual experiment and observation. The successive repletions and contractions made in the great vein, auricle, ventricle, and artery, are plainly and easily seen in a weak or expiring animal; but, more especially, and more evidently, in those animals which have but one ventricle in the heart, as the tortoise, frog, snake, fishes; and in the chick hatching in the egg, which, instead of a heart, has only one crooked canal. Besides, it is confirmed from the inertia of the heart, produced by tying the veins; and, from the return of its motion, when the ligatures are unloosed; provided these phenomena are sufficiently valid; but it is more unequivocally corroborated by injection, and by the experiment of inflating a frog's heart with a small bubble of air, which we see alternately pass from the ventricle to the auricle and back again for many hours. The left ventricle first ceases its motion; then the auricle of that side; then the right ventricle; after that the right auricle; and, last of all, the pulmonary veins and *venæ cavæ*. Whatever motion is in the *venæ cavæ*, ought to be attributed to the auricle repelling the blood into both these veins, and which the heart, when dead, is not capable of receiving. Dr. Haller believes that nothing more is requisite to produce the heart's motion than a continual stimulus applied to a very irritable part. For, on the approach of death, the coldness of the limbs contracts the veins, and drives the blood to the heart; the lungs, being impermeable for want of respiration, transmit no blood to the cavities of the left side; and

the heart, after it is thoroughly emptied, remains at rest. The velocity of the blood, at its entrance into the aorta, and the force with which it is expelled from the heart, have been subjects of much controversy; and different anatomists have computed them differently. To determine the velocity, modern writers proceed on the following data. They suppose that two ounces are expelled by each systole, that each systole is the third part of the whole pulsation, and is performed in healthy persons in $\frac{1}{25}$ part of a minute, that the area of the aorta is 0.4187 of an inch, and that two ounces of blood occupy a space of 3.318 cubic inches; or, in other words, that a cylinder of blood, whose solidity is 3.318 inches, and base 0.4187, is expelled by the heart in $\frac{1}{25}$ part of a minute. Since the solidity of a cylinder is the product of the area of its base into the length, its length will be equal to the solidity divided by the base; therefore, in this case, 3.318 divided by 0.4187 gives 7.9245 for the length which the blood runs in $\frac{1}{25}$ part of a minute; that is, 148 feet 7 inches in a minute. To determine the force, they suppose that the perpendicular jet from the heart is 7 feet 6 inches, and the area of the surface of the ventricle is 15 inches; these two numbers multiplied give 1350 cubical inches, or 51 pounds of blood against which the heart acts. The heart, therefore, sends a weight of 51 pounds, with the velocity of 149 feet in a minute.

The above computation may perhaps be inaccurate, both from the omission of some circumstances that ought to have been taken into the account, and from the inaccuracy of the data; but that the heart appears to be a very powerful machine, is evident from the great difficulty we have in filling all the red blood-vessels by anatomical injections, and the utter impossibility of filling all the smaller ones; yet the heart, we see, not only gradually distends all the larger, the smaller, and even the least, vessels, with blood, but also drives it forward through them with a considerable velocity. Even in the least arteries, the blood is urged forward by the heart with such a force as to make the alternate motions of that powerful muscle perceptible; even in such animals as are scarcely visible to the naked eye, and in the small embryos of insects.

Moreover, that we may make a just estimate of the heart's force in living animals, we must consider what great resistances that complex muscle overcomes: we must compute the enormous weight of the whole mass of blood; a mass perhaps of fifty pounds and upwards: for all the quantity of fluids, once stagnant in a person lately drowned or fainting away, are easily put into their former motion by the heart alone. We must also consider the great decrease of the blood's velocity, arising from the greater capacity of the dividing branches; and yet, even in the least vessels, its velocity is very considerable, as appears by the Sanctorian perspiration seen to fly rapidly off like smoke, and by the quick motion of the blood seen, by the help of microscopes, in fishes tails. Frictions in every machine always consume the greatest part of the moving forces; and these frictions will doubtless be very large in the human body, whose blood and juices are extremely viscid, and whose vessels are so small as scarcely to allow more than a single globule to pass at a time, and even that not without changing its figure. All these resistances being considered, we may without doubt conclude that the force of the heart must be extremely great, in order to preserve the motion so strong as we perceive it in the least arteries. Another argument of the heart's force is, that aneurisms and arteries are burst, and very great weights, as well as the body itself, raised by the force of the heart's systole.

The liquor which is contained in the arteries and their corresponding veins, is known by the general name of *blood*. It appears homogeneous, is coagulable, and of a red colour; it is redder in strong and well-fed animals, and generally yellow in such as are weak and starved. White streaks sometimes appear in it, in consequence of the chyle. But from various experiments it is certain, that this animal liquor contains very different ingredients. That fire

is contained in the blood may be proved from its heat, which, in human blood, and that of some other animals, is from 92 to 100 degrees of Fahrenheit's thermometer, which is more than the mean degree of atmospheric heat, but less than the greatest. Dr. Wrisberg says, that it differs in man, according to age, temperament, state of mind, motion or rest of body, climate, weather, kind of life, meat and drink, health, and the various species and violence of disease. It is also certain that the degree of heat in the body increases a little from an augmentation of heat in the atmosphere; but it does not rise to the greatest pitch of summer heat. We can live in a much greater heat than the heat of the warmest summer, as is proved by persons employed in sugar-houses, melting-furnaces, by mowers, and the use of baths and stoves in Finland and Russia; and also by the late experiments of Fordyce, Blagden, Hunter, and Dobson. The heat of the blood is sometimes so diminished in an intense cold, that in a person frost-bitten, but not dead, a thermometer applied to the mouth, armpits, groins, and even the vagina, would not rise above 76° of Fahrenheit. Is the matter of heat in the blood alone? This is sufficiently probable from phenomena; for the heat of the body is diminished by hæmorrhage, or when the blood is intercepted by ligature and compression from reaching the joints, and is restored when the blood returns. Again, a kind of volatile vapour or exhalation continually flies off from the warm blood, which has a sort of foetid smell, intermediate between that of the sweat and urine. After this vapour has dissipated, the blood of a healthy person spontaneously congeals into a scissile trembling mass, especially in a heat of about 130 degrees, and sooner in feverish persons than in such as are in health. It sometimes coagulates in the veins of a living person, and is found clotted in wounds of the arteries. The principal part of this coagulated mass is the *crassamentum* or *crur*, which has the red colour peculiar to itself, and gives it to the other parts of the blood. This, if it be not kept fluid by the attrition of a vital circulation, or some similar concussion, runs into a confused compact, but soft, mass, like liver, merely by rest and a moderate degree of cold; as it also does by the addition of alcohol, by mineral acids, or by a heat of 150 degrees. It is, either as a fluid or a solid, specifically heavier than water by near an eleventh part; and, when freed from its water, it is inflammable. In a mass of healthy blood, one half or upwards is red cruor; and, in strong laborious people, the serum makes only a third part; and is still more diminished in fevers, often to a fourth or fifth part of the mass.

The white yellowish watery part of the blood, commonly called serum, which separates from this coagulum, transuding, as it were, through its pores, forms a fluid in which the coagulum sinks; this again seems, though it really is not so, a homogeneous liquor; it is, in general, one thirty-eighth part heavier than water, and almost a twelfth part lighter than the red globular mass of crassamentum. By a heat of 150 degrees, or by mixture of mineral acids or alcohol, and by a concussive motion, it is coagulable into a much harder mass than the red cruor, and forms first an indissoluble glue, then a flesh-like membrane, and at length shrinks up to a horn-like substance or friable gum. The pleuritic crusts or skins, polypuses, and artificial membranes, are formed from this part of the blood. By putrefaction alone, or the dissolving power of the air, in a heat equal to 96 degrees, the whole mass, but especially the serum, dissolves or melts into a foetid liquor; first the serum, and then the cruor more slowly, till at length the whole mass, both of serum and cruor, is turned into a volatile and foetid exhalation, leaving very few feces behind.

The exact mass or quantity of blood contained in the whole body cannot be certainly computed. The weight of the mass of humours, however, is much greater than that of the solids; but many of them, as the gluten and fat of particular parts, do not flow in the circulation. But, if we may be allowed to form a judgment from those pro-

fuse hæmorrhages that have been sustained without destroying the life of the patient, and from experiments made on living animals by drawing out all their blood, the mass of circulating humours will be at least fifty pounds; of which, about twenty-eight will be true red blood, running in the arteries and veins; of which the arteries contain only four parts, and the veins nine. The blood does not always contain the same proportion of the principles above-mentioned. For an increased celerity, whether by laborious and strong exercises, a full age, fever, or otherwise, augments the crassamentum, the redness, the congealing force, and the cohesion of the particles; and the hardness and weight of the concreted serum with the alkaline principles are increased by the same means. On the other hand, the younger and less active animal, and the more watery or vegetable the diet on which it is fed, the crassamentum of the blood is proportionably lessened, and its serum and mucus increased. Old age, again, lessens the crassamentum, and the gelatinous part likewise.

From these principles, and a due consideration of the solid fibres and vessels, the different temperaments are derived. For a *plethoric* or *sanguine* habit arises from an abundance of the red globules; a *phlegmatic* temperature from a redundancy of the watery parts of the blood; a *choleric* disposition of the humours seems to arise from a more acrid and alkalescent property of the blood; as appears from those, who live on flesh and on the human species, being so much fiercer and more passionate than those who live on vegetable food. A great firmness in the solid parts, joined with an exquisite sensibility, or nervous irritability, disposes to a choleric habit; a less irritability, with a moderate density, to a sanguine habit; and a less degree, both of density and irritability, are to be referred to a phlegmatic temperament. There is also a kind of dull heavy temperament, in which there is the greatest strength of body, joined with no great degree of irritability. In the melancholic, again, a weakness of the solids is joined with the highest degree of nervous irritation or sensibility. But we must not describe the temperaments too systematically; for they are found to be not only four or eight, but almost infinitely varied.

The red part of the blood seems chiefly of use to generate heat, since its quantity is always in proportion to the heat of the blood. The globular figure of its parts, together with their density, makes it easily pervade the vessels; and the quantity of iron it contains, as well as of oil, perhaps increases its power of generating heat. And hence it is, that the red part of the blood being too much diminished by profuse bleedings, there follows a stagnation or lessened motion of the humours in the smaller vessels; whence fatness and dropsy. By the same rule also a due proportion of cruor is necessary within the habit, to generate new blood. For, by large hæmorrhages, we see the blood loses its red and dense nature, and degenerates into a pale, serous, or watery, state. Health, therefore, cannot subsist without a dense and red blood; and, if its quantity be too much diminished, a stagnation of juices takes place, whence the whole body becomes pale, cold, and weak. Nor can life or health subsist without a sufficiency of thinner juices intermixed with the red blood; since the cruor, deprived of its watery part, congeals and obstructs the smallest passages of the vessels, and causes too great a heat.

"The theory of the temperaments of the human body (says Dr. Wrisberg), in the sense commonly received by physicians, and taught in the schools, the received division of them into four species, and their repeated production from the different nature and mixture of the blood, favours too much of the ancient and particularly of the Galenical doctrine. I think there can be no doubt that there are temperaments; and that the manner and rule which nature follows in man, and likewise in perfect animals, may be observed in the performance of the corporeal and mental functions, in either preserving or endangering health, in the exercise of most of the duties and affairs

affairs of life, and in the actions of the internal and external parts, which are more or less connected with the health of the animal.

"The causes of diversity of temperament seem to be, 1. The various quantity, firmness, and sentient faculty, of the nervous system, from the brain communicated to each nerve. I have always observed a choleric disposition in all persons having a large brain and thick strong nerves, along with a great sensibility as well of the whole body, as of the organs of sense. Hence arises a ready apprehension of objects, and an increase of understanding and knowledge, and, owing to the comparison of many ideas, an acute and entire judgment, which choleric persons possess in so eminent a degree. But, along with this condition of the nerves, these people are excessively liable to grief and anger, when the body or mind is but slightly affected; and on this account medicines should be cautiously given, and less doses prescribed to them. With a small brain, and slender nerves, I have observed the senses more dull. These people therefore require from external objects stronger impressions upon the organs of sense, and these impressions longer applied, if they are meant to leave lasting effects. Hence their judgment is frequently weak on account of the defect of ideas; and they seldom acquire any extensive knowledge. But nature has compensated these disadvantages, by making them more able to undergo hardships, from change of climate, life, or labour; they demand more powerful medicines, and larger doses. 2. The various degrees of irritability in the muscular parts. For, wherever you find a very delicate irritability, affected by almost every stimulus, and retaining lasting impressions, and at the same time acting with a certain celerity; in that case you cannot doubt of a choleric disposition. Hence that remarkable strength in the muscles of some persons, which act with incredible quickness, dispatch, and constancy. On the contrary, if you examine a phlegmatic person, you observe the contractile power of the muscles languid, and long of being determined to motion, although strongly excited. 3. Even a certain softness is observable in all fibres and membranes, if you touch the body of a phlegmatic person; or a seeming hardness and dryness in melancholic habits. Along with which particularities the phlegmatics join less elasticity, whilst, in the melancholic, there is a greater tone and contractile power. 4. There is in the air, undoubtedly, a certain electrical principle, which being by respiration communicated in different ways with the body, imparts a natural tone to the fibres, occasions a quicker motion in the vessels, and increases and diminishes by turns the alacrity of the mind. But, as this principle of atmospheric air does not prevail in equal quantity every hour of the day, all times of the year, and in every climate; so sometimes we feel an universal lassitude, which suddenly ceases, the strength of the body and mind being restored with a serene and elastic air; so, in like manner, all men do not equally absorb this electric matter, which thus forms a remarkable diversity of temperament. 5. We ought, too, to combine with these the various nature of the blood from the proportion of its elements. And, in fact, as greater stimuli in the blood excite the heart to brisker contractions, so a more acrid and copious bile may effectually promote the peristaltic motion, and the abundance of mucus occasion a tendency to lentor and frequent catarrhs.

"There are then sufficient causes, which, from our birth, may bring on, in the first growth of the parts of the body, an irrevocable determination to this or that habit or temperament. I therefore can scarcely admit a complete transmutation of temperament, which, during the exercise of these natural laws, could render a purely choleric person phlegmatic. But, that some change may take place in temperaments, that violent attacks may be mitigated, that lentor, torpor, and listlessness, may be increased, I readily agree; and, from the remedies by which such a change may be produced, I form a second class of the causes of temperaments. The chief are, 1. A different kind

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of meat and drink. An animal diet adds a great stimulus to our strength, invigorates our senses, and sometimes induces ferocity; as is evident from the Anthropophagi, carnivorous animals, wild beasts and their whelps, and hunters, particularly if the abuse of aromatics, wines, and medicines, has supervened. Vegetables, on the contrary, increase the lentor of the fibres, weaken the strength, diminish sensibility and irritability; in a word, induce a phlegmatic disposition; in which potatoes have a wonderful effect. It would be of great consequence to pay regard to this in the bringing up of children, viz. to invigorate the inertia of the mental and corporeal faculties by the use of animal food, but to temper the vehement passions peculiar to choleric persons, by using a vegetable diet. 2. The particular mode of education and examples. It need scarcely be insisted on that these possess great influence, particularly in infancy. Hence it happens that whole nations are of one temperament. 3. Climate, weather, native country. Rarely in an unsettled climate or country, in hot climates, or in moist countries, will you find in choleric persons that alacrity of temper, agility of body, and quickness of understanding, which is so common in a serene and temperate climate, and high hilly countries. 4. The increase of knowledge. I have often admired that change which a strenuous industry produces in some of the most dull men; so that, with the increase of knowledge, they became of a more cheerful temperament. 5. Abundance and want of necessities, both in life, and for the purpose of forwarding improvement. For this reason, it may happen that, according to the diversity of the form of government, whether under mild or more severe and tyrannical laws, the temperament of the subject may be either lively or languid. 6. The sort of life itself, intercourse with men, and public employment, may have a great share in changing temperaments; since rarely, after the thirty-sixth year of a man's life, do you find the blood still pure; and a choleric person scarcely preserves his former alacrity after his fiftieth. It is therefore difficult to say, into how many species temperaments might be divided, and what kind of character should be assigned to each, according to nature, and not conjecture."

Of the CIRCULATION or MOTION of the BLOOD.

The arteries and veins contain either blood or lymph. The red blood fills those arteries and veins which we call *red*, or of the first order, and which have their origin in the heart. Sometimes they are very loosely and imperfectly distended by the blood, and at other times they are rendered very full and turgid. This distending blood is rapidly moved through all the vessels of the body, as is demonstrated to us from wounds; and the patient sooner or later expires from the loss of so much blood as was necessary for the maintenance of life; this loss of blood happens almost instantly from the larger arteries, and sometimes very suddenly from the smaller ones. But from the veins, unless they are some of the largest, it is generally slow; yet there are not wanting instances of fatal hæmorrhages from wounds of the veins, in the inner corners of the eyes, and those under the tongue. The motion of the blood through the veins is uniform and equable; but, in the arteries, it is alternately greater when the vessel is more dilated, and less when it is contracted. This is proved by ocular inspection in living animals.

That the motion of the blood is a continued course through the sanguineous arteries into the veins is discovered from experience. For, first, it is certain, that all the arteries and veins communicate or open the one into the other; because often, from even a small artery, all the blood of the whole body may be evacuated. We have numerous examples of fatal hæmorrhages from an inner artery of the nose, from the gums, from a finger, from a tooth, from a cutaneous pore enlarged, from the punctum lachrymale, from the wound of cupping, and even from the bite of a leech. There are, therefore, of course, open ways, by which the blood speedily flows from the venous into the arterial

terial system. That the blood, again, in the arteries, flows from the heart towards the extreme parts of the body, is proved by the microscope, and by a ligature on the artery of a living animal, and likewise by the fabric, mechanism, and proportion, of the femilunar valves between the arteries and their corresponding ventricles. Whatever artery is stopped by a ligature, the swelling ensues in that part between the heart and the ligature, whilst the other part beyond the ligature, which is more remote from the heart, is emptied. Neither has it there any pulsation, nor, if it be there wounded, will it yield any blood. The same effects which we see follow from a ligature, are likewise often produced by disease; as when some tumour, by compression or an aneurism, intercepts the blood's motion from the heart. Experiments of this kind have been made on most of the arteries; anastomoses, however, or the blood flowing through a neighbouring branch, or the retrocession of the blood in a dying animal, form exceptions to this rule.

But the course or motion of the venous blood has been always more doubted; almost all the ancients have been persuaded, that the blood in the veins flowed through them, either from the heart or from the liver, to all parts of the body. Very few of them knew that this was an error. Several of them have, indeed, acknowledged it to be false in the pulmonary vein. But that the blood did not move from the heart in the vena cava, was known to still fewer anatomists among the ancients. Dr. William Harvey was the first who experimentally asserted the motion of the blood returning in the veins to the heart, in such a manner as to render the whole intelligible, and leave no room for doubt. The valves of the veins lead us to this truth. For the common use or office of these valves is, to determine the pressure that is made from any quarter upon the veins, towards the heart, by allowing no opportunity to the venous blood that has once entered the trunk to flow back to the branches. For, since the valves open upwards towards the heart, the blood enters and expands them; and those parts of the valves which project into the cavity of the vein, approach towards the axis, until the opposite sides, by meeting together, shut up the tube. Another office of the valves in the veins seems to be for sustaining the weight of the blood, that its upper columns may not gravitate upon the lower; nor the blood, flowing through the trunk, make too great a resistance against that which follows it through the branches. For if, from the slower motion of the blood, its weight or pressure shall, in any part, much exceed the impulse that drives it on, so as to cause some part of the column to descend by its weight, it is, in that case, immediately caught, and sustained in its relapse by the next adjacent valve, which hinders it from urging against the next succeeding column, and affords time and opportunity for some contiguous muscle, by its pressure or concussion, to propel the column. This is the reason why valves are placed in the veins of the limbs and necks, in which parts they are both more numerous and more robust than elsewhere. Moreover, the valves placed in the right side of the heart are so constructed, that they freely permit blood, air, or wax, to pass from the venous trunks of the cava into the heart, but deny any reflux from the heart into the veins. Again, ligatures, in a living person, make this circumstance more evident. When the veins of the limbs are tied, either by design or accident, about the hams, arms, ancles, or wrists, the limb below the ligature swells, the veins fill and distend themselves, and, when opened, make a free discharge of blood. But at the same time nothing of this kind happens above the ligature, nor any of the veins to be seen there. These ligatures will serve to keep the blood in any limb round which they are tied, that it may not return to the heart, and be lost through a wound in another part.

The experiments which have been made in living animals, to prove this course of the blood, are still more accurate. From them, it appears, that by tying any vein, in a living animal, near the cava, or belonging to the pul-

monary veins, that part always swells which is most remote from the heart, all below the ligature appearing distended with the retained blood, while above and next the heart they are pale and flaccid. Lastly, if the arteries are tied at the same time with the veins, these last remain flaccid and empty; but, upon removing the ligature from the arteries, the veins are immediately filled. In like manner, the infusion of poisons or medicinal liquors shew, that, into whatever vein you inject chemical acid spirits, the force of the poison is driven along with the blood to the heart itself. That the brain is affected with the narcotic virtue of opium, and the intestines and stomach with the virtue of purgatives and emetics injected into the veins, is a demonstration that the blood, with which these substances were mixed, had passed through the ramifications of the veins to the heart, and from thence through the whole body. We have another proof in the *transfusions* of blood; in which all the blood from the arteries of one animal is urged into the veins of another exhausted of blood; whereby the heart, arteries, and empty veins, of the latter, become so turgid, and well replenished, that they produce a remarkable degree of vivacity in the animal, or even cause it to labour under a plethora.

That the blood passes from the least arteries into the least veins, we are clearly taught by *anatomical injection*; where, by one arterial trunk, we easily fill all the arteries and veins, almost throughout the whole body, provided the liquor be very fluid, so as to pass easily into the vessels of the head, mesentery, heart, and lungs. The circulation of the blood is therefore now received by every one as a medical truth; namely, that all the blood of the human body is carried through the aorta, from the left cavity of the heart, to the extreme parts or converging ends of the arterial branches; from whence the whole mass is again transmitted into the least veins, which convey it to the larger, and from them into the cava and heart itself; in which course it perpetually goes and returns during life.

The course of the humours in the *lymphatic veins* which have valves, appears both from the nature of those veins, and from ligatures. For every lymphatic vein, when tied, swells between its smaller extremities and the thoracic duct; but grows flaccid between the duct and the ligature. All the valves in these, like those of the blood-veins, give a free passage for flatus and mercury to flow to the thoracic duct. But they make a resistance, and often an obstinate one, to any return the other way; although sometimes they have been known to yield. The *vapours* that moisten the whole cellular substance, the steams of the abdomen and other cavities, are all absorbed by the least pellucid veins, and so conveyed to the blood-veins, that their contained juices may pass on to the heart. And from thence it is that œdema ensues, when a vein is compressed by a ligature; because, by intercepting the course of the absorbing veins by the ligature, the vapours, being unabsorbed, stagnate. All the juices, therefore, in the human body, are driven out of the heart into the aorta; from whence they are all uniformly returned again to the heart, by the veins. To complete this circle, it only remains for us to find out a course for the blood from the right to the left cavities of the heart; but this first supposes us to be acquainted with the history of the lungs and the pulmonary vessels.

OF THE LUNGS.

The lungs are two large spongy substances, of a reddish colour in children, greyish in adult subjects, and bluish in old age. They fill the whole cavity of the thorax, one being seated in the right side, the other in the left, and are parted by the mediastinum and heart. They are convex next the ribs, concave next the diaphragm, and irregularly flattened and depressed next the mediastinum and heart. They are distinguished into the right and left lung; and each of these into two or three portions called *lobes*, of which the right lung has commonly three, and the left lung two. At the lower edge of the left lung, there is an indented

indented notch or sinus opposite to the apex of the heart, which is therefore never covered by that lung, even in the strongest inspirations; and consequently the apex of the heart and pericardium may always strike against the ribs; the lungs not surrounding the heart in the manner commonly taught. This sinus is expressed in Eustachius's Tables.

The vessels which compose part of the substance of the lungs are of three or four kinds; the air-vessels, blood-vessels, and lymphatics, to which we may add the nerves. The air-vessels make the chief part, and are termed *bronchia*. These bronchia are conical tubes, composed of an infinite number of cartilaginous fragments, like so many irregular arches or circles, connected together by a ligamentary elastic membrane, and disposed in such a manner as that the lower easily insinuate themselves within those above them. The bronchia are also divided, in all directions, into an infinite number of ramifications, which diminish gradually in size; and, as they become capillary, change their cartilaginous structure into that of a membrane. Besides these very small extremities of this numerous series of ramifications, we find that all the subordinate trunks, from the greatest to the smallest, send out from all sides a vast number of short capillary tubes of the same kind. Each of these tubes is widened at the extremity, and thereby formed into a small membranous cell, commonly called a *vesicle*. These small vesicular cells are formed into bundles, termed *lobules*; and, as the great branches are divided into small rami, so the great lobules are divided into several small ones. All the bronchial cells are surrounded by a very fine reticular texture of the small extremities of arteries and veins, which communicate every way with each other. The greatest part of this admirable structure is the discovery of the illustrious Malpighi.

The blood-vessels of the lungs are of two kinds; one common, called the *pulmonary* arteries and veins; the other proper, called the *bronchial* arteries and veins. The pulmonary artery goes out from the right ventricle of the heart; and its trunk, having run directly upward as high as the curvature of the aorta, is divided into two lateral branches; one going to the right, called the *right pulmonary* artery; the other to the left, termed the *left pulmonary* artery. Besides these capital blood-vessels, there are others called the *bronchial arteries and veins*, which are very small, but they follow the bronchia through all their ramifications. They communicate with the pulmonary arteries and veins in many places; and likewise with the arteries and veins of the œsophagus, and with the branches of the coronary artery and vein.

The principal use of the lungs is for respiration, in which they are chiefly assisted by the diaphragm and intercostal muscles. As soon as the intercostal muscles begin to contract, the arches of the ribs are raised together with the sternum, and placed at a greater distance from each other; by which means the cavity of the thorax is enlarged on the two lateral and anterior sides. At the same instant the diaphragm is flattened or brought toward a plane by two motions, which are apparently contrary; that is, by the contraction of the diaphragm, and dilatation of the ribs in which it is inserted. The external surface of the thorax being thus in a manner increased, and the cavity of the bronchia being at the same time, and by the same mean, less resisted or pressed upon, the ambient air yields to the external pressure, and insinuates itself into all the places where the pressure is diminished; that is, into the *aspera arteria*, and into all the ramifications of the bronchia, all the way to the vesicles. This is what is called *inspiration*. This motion of inspiration is instantaneous, and ceases in a moment, by the relaxation of the intercostal muscles; the elastic ligaments and cartilages of the ribs bringing them back at the same time to their former situation. This motion, by which the ribs are depressed and brought nearer to each other, is termed *expiration*. The pulmonary arteries and veins, which accompany the

bronchia through all their ramifications, and surround the vesicles, transmit the blood through their narrow capillary extremities, and thereby change or modify it, at least in three different manners. The first change or modification which the blood undergoes in the lungs, is to have the cohesion of its parts broken, to be attenuated, and, as it were, reduced to powder. The second is, to be deprived of a certain quantity of serum, which transpires through the lungs, and is what we commonly call the *breath*. The third is, to be in a manner re-animated by the impression of the air, whether the whole body of the air enters the blood, whether the common air is only the vehicle of some finer parts which are conveyed to it, or whether the air only compresses and shakes the blood as it passes round the bronchial vesicles in the reticular capillary extremities of the vessels.

The diaphragm almost alone performs the office of respiration in a healthy man at rest. The diaphragm is also the chief instrument of respiration in the case of fractured ribs or sternum, or where the ribs cannot be moved without exciting considerable pain. The force of the diaphragm also, in dilating the breast, is greater, according to the calculations that have been made, than all the rest of the powers which contribute to respiration. A great inspiration is somewhat hindered; because, during the greatest exertion of the diaphragm, the lowermost ribs are brought inwards, and thus the thorax is straightened. Left this should always happen, the intercostal muscles interfere in ordinary inspirations; in the very great ones, they are inferior to the diaphragm. The phrenic nerve, which is more easily irritated than in most other muscles, forces the diaphragm to perform its office. The lungs themselves are altogether passive or obedient to the action of the air; and also to that of the ribs and diaphragm, to which they are pressed into close contact on all sides.

But respiration, whether by the admixture of a subputrid vapour, or by some other method, certainly vitiates the air, and renders it unfit either for inflating the lungs or supporting flame; and lastly, it deprives that element of its elasticity. We may suppose that this happens from putrefaction, since the air is rendered pestilential by a crowd, and fevers of the most malignant kind are thus generated in a few hours. But, in whatever manner this is produced, we are certain that the air is vitiated in the lungs, loses its elasticity, and thus cannot keep the lungs distended, so as to transmit an increased quantity of blood through the dilated pulmonary arteries into the veins. Nor can the will dilate the breast beyond certain bounds, or assist that passage of the blood in an unlimited manner. A state of body, therefore, will take place, in which the blood cannot pass through the lungs. Thus is generated a new resistance to the blood continually coming from the heart. And in long retentions of the breath, as in making violent efforts, the venous blood, especially that coming from the head, stagnates before the right ventricle of the heart, which is shut, because it cannot evacuate itself into the lungs, and thus swells up the face with redness, sometimes bursts the veins of the brain, neck, intestines, kidneys, and lastly of the lungs and even right auricle of the heart. This stagnation of the blood occasions prodigious anxiety and uneasiness to the spirits; it is also the cause of death in compressed air, in drowned people, and such as are strangled, which is much more sudden than is commonly imagined. A living person, therefore, that he may remove those inconveniences which proceed from an obstruction of the passage of the blood, slackens the powers of inspiration, and excites those of expiration, which free the breast from an air too greatly rarefied. These powers are, at first, the elasticity of the ribs; which being drawn upwards out of their natural situation, as soon as the powers which elevated them cease to act, spontaneously place themselves, so as to make more acute angles with the sternum and vertebræ. To this end conduces likewise the elastic force of the bronchia and vesicles distended with air, which strive to contract themselves.

Hence

Hence expiration is performed more easily and quickly than inspiration; and hence it is the last action of dying people.

The inconveniences produced by expiration, excite new efforts for repeating the respiration; because the collapsed vessels of the lungs resist the blood expelled from the right ventricle of the heart. Hence the cause of death in those animals which expire in vessels exhausted of air. For their lungs, being void of air, become dense, solid, and heavier than water, whence they are rendered impervious to the blood. Of the same kind is the death of those who are killed by lightning, and, perhaps, by the noxious vapours of caverns. How admirable are the structure and mechanism in these organs of respiration! The uneasy sensations of a too long continued expiration, which arise from hindrances of the blood's passage through the lungs, excite into action the powers of inspiration, whereby the blood's passage through the lungs is rendered again more free and easy; and, *vice versa*, the uneasiness proceeding from a too long continued inspiration excite the powers of expiration.

Respiration seems somehow to agree with the pulsation of the heart, there being ordinarily three or four pulses to one respiration. And, if a greater quantity of blood is sent to the heart in a given time, the numbers both of the pulse and respiration are increased. This is the reason of the panting or short breathing, after exercise, or any considerable motion, which increases the return of the blood to the heart. If the blood meets with a resistance in the lungs, so that it cannot pass freely from the right into the left ventricle of the heart; then the respiration is increased, both in quickness and magnitude, in order to forward its course. And this is the cause of sighing, yawning, and panting; of which the first is a deep inspiration; the second a slow and very great one; and the third a frequent and imperfect one. The number of respirations, however, does not always increase with the pulse, as we see in those fevers where the lungs are not affected. The mucus, which lines the sensible membranes of the air-vessels in the lungs, may become troublesome, both by its quantity and acrimony; it has been known to cause even suffocation in a dropy of the lungs. Its quantity, adhesion, or acrimony, therefore, excite a cough; which operation, caused by an irritation of the organs of respiration, is performed by alternate large inspirations, succeeded by large and quick expirations, together with sudden shocks of the abdominal muscles; and by these means the mucus, and sometimes calculous matters, are expelled from the lungs.

Laughter differs from coughing in its cause, which resides commonly in the mind, or at least consists in a certain titillation of some of the cutaneous nerves; and also its action, which is one large inspiration succeeded by several imperfect quick expirations through the contracted glottis, the lungs being never totally evacuated of air. Hence laughter, in a moderate degree, conduces to health; because, instead of one full inspiration, many short inspirations and expirations happen, and thus the concussion is greater. Hence its danger of stagnating the blood; because the expiration is not full or entire, and the blood is admitted into the pulmonary artery without being suffered to pass through it. Weeping begins with a great inspiration, after which follow short alternate inspirations and expirations; and it is finished with a deep expiration, that is immediately joined by a large inspiration. Hence it has nearly the same good and bad effects; and, when moderate, it conduces to relieve the anguish arising from grief. An hiccup is a very great, sonorous, and sudden, inspiration. Sneezing consists of one large or deep inspiration, which is followed immediately with a powerful and sudden expiration; it evacuates with great violence any acrid or other substance irritating the nostrils.

Some of the secondary uses of respiration are to compress the abdominal viscera, so that the stomach, intestines, gall-bladder, receptacle of the chyle, bladder, intestine rectum, and the womb itself, may discharge their contents; that the aliments may be triturated or dissolved,

and the blood urged through the sluggish vessels of the liver, spleen, and mesentery. Respiration excites a kind of flux and reflux in the blood, so that it is alternately pressed back towards the extremities of the veins, and a little after is propelled towards the heart by an accelerated velocity. Moreover, inspiration serves to convey odours along with the air to the organ of smelling; and is also the principal means by which a new-born infant is enabled to perform the operation of sucking.

OF THE ABDOMEN.

The cavity of the abdomen is of an irregularly-oval figure, but still symmetrical. On the fore-side it is uniformly arched or oval, and its greatest capacity is even with the navel and nearest part of the hypogastrium. On the upper side it is bounded by a portion of a vault, very much inclined. On the back-side it is in a manner divided into two cavities by the jutting out of the vertebræ of the loins. On the lower-side it contracts gradually all the way to the edge of the pelvis; and from thence expands again as far as the os coccygis, and tubercles of the ischium, terminating in the void space between these three parts.

Having carefully removed the muscles of the abdomen, the first thing we discover is a very considerable membranous covering, which adheres immediately to the inner surface of the muscoli transversi, and of all the other parts of this cavity, and involves and invests all the viscera, as in a kind of bag. This membrane is named *peritonæum*, from a Greek word, which signifies to be spread around. The peritonæum, in general, is a membrane of a close texture, and yet very limber, and capable of a very great extension; after which it can recover itself, and be contracted to its ordinary size, as we see in pregnancy, dropsies, corpulency, and repletion. The uses of the peritonæum, in general, are, to line the cavity of the abdomen, to invest the viscera contained in that cavity as in a common bag, to supply them with particular coats, and to form productions, ligaments, connections, folds, vaginae, &c. A fine fluid transudes through the whole internal surface of the peritonæum, which prevents the inconveniences that might arise from the continual frictions and motions to which the viscera of the abdomen are exposed, either naturally or by external impulses.

The *ventriculus* or stomach, is a great bag or reservoir, situated partly in the left hypochondrium, and partly in the epigastrium. The figure of the stomach is oblong, incurvated, large, and capacious, at one end, and small and contracted at the other. We see this figure most evidently when the stomach is moderately filled with air, or with any other fluid. It has two openings, called the *orifices of the stomach*; one between the great extremity and the small curvature, the other at the end of the small or contracted extremity. The first opening is a continuation of the œsophagus; the other joins the intestinal canal, and is called the *pylorus*. The stomach is composed of several *tunica* or coats. These coats are commonly reckoned to be four in number; the outer or common, the fleshy or muscular, the nervous or aponeurotic, and the villous or inner coat; and they are afterwards subdivided several ways. The first or outermost coat is simply membranous, being one of the internal productions of the peritonæum. The second or muscular coat is made up of several planes of fibres, which may all be reduced to two; one external, the other internal. The external coat is longitudinal, though, in different respects, following nearly the direction of the curvatures and convexities of the stomach; and the internal plane is transversely circular. The third coat, commonly called *tunica nervosa*, but properly *tunica cellulosa*, is composed of capillary vessels and nerves, with a very large proportion of cellular substance. The fourth coat of the stomach has been termed by Fallopius *tunica villosa*, because, when it swims in clear water, something is seen in it like the pile of velvet. The ancient called it *tunica fungosa*; and perhaps this name agrees best with its true structure.

The

The *pylorus* is a fold or duplicature of the two inner coats of the stomach, the *nervosa* and *villosa*; and it is formed in part by a fasciculus of fleshy fibres fixed in the duplicature of the *tunica nervosa*, and distinguished not only from the other fleshy fibres of the extremity of the stomach, but also from those of the intestines, by a thin whitish circle, which appears even through the external or common coat, round the union of the stomach and intestines. The figure of the *pylorus* is that of a ring transversely flattened; the inner edge of which, or that next the centre, is turned obliquely towards the intestines. This inner edge runs naturally more or less into little plaits or gathers, like the mouth of a purse almost shut; all which particulars are very different from what figures and dried preparations would make us believe. It is therefore a kind of sphincter, which can contract the inferior orifice of the stomach, but seems not capable of shutting it quite close. The stomach receives in general whatever the mouth and tongue send thither through the canal of the *œsophagus*: but its particular use is to receive the aliments; to contain them for a longer or shorter time, in proportion as they are more solid or fluid; and to digest them, and to put them in a condition to be turned into that nutritious fluid called *chyle*. This operation, which goes by the general name of *digestion*, is performed partly by the *succus gastricus*, which flows continually from the *tunica villosa*, and partly by the continual contraction and relaxation of the muscular coat. These motions in men are but very weak, and no wise sufficient for digestion, without the assistance of the alternate motions of the diaphragm and muscles of the abdomen. The *pylorus*, or fleshy circle of the inferior orifice of the stomach, serves to retain the aliments in it till they have acquired a sufficient degree of fluidity to pass easily through that opening. But, by a particular irritation of the muscular coat of the stomach, and still more by a violent contraction of the diaphragm and muscles of the abdomen, the contents of the stomach may be very soon forced towards the small extremity, and pushed through the *pylorus* into the intestines. The gentle and alternate motions of the orbicular fibres of the muscular coat may also assist in sending through the *pylorus*, in the natural way, the aliment that is sufficiently digested. This was called the *peristaltic* or *vermicular motion*, by those who believed that it is successively reiterated, like that of earth-worms when they creep. Trituration might be a proper term for this operation, provided it be made to signify only a gentle agitation or action of the fleshy fibres in a substance continually moistened by the gastric liquor, and not a violent grinding of a dry substance.

Between the *pylorus* and the very lowest part of the abdomen lies a long canal, bent in a great many different directions by numerous convolutions, called the *intestines*. This canal, thus folded and turned, forms a considerable bulk, which fills the greatest part of the cavity of the abdomen; and it is connected through the whole extent to membranous productions or continuations of the *peritonæum*, but principally to those called the *mesentery* and *mesocolon*. The whole canal is generally about six or seven times as long as the subject; and it is divided into three portions, which are distinguished by particular names. In the small intestines, the three portions are named *duodenum*, *jejunum*, and *ileum*; and in the great intestines, *cæcum*, *colon*, and *rectum*. The *intestina tenuia*, or small intestines, form one continued uniform canal; and, although the three portions of it have three different names, yet we have no sufficient marks whereby to distinguish them, to fix the precise extent or length of each portion, or to settle its just limits.

The *intestina crassa*, or great intestines, are one continued canal, divided into three portions, like the small ones. The *intestinum cæcum* is only a round short broad bag, the bottom of which is turned downward, and the mouth or opening upward. It lies under the right kidney, and is hid by the last convulsion of the *ileum*. On one side of the bottom of the *cæcum* lies an appendix, resembling a small intes-

tine, nearly of the same length with the *cæcum*, but very slender. It is termed *appendicula vermiformis*, from its supposed resemblance to an earth-worm. The *colon* is the most considerable of all the intestines. From the *cæcum*, of which it is a continuation, it reaches to the lower part of the left hypochondrium. Its continuity is, however, a little interrupted by the *ileum*, which advances into the cavity of the colon, and, together with a certain fold of that intestine, forms what is called *valvula coli*. The capacious arch of the colon is connected by both extremities to the *regio lumbaris*, near the kidneys, by two particular ligaments, one on the right side, the other on the left, which are only small duplicatures of the *peritonæum*, more or less transverse. The last of the intestines is named *rectum*, or the *straight gut*, from its situation; for, when viewed directly forward, it appears to run down in a straight course from the last vertebra of the loins, on the fore-side of the *os sacrum*, all the way to the *os coccygis*, where it ends in what is called the *anus*. This intestine is a true continuation of the last convolution of the colon; and it is the repository of the whole intestinal canal. It has likewise a special relation to the bladder, and to the parts of generation in both sexes.

The intestines are not left to move at random in the cavity of the abdomen; but are artfully bound down by a membranous web, which prevents the intestinal convolutions from being intangled in each other, and from being twisted or compressed in all their different ways of meeting; and yet allows them a gentle floating, but limited motion. This web goes by the Greek name of *mesentery*, as being in some measure in the middle of the intestines. It is distinguished into two portions; one of which being very broad, and very much plaited, connects the small intestines; the other, which is long and incurvated, does the same office to the great intestines. These two portions form a kind of spiral roll, more or less plaited in its circumference. The first portion is the *mesentery*; the other is termed *mesocolon*. The *mesocolon* is the continuation of the *mesentery*; which, having reached the extremity of the *ileum*, contracts and changes its name. At this place, the particular lamina, which is turned to the right side, forms a small transverse fold, called *ligamentum coli dextrum*. Between the laminae of the *mesentery*, a great number of glands lie scattered through the cellular substance. These glands are of the number of those that anatomists call *glandulae conglobatae*, the structure of which is not as yet sufficiently known. The nicest anatomical injections have not hitherto given us any satisfaction about them; for, though they be made with all possible care, they always fill the folliculous texture of these glands; and though, by means of these injections, we may discover a great many vessels which were before invisible, we do not advance much nearer our purpose, because we cannot, by this method, distinguish the secretory, excretory, and blood-vessels from each other.

OF DIGESTION.

Both the pain of hunger, and the pleasure of gratifying the appetite, excite us to the performance of an action absolutely necessary for our support, viz. the taking a due portion of aliment, in order to counterbalance the waste of the body by the insensible perspiration and other evacuations; and for which purpose the functions of the abdominal viscera, hitherto described, were principally intended. The necessity of frequently taking food is increased by the blood, which being naturally of a saline quality, soon acquires an acrimonious putrescency, by the evaporation of its thin watery parts; and this evaporation being increased by the heat of the body, and the motion of the heart and arteries, nature calls strenuously for a recruit of the watery element, by which the cohesive globules of the blood are separated from each other, and hindered from running together into a solid mass. These truths are proved, not only from their causes, but likewise by the appearances which they exhibit in men and other animals

starved to death. For, in such, we commonly observe the breath sharp and fetid, the teeth loose by the dissolving acrimony of the juices, violent pains in the stomach, acute fevers, and even madness. The fresh chyle, prepared, for the most part, from acescent vegetable food, is of a consistence always thinner than that of the blood itself; being received into the circulation, it temperates the putrescent acrimony, dilutes the threatened coagulation, and reduces the whole mass to that moderate degree of saline nature which is congenial to man: and finally, the chyle, but more especially that derived from animal food, and likewise what is formed of farinaceous vegetables, being replenished with gelatinous lymph, serves to repair the consumption or waste which is made from the body itself, to the vacancies of whose broken solids it is applied by the causes which promote the growth of the body. The drink dilutes the cohesive diathesis of the blood, hinders its putrefaction, and carries off by the excretories such particles as are already putrid: and hence it is that a person may live for a long time without solid food, if he is supplied with drink; but, without drink, life subsists but a few days.

We are solicited to take food, as well from the pain of hunger, as from the pleasure received by the taste. The first of these proceeds doubtless from the folds or plicæ of the stomach, whose sensation is extremely acute, rubbing against each other by the peristaltic motion, and from a pressure of the diaphragm and abdominal muscles, by which the naked villi of the nerves on each side of the stomach are made to grate against those of the other, producing, at the same time, an intolerable sense of pain. Thus, we are effectually admonished of the dangers ensuing from too long abstinence or fasting, and excited to procure food or nourishment by labour and industry. The gastric liquor, becoming acid from fasting, may also perhaps conduce to excite the sense of hunger; but it will not produce any effect if it is putrescent. *Thirst* is perceived by the tongue, fauces, œsophagus, and stomach. For, whenever these very sensible parts, which are constantly and naturally moistened by mucous and salivary juices, grow dry from a deficiency of these humours, or are irritated by a redundancy of muriatic or alkalescent salts, a sense called *thirst*, which is much more intolerable and dangerous than the former, arises; this disagreeable sensation continues until the proportion of diluting water in the blood, being recruited, restores the necessary moisture and free secretion required in the parts before-mentioned. From hence we learn why thirst attends labour, which exhales a greater proportion of the watery perspiration; and why it is a symptom of fevers, where there is an obstruction of the exhaling vessels belonging to the tongue and fauces; and why simple water is less efficacious in abating thirst than acid liquors, that not only moisten and render fluid, but also, by their mild irritation of the tongue and mouth, provoke forward the humours, and at the same time correct their putrid tendency.

Although there are many instances of particular persons, and even of whole nations, who have supported life only with one kind of food, either vegetable or animal, or even from a small class of either of them; and, lastly, though some have lived altogether upon milk, or its whey; yet it seems to be necessary, both from the nature and fabric of the human body itself, as well as from certain experiments, that we ought to support life by the different kinds of food, so intermixed, that none of them may exceed their reasonable bounds; and this mediocrity we are taught from the loathing which follows any one kind of food continued for too long a time together. Animal food appears a necessary part of our nourishment, from the necessary vigour which we require. It alone contains the gelatinous lymph ready prepared for the recruit both of our fluids and solids; and this lymph, extracted from the broken vessels and fibres, easily passes in great abundance into the blood. An abstinence from animal food generally causes great weakness both to the body and stomach, being per-

petually attended with a troublesome diarrhœa. The use of vegetables is likewise extremely necessary in order to prevent a too great quantity of blood, and to hinder its putrescency. Too much animal food produces, as we see more particularly in Anthropophagi, the hot alkalescent scurvy, a fierce or savage temper, a peculiar fetor, and leprosy, with a lixivial corruption of all the juices; which are only to be cured by change of diet, in which a vegetable acidity abounds. Hence it is that we are furnished but with few canine teeth; and that our appetite in health, but more especially in disease, is stronger for acidulous vegetables, in proportion to our warmer temperature of body, and greater heat of the country, or the season of the year. Hence we see, that, in the hottest climates, people live either altogether upon vegetables, or use flesh meats but very rarely, and not without danger of acute diseases; while, in the colder countries, flesh is eaten freely with less danger; and hence bread, or a farinaceous aliment similar to it, is made a standing part of our food throughout the world.

The measure of our food is determined by hunger, which is different in different circumstances. Animal and farinaceous food nourishes most: other aliments ought to supply, by their quantity, what they want in their powers of nourishment. In general, we are nourished best by a somewhat spare diet, unless we are subjected to much labour. During digestion, the stomach is perfectly closed, both at its superior and inferior orifices; and, although the muscular fibres of the stomach contract, yet no food is propelled into the intestines, until it has been thoroughly digested; even milk itself is often retained in the stomach of strong animals several hours after a meal, without passing into the intestines. The aliments, either naturally containing air in themselves, or mixed with air in mastication, are macerated in the juices of the stomach. In consequence of the heat, this included air is expanded, and, by an operation somewhat similar to fermentation, breaks the cells in which it was included, and thus the contents of the stomach are reduced to a pulpy state. The solidity of animal substances is occasioned solely by their being impregnated with air, and the air being extricated or set free in the stomach, these substances are reducible to a friable or soluble state. This last fact is illustrated by Papin's digester. This air, set at liberty by the digestion, often, under the denomination of flatus, distends the stomach more than the food itself. During digestion there is no sense of hunger, for the nervous plicæ of the stomach are kept from grating on each other by the interposition of the food; and they are not affected by the gastric juice, which, in digestion, acts on the aliment.

Dr. Stevens, in an Inaugural Dissertation concerning Digestion, has published several experiments upon a German, who gained a miserable livelihood by swallowing stones for the amusement of the people. He began this strange practice at the age of seven, and had at that time continued in it about twenty years. He swallowed six or eight stones at a time, some of them as large as a pigeon's egg, and passed them in the natural way. Dr. Stevens thought this poor man would be an excellent subject for ascertaining the solvent power of the gastric juice in the human stomach. The doctor, accordingly, made use of him for this purpose. He made the German swallow a hollow silver sphere, divided into two cavities by a partition, and perforated with a great number of holes, capable of admitting an ordinary needle. Into one of these cavities he put four scruples and a half of raw beef, and into the other five scruples of raw bleak. In twenty-one hours the sphere was voided, when the beef had lost a scruple and a half, and the fish two scruples. A few days afterwards, this German swallowed the same sphere, which contained, in one cavity, four scruples and four grains of raw, and, in the other, four scruples and eight grains of boiled beef. The sphere was returned in forty-three hours: the raw flesh had lost one scruple and two grains, and the boiled one scruple and sixteen grains. Suspecting that, if these

these substances were divided, the solvent would have a freer access to them, and more of them would be dissolved. Dr. Stevens procured another sphere, with holes large enough to receive a crow's quill. He inclosed some beef in it a little nasticated. In thirty-eight hours after it was swallowed, it was voided quite empty. Perceiving how readily the chewed meat was dissolved, he tried whether it would dissolve equally soon without being chewed. With this view, he put a scruple and eight grains of pork into one cavity, and the same quantity of cheese into the other. The sphere was retained in the German's stomach and intestines forty-three hours; at the end of which time, not the smallest quantity of pork or cheese was to be found in the sphere. He next swallowed the same sphere, which contained, in one partition, some roasted turkey, and some boiled salt herring in the other. The sphere was voided in forty-six hours; but no part of the turkey or herring appeared, for both had been completely dissolved. Having discovered that animal substances, though inclosed in tubes, were easily dissolved by the gastric juice, the doctor tried whether it would produce the same effect upon vegetables. He therefore inclosed an equal quantity of raw parsnep and potatoe in a sphere. After continuing forty-eight hours in the alimentary canal, not a vestige of either remained. Pieces of apple and turnip, both raw and boiled, were dissolved in thirty-six hours.

It is a comfortable circumstance, that no animal, perhaps, except those worms which are hatched in the human intestines, can resist the dissolving power of the gastric juice. Dr. Stevens inclosed live leeches, and earth-worms, in different spheres, and made the German swallow them. When the spheres were discharged, the animals were not only deprived of life, but completely dissolved by the operation of this powerful menstruum. Hence, if any live reptile should chance to be swallowed, we have no reason to apprehend any danger from such an accident. And as the gastric juice of the human stomach is capable of dissolving, nearly with equal ease, both animal and vegetable food, this circumstance affords a strong and almost an irresistible proof, that nature originally intended man to feed promiscuously on both.

Live animals, as long as the vital principle remains in them, are not affected by the solvent powers of the stomach. "Hence it is," Mr. Hunter remarks, "that we find animals of various kinds living in the stomach, or even hatched and bred there; but the moment that any of these lose the living principle, they become subject to the digestive powers of the stomach. If it were possible, for example, for a man's hand to be introduced into the stomach of a living animal, and kept there for some considerable time, it would be found that the dissolvent powers of the stomach could have no effect upon it: but, if the same hand were separated from the body, and introduced into the same stomach, we should then find, that the stomach would immediately act upon it. Indeed, if this were not the case, we should find that the stomach itself ought to have been made of indigestible materials; for, if the living principle was not capable of preserving animal substances from undergoing that process, the stomach itself would be digested. But we find, on the contrary, that the stomach, which at one instant, that is, while possessed of the living principle, was capable of resisting the digestive powers which it contained, the next moment, viz. when deprived of the living principle, is itself capable of being digested, either by the digestive powers of other stomachs, or by the remains of that power which it had of digesting other things."

The fleshy fibres of the stomach being irritated by the flatus, the weight, and the acrimony, of the food, begin to contract themselves more powerfully than when the stomach is empty, and with a greater force in proportion as it is more full. And, first, the muscular stratum, which passes along the lesser curvature, draws the pylorus to the œsophagus; and, being inserted only into the left face of the former, draws it to the right. The principal stratum

of the circular fibres contracts the capacity of the stomach according to its length; grinds or intermixes its contents with the liquors; and determines them both, like the pressure of two hands placed opposite, to flow towards the pylorus: but this flux through the pylorus is not continual, on account of the valvula pylori, and likewise because this motion begins from some part that is more irritated, and, as we see by numerous experiments, part of it is very soon received into the blood. These alternate contractions at last terminate in a full evacuation. In this action of the stomach, there is nothing which resembles the trituration made by the strong gizzards of granivorous fowls, which some anatomists have falsely ascribed to the human stomach. The stomach, however, has a considerable degree of strength, since the contraction of its fibres is often more than a third part of their length; for we frequently see the stomach reduced to less than a third part of its diameter. The stomach is also frequently observed to be diminished to much less than its third part, even to the breadth of an inch, so that it can expel the smallest substances, and entirely evacuate itself.

The stomach being irritated by too great a quantity or acrimony of the food, by sickness, by a repulsion of the bile, or other causes, does, by an antiperistaltic or reverted motion of its fibres, drive its contents upwards through the open and relaxed œsophagus. Any part of the whole intestinal canal, from the pharynx to the rectum, may be constricted, either suddenly or slowly, by an antiperistaltic motion. If it happens suddenly to the upper parts of the stomach, the diaphragm, and likewise the abdominal muscles, being convulsed at the same time, it is called *vomiting*; if it is slowly performed, it may be called *rumination*; if the small, and particularly the great, intestines, return their contents upwards, the disease is called *ileus*. The effect of vomiting is partly from the pressure of the abdominal muscles depressing the false ribs, and urging the contents of the abdomen against the diaphragm, which, at the same time, contracting itself to a plane downwards, forces the stomach, as between the sides of a press, to throw up its contents.

The peristaltic motion, which is more particularly strong and evident in the small intestines, is the chief power by which the digested aliments are propelled along the intestinal tube. Any part of the intestine, irritated by flatus or any sharp or rough body, contracts itself, even after death, most violently in that part where the stimulus is applied, in order to free itself from the offending or distending body, which it expels into the next open part of the lax intestine; where, being received, it is again propelled forward, by exciting a like stimulus and contraction as before. This contracting motion of the intestines is made in various parts of the gut, either successively or at the same time, wherever the flatus or aliment excites a stimulus, without observing any certain order. So well fitted, however, are the intestines for this motion, that they even exceed the irritability of the heart. When they are not irritated, they remain at rest; and we may suppose this to be the cause why the fat is deposited in the abdomen. The principal stimulus is the air; next to that is the aliment; and lastly, the bile. This motion is performed by a sort of alternate creeping and revolution of the intestines, which dissection easily demonstrates in brute animals, and cases of wounds in the abdomen and ruptures have manifested it in the human species. Among so many inflexions, the weight of the aliment is but of little consequence, for it easily ascends or descends through the irritated intestine, which thus empties itself. This peristaltic motion of the intestines is performed by the constriction of their circular fibres, which empty the tube exactly, without injuring it against pins, needles, or any other sharp bodies accidentally introduced into it.

OF THE LIVER, &c.

The liver is a large and solid mass, of a dark red colour, a little inclined to yellow; situated immediately under the arch

arch of the diaphragm, partly in the right hypochondrium, which it fills almost entirely, and partly in the epigastrium, between the appendix ensiformis and spina dorsi, and terminating commonly in the left hypochondrium, into which it sometimes runs a considerable way. The liver may be divided into two lateral parts, called *lobes*; one of which is termed the *great or right lobe*, the other the *small or left lobe*. These two lobes are distinguished above by a membranous ligament, and below by a considerable scissure, lying in the same direction with the superior ligament.

The liver is composed of several kinds of vessels; the ramifications of which are multiplied in an astonishing manner, and form, by the intertexture of their capillary extremities, an innumerable collection of small pulpy friable corpuscles, which are looked upon to be so many organs designed to separate from the mass of blood a particular fluid, termed the *bile*. In these corpuscles the bile is secreted, and it is immediately collected in the same number of extremities of another kind of vessels, which unite by numerous ramifications, into one common trunk. These ramifications are termed *pori biliarii*, and the trunk *ductus hepaticus*; and the ramifications of these two kind of vessels are invested together by the capsula of the vena portæ. The ductus hepaticus, or trunk of the pori biliarii, joins another canal, called *ductus cysticus or vesicularis*; because it comes from the vesicula fellea: these two united ducts form a common trunk, named *ductus cholidochus*, because it conveys the bile. This duct, having reached the incurvation of the duodenum, insinuates itself through the coats of that intestine, and opens into its cavity by an oblong orifice rounded at the upper part, and contracted at the lower like the spout of an ewer.

The *gall-bladder* is a kind of small bag, shaped like a pear, narrow at one end and wide at the other. About one third of the body of this vesicula lies in a depression on the concave side of the liver, from the trunk or sinus of the vena portæ, where the neck is situated, to the anterior edge of the great lobe, a little toward the right side, where the bottom is placed; and in some subjects it advances beyond the edge, so as to oppose itself to the muscles of the abdomen, under the edges of the false ribs. Therefore when we stand, it lies in a plane inclined a little from behind forward. When we lie upon the back, it is almost inverted. When we lie on the right side, the bottom is turned downward, and it is turned upward when we lie on the left side; and these situations vary according to the different degrees of each posture. The gall-bladder is composed of several coats, the outermost of which is a continuation of that which invests the liver, and consequently of the peritonæum. The bile, which passes thro' the ductus hepaticus into the cholidochus, may be called *hepatic*; and that which is collected in the gall-bladder may be termed *cystic*. The hepatic bile flows continually through the ductus cholidochus into the duodenum; whereas the cystic bile flows only by reason of plenitude, or by compression.

The *pancreas* is a long flat conglomerate gland, situated under the stomach, between the liver and the spleen. It is composed of a great number of soft glandular molecule, combined in such a manner as to exhibit the appearance of one uniform mass on the outside, the surface of which is rendered uneven only by the numerous small convexities, more or less flattened. When these molecule are separated a little from each other, we find the pancreatic duct, which pierces the coats of the duodenum, and opens into the ductus cholidochus, commonly a little above the prominent point of the orifice of that canal; and sometimes it opens immediately into the duodenum.

The pancreatic juice seems principally of use to dilute the gall, to mitigate its acrimony, and mix it with the food. Hence it is poured into a place remote from the cystic duct as often as there is no cystis. Like the rest of the intestinal humours, this juice dilutes the mass of aliments, resolves them, and does every other office of the saliva.

The *spleen* is a bluish mass, something inclined to red, and of a long oval figure, being about seven or eight fingers breadth in length, and four or five in breadth. It is of a softish substance, and is situated in the left hypochondrium, between the great extremity of the stomach and the neighbouring false ribs, under the edge of the diaphragm, and above the left kidney. It is connected to the stomach by the vessels called *vasa brevia*; to the extremity of the pancreas, by ramifications of the splenic arteries and veins; and to the omentum, by ramifications which the same artery and vein send to the spleen. In man, the substance of the spleen is almost wholly vascular, that is, composed of the ramifications of all kinds of vessels. Being of a very soft and loose texture, it grows larger by distension when the stomach is empty, and becomes less again when it is pressed by the full stomach against the ribs. Hence the spleen is found large in those who die of lingering diseases; but in those who die suddenly, and in full health, it is small. The spleen seems to prepare the blood for supplying a sort of watery juice (probably of a sub-alkaline nature, and rendered somewhat sharp by the remora of the blood) to the bile. As to the old question, Whether the spleen prepares an acid to whet or sharpen the stomach; that opinion has been long discarded, as repugnant to the nature of all the animal juices.

The *omentum* is a large, thin, and fine, membranous bag, surrounded on all sides by numerous portions of fat, which accompany and even invest the same number of arteries and veins adhering closely to each other. The greatest part of it resembles a kind of flat purse, and is spread more or less on all the small intestines from the stomach to the lower part of the regio umbilicalis. Sometimes it goes down to the lower part of the hypogastrium, and sometimes does not reach beyond the regio epigastrica. It is commonly plaited or folded in several places, especially between the bands of fat.

The *kidneys* are two solid glandular bodies, situated in the posterior part of the cavity of the abdomen, on each side of the lumbar vertebrae, between the last false ribs and os ilium. The right kidney lies under the great lobe of the liver, and is consequently lower than the left, which lies under the spleen. We may distinguish three kinds of substances in the kidney; an exterior substance, which is thick, granulated, and in a manner cortical; a middle substance, which is medullary and radiated, called *striata, sulcata, or tubularis*, because it seems to be made up of radiated tubes; and an inner substance, which is only a continuation of the second, and terminates on the inside by papillæ; for which reason it goes under the name of *papillaris*. Each papilla lies in a kind of membranous calix or infundibulum, which opens into a common cavity, called the *pelvis*. This pelvis is membranous, being of the same structure with the calices, of which it is a continuation; and its cavity in man is not uniform, but distinguished into three portions, each of which contains a certain number of infundibula or calices, together with the papillæ which lie therein; and sometimes we find two or three papillæ in the same infundibulum.

After the infundibula have contracted in a conical form round the apices of the papillæ, each of them forms a small short tube or gullet, which, uniting at different distances along the bottom of the sinus of the kidney, form three large tubes which go out from the sinus, in an oblique direction from above downwards, and immediately afterwards unite into one trunk. This trunk becomes a very long canal, called the *ureter*. In men, the three tubes supply the place of what is called the *pelvis* in brutes, and might more properly be called the *roots or branches* of the ureters than the pelvis. The situation of the trunk, and of the roots and branches of each ureter, with respect to the renal artery and vein, is in the following manner: The artery is in the upper part of the sinus, and partly before the vein. The vein is about the middle, and between the

the artery and ureter. The ureter is in the lower part, a little behind the vein, and it is partly surrounded by one branch of the artery.

The *renal glands* are situated on the upper extremity of each kidney a little obliquely. They contain an unctuous viscid liquor, of a yellowish red colour, which, with age, changes gradually into a yellowish purple, a dark yellow, and a black yellow: sometimes it is perfectly black; but even then, if it be spread thin on a large surface, it appears yellow. It is sometimes found not only reddish, but mixed with real blood. The uses of these renal glands have not as yet been discovered; and all that we know about the liquor contained in them is, that it has somewhat the appearance of the bile. They are very large in the fœtus, and diminish in adults. These two phenomena well deserve our attention. They lie sometimes directly on the top of the kidneys, but seldom, if ever, on the gibbous part.

The Anatomical Plate V. affords a pretty accurate View of the Brain and different Viscera, as follows, viz.

Fig. 1. represents the *basis of the BRAIN.* *aa*, The anterior lobes of the brain. *bb*, The posterior lobes. *cc*, The cerebellum. *dd*, The lateral sinuses. *ee*, The vertebral arteries, as they pass between the first vertebra and the bones of the occiput. *f*, The vertebral sinus. *gg*, The dura mater. *h*, The foremost branch of the carotid artery.

The *TRUNK.* *1*, Trachea. *2*, The internal jugular vein. *3*, The subclavian vein. *4*, Vena cava descendens. *5*, Right auricle of the heart. *6*, The right ventricle, the pericardium being removed. *7*, Part of the left ventricle. *8*, Aorta ascendens. *9*, Arteria pulmonalis. *10*, Right lobe of the lungs. *11*, The left lobe. *12*, The diaphragm. *13*, The liver. *14*, The ligamentum rotundum. *15*, The bottom of the gall-bladder. *16*, The stomach, pressed down by the liver. *17*, The small intestines. *18*, The spleen.

Fig. 2. represents the *PERFECTED BRAIN.* *aa*, The anterior lobes of the cerebrum. *bb*, The lateral lobes of the cerebrum. *cc*, The two lobes of the cerebellum. *d*, Tuber annulare. *e*, Passage to the infundibulum. *f*, Medulla oblongata, which sends off the medulla spinalis thro' the spine. *gg*, That part of the os occipitis which is placed above. *hh*, The transverse processes of the first cervical vertebra. *ii*, The cervical vertebrae.

TRUNK. *1*, The gall-bladder. *2*, The pancreas. *3*, The spleen. *4*, *4*, The kidneys. *5*, Aorta descendens. *6*, Vena cava ascendens. *7*, *7*, The emulgent veins. *8*, *8*, The ureters. *9*, *9*, The iliac vessels. *10*, The intestinum rectum. *11*, The bladder of urine.

OF THE PELVIS.

The pelvis is bounded forward by the os pubis; backward by the os sacrum above, and coccygis below; laterally by the ilia above, and ischia below. In midwifery, a complete knowledge of these parts is a circumstance of considerable importance.

VESICA URINARIA, or BLADDER.—The bladder is a kind of membranous and fleshy pouch or bottle, capable of dilation and contraction, situated in the lower part of the abdomen immediately behind the symphysis of the ossa pubis, and opposite to the beginning of the intestinum rectum. It is divided into the body, neck, and bottom; into an anterior, posterior, and two lateral parts. The upper part is termed the *fundus* or *bottom*; and the neck is a portion of the lower part. Round the neck of the bladder the muscular fibres being closely connected, form what has been called *sphincter vesicae*. But this part is not a distinct muscle, nor is its action distinct from the rest of the muscular coat. At the top of the bladder above the symphysis of the ossa pubis, we observe a ligamentary rope, which runs up between the peritonæum and the linea alba of the abdomen, all the way to the navel, diminishing gradually in thickness as it ascends. This rope in the fœtus is in part a production of the inner coats of the bladder, which production is termed *urachus*.

The kidneys and bladder serve for the secretion of the

urine, which is effected in the following manner: The chyle, when it enters the blood, contains a very large portion of water, which would be liable to lodge in the cellular substance, if it was not expelled again from the body. A part of it is therefore exhaled through the skin; and another part, as large, or often larger than the former, is strained through the kidneys into the bladder, and is thus expelled out of the body.

Dr. Haller observed, "that the blood of the renal artery moving slower, as is generally believed, than that of the brain, and probably stored with more water, brought by the serpentine circles of the arteries, deposits great part of its water into the rectilinear tubes of the papillae. This water contains fine oils and salts, intermixed with earthy particles, or such other matters as are thin enough to pass through with it. The small diameter of the origin of each uriniferous duct, and its firm resistance, seems to exclude the thick oil, chyle, and the coagulable lymph; but, as these uriniferous ducts are always open, if the velocity of the blood be increased, or a morbid laxity of the parts supervenes, they easily transmit the above-mentioned thick parts of the blood along with the thinner. The disease hence arising, is called diabetes, which may be cured by restoring the kidneys to their former healthy state, by the use of astringents and tonics. The nerves have some power of contracting or relaxing these passages; and thus we see that urine, which in health is of a yellow colour, becomes watery from sudden grief. A vast quantity of it is prepared; equal to that of perspiration, and sometimes even more." Later physiologists explain the secretion of urine by observing, that part of the blood is changed by the kidneys into this fluid.

The urine, by fire or putrefaction, sometimes by disease, in some animals more easily than in others, changes into a volatile alkaline nature, intimately mixed with a fetid oil. This oil which is partly empyreumatic, yellow, volatile, tenacious, separable only by the greatest degrees of fire, is known by the denomination of phosphorus; it is a shining substance, taking fire spontaneously in the air. The urine abounds more with earth than any other juice of the human body, both of a cretaceous and sparry nature; the latter coming chiefly from the drink, the former from the solid parts of the body dissolved and mixed with the blood. That the urine is separated in the kidneys is shewn experimentally, by pressing it out of their vessels. That it descends by the ureters is shewn by the surprising swelling of the kidney, and that part of the ureter which is above, as well as the emptiness of that part which is below the ligature. In the bladder also, as well as in the kidneys and ureters, there is an immense swelling as often as the bladder cannot receive the urine, or cannot emit it. Nor does there seem to be any other way for the urine to pass. The bladder may be so distended with urine as to produce death; yet, in these cases, we never observe that the urine has found any passage through which it might escape into the pelvis. Again, when the ureters are obstructed with stones, so that the bladder receives nothing from them, it is either quite empty, or contains a very acrimonious and thick urine, manifestly indicating that the water can find no other way from the kidney into the bladder. And a careful attention to the manner in which mineral waters are discharged by urine, sufficiently demonstrates that there is no such rapidity therein as is commonly imagined; but the stimulus of the cold water received into the stomach, like the external cold applied to the skin, causes a constriction of the bladder and urinary parts, by which they are solicited to repeated discharges of the old urine which was before in the body, and not immediately of that which was last drunk. Again, the largeness of the renal vessels demonstrates, that they cannot receive much less than an eighth part of the blood of the whole body at a time, and consequently above 1000 ounces of blood are conveyed through the kidneys in an hour; and it will appear but a moderate allowance for twenty or even fifty ounces of water to distil from that quantity of blood in the same time.

Finally, it is certain that both men and brute animals perish if the ureters are obstructed by a ligature, or otherwise; we then observe also that no urine can be found in the bladder. We are not fully acquainted with the cause which retains the urine in the bladder. The sphincter is obscure; the situation of the bladder lying on the rectum may probably contribute to the retention of the urine. Certain it is that the urine does not flow spontaneously, even from a dead carcase.

By the urine, besides the particles of food and water, much matter that is noxious to the human body seems to pass off, especially calcareous earth reformed from the bones and solid parts, and which would not fail to produce bony crusts and calculi wherever it was stopped; a sparry or gypseous earth; and an acrid oil mixed with salt, so as to assume a volatile nature. The urine, by its retention, disposes to the generation of the stone and gout; when suppressed, it produces acute fevers, and several morbid affections of the brain.

THE PARTS OF GENERATION IN MALES.—The parts of generation in males consist of the spermatic veins and arteries; the testes, epididymis, and scrotum; the vasa deferentia, vesiculæ seminales, and prostates; the corpora cavernosa, urethra, integuments, &c. The *scrotum* is the cutaneous covering of the testes. Outwardly, it is a bag common to both, formed by a continuation of the skin of the neighbouring parts, and commonly very uneven, having a great number of rugæ on its outer surface. Interiorly, it is fleshy, and forms a muscular capsula for each testicle, termed *dartos*. Though it is a common covering for both testicles, it is nevertheless distinguished into two lateral parts by a superficial and uneven prominent line, which appears like a kind of suture, and from thence has been termed *raphe*. This line is a continuation of that which divides, in the same manner, the cutaneous covering of the penis; and it is continued through the perineum, which it divides likewise all the way to the anus. It is only superficial, and does not appear on the inside of the skin.

The *dartos* of the scrotum has been accounted a true cutaneous muscle; but it is chiefly a cellular substance condensed, with a great number of blood-vessels entering into its composition, but without fat. The particular coverings of the testes are commonly called *coats*; and they are reckoned to be three in number, the *tunica musculo-fasciata*, named *cremaster*, *vaginalis*, and *albuginea*. The first two are common to each testicle, and to the spermatic rope that belongs to it; and the third is peculiar to the testicle alone. The testes are two glandular bodies, situated near each other, without the abdomen, below the interstice between the groins in an adult. The ancients named them *adyami* or *gemini*. Their size is nearly that of a pigeon's egg, and they are of an oval figure, a little flattened at each side. But they are frequently unequal in size in the same person. Fabricius ab Aquapendente, was consulted frequently by persons who believed they had got a diseased testicle, because it was larger than the other one; but, upon examination, it was found they had no inconvenience from it. Each testicle is a spermatic gland formed by a vast number of fine whitish tubes, folded and twisted in different manners, and distributed in different fasciculi, between membranous septa; the whole being surrounded by a strong common covering, named *tunica albuginea*.

The seminal vessels are serpentine, firm, solid, and exceedingly small; they have been filled with quicksilver, &c. by several anatomists, but first by Dr. Monro, Hunter, and Haller. They are collected into above twenty bundles, divided by distinct cells or partitions, which descend from the *tunica albuginea* to conduct the arteries or veins. In each of these cells there is a seminiferous duct to convey the secreted humour from the testicle. The ducts form a net-work, adhering to the surface of the *albuginea*, and forming inosculations one with another. From this net-work, in the upper part of the testicle, ten or twelve ducts ascend; which, being contorted together

into folds, form as many vascular cones, that are joined together by an intermediate cellular substance; and, lying incumbent one upon another, they form the *epididymis*, which goes round the outer and posterior margin of the testicle, to which it adheres by its thicker head, joined with a good deal of cellular substance. While in its lower, middle, and more slender, part, it partly adheres, and is partly free; so as to intercept a sort of impervious bag between itself and the testicle. The vascular cones, at the upper part of the epididymis, by degrees uniting, form at length one duct, which composes the greater part of the testicle, and which grows larger as it descends, being largest at the bottom of the testicle; from whence again ascending along the posterior face of the testicle, in a contrary direction, it by degrees spreads open its spiral convolutions, and comes out much larger, under the name of *vas deferens*.

The spermatic arteries go out most commonly from the anterior part of the inferior aorta, near each other, and about an inch lower than the arteriæ renales. Their origin oftentimes varies: sometimes there are two on each side, one arising a little below the other; or at other times one comes from the aorta, the other from the renal artery on the same side; and here they give off branches to the *cremaster muscle*, &c.

The spermatic veins accompany the arteries, and have nearly the same course. The right vein ends commonly in the trunk of the vena cava, and sometimes it ends in the union of the right renal vein. After getting into the abdomen, they receive a branch which communicates with the vena porta.

The *vesiculæ seminales* are soft whitish knotted bodies, about three or four fingers breadth in length, one in breadth, and about three times as broad as thick, situated obliquely between the rectum and lower part of the bladder, in such a manner, as that their superior extremities are at a distance from each other, and their lower extremities are contiguous. Their inner surface is villous and glandular, and something similar to the inner surface of the gall-bladder, or like the cells of a honeycomb. This furnishes a particular fluid, which exalts, refines, and perfects, the semen that the *vesiculæ* receive from the *vasa deferentia*, and of which they are the reservoirs for a certain time.

The first portion of the urethra, or that which is not covered by the cavernous substance, and which, from the bladder to the bulb, is only a membranous canal, is sustained by a large solid whitish mass, of the figure of a chestnut, and situated between the bladder and the bulb of the urethra; its basis being towards the bladder, the apex or point towards the urethra, and the sides lying upward and downward. This body is termed the *prostate*, from a Greek word that expresses its situation before the *vesiculæ seminales*, and implies a plurality, because it appears to be divided into two lateral lobes by a hollow groove, which runs through its upper side from the basis to the apex. The inner substance is spongy, but very compact; and in each lobe there are several folliculi, which open into the first portion of the urethra. The spongy substance of the urethra, having reached the extremity of the *corpora cavernosa*, forms a large head called the *glans*, which crowns the three spongy pillars; with this difference, however, that it is a continuation of the spongy substance of the urethra, and only adheres to the extremity of the *corpora cavernosa*, without any direct communication. The figure of the *glans* is that of a rounded cone, a little flattened at the lower part, and with an oblique prominent basis, the circumference of which is something greater than that of the *corpora cavernosa*. All the convex surface of the *glans* is covered by a fine villous substance, and that again by a fine membrane, resembling the red part of the lips. The circumference of the basis of the *glans* has a double row of small papillæ, which may be reckoned sebaceous glands, from which a thick matter is discharged.

The *corpora cavernosa* are two ligamentary and very
2 limber

limber tubes, united laterally to each other through the greatest part of their length, and solid at their two extremities. By their union two external grooves are formed; one on the upper side, the other on the lower. The lower groove is something broader than the upper; and it is filled through its whole length by the *urethra*, which is the third spongy tube that composes the penis. It descends from its origin to the under end of the symphysis pubis; then it ascends before the symphysis to the root of the penis; and at last re-descends to the point of the glans. About a finger's breadth from this part it joins a cavernous substance, in shape like a pear, which is connected only to the lower convex side of the canal; and, afterwards being split on each side, invests it quite round. This body is called the *bulb* of the urethra, being larger than any other part of that canal, and divided interiorly by a very fine membranous septum into two lateral parts; and therefore, when it is inflated, it appears to be double, or with two heads. The inside of the canal of the urethra is lined by a fine membrane, full of capillary blood-vessels; and its surface is perforated by a great number of oblong holes, or small lacunæ of different sizes, the largest lying near the glans. The cavity of the urethra resembles nearly that of a small writing pen. It is not every where round, and towards the glans becomes broader and flatter on each side, especially in the glans itself, where there is a kind of oval or navicular fossula. The integuments which cover all these parts are three or four in number. The principal is named *preputium*; the inner surface of which is lined with a fine membrane from the opening all the way behind the basis of the glans, that membrane being folded from behind, forward, round the glans, covering very closely its whole villous surface, as far as the orifice of the urethra, where it joins the membrane which lines the inside of that canal. This proper membrane of the glans, and internal membrane of the preputium, form conjointly along the flat part of the glans, from its basis to the orifice of the urethra, a membranous duplicature, which, like a septum or mediastinum, divides this part into two lateral portions, and limits the motions of the preputium; for which reason it is called *frænum preputii*.

Several muscles are inserted in the parts which we have just described. They are six in number; two for the corpora cavernosa, two for the urethra, and two common muscles, called *transversales*. The arteries of these parts come chiefly from the *iliacæ internæ* or *hypogastricæ*, and the rest from the *iliacæ externæ* or *crurales*. The principal are termed *pudicæ*, of which one is external, the other internal. The distribution of the veins follows nearly that of the arteries; but they have more ramifications and communications, as in other places. The principal vein is that which runs along the whole superior groove formed by the union of the corpora cavernosa. It passes directly under the symphysis of the ossa pubis, between the two arteries. It is very large, and often double. The nerves of these organs come from the *lumbares* and *sacri*; and they communicate with the *sympatheticus maximus*, and *plexus mesenterici*. The nerves of the testicles are very small. They are formed by the renal and mesenteric plexus. They run along the spermatic cord; but it is exceedingly difficult to trace them into the testicle.

The semen masculinum is first formed in the testicle, and then conveyed by the *vasa deferentia* into the vesiculæ seminales, being propelled forward by the motion of the succeeding juices in the testicle; and perhaps, in some measure, though slowly, by the contraction of the cremaster. This supposition is confirmed by the numerous spires and convolutions formed by the epididymis, obstructing almost every kind of injection; and by the length of time that is required to fill the seminal vesicles again, after they have been once exhausted. The liquor brought from the testicles by the *vasa deferentia*, is yellowish, thin, and watery; but in the vesicula seminales it becomes somewhat thicker and higher coloured. It is white in man when it has been mixed with the liquor of the prostate. It has a

peculiar smell in each class of animals; and it is the heaviest humour in the human body. In water a part separates into a kind of cuticle, like a cobweb, that swims in the liquid; the greater part, which is seemingly of a pulpy nature, falls to the bottom. In the semen which is long retained by chaste people, shining globules mixed with the white liquor are easily to be seen. It has a very great quantity of mucus. That the semen is produced from the lymph of the blood, and that the chyle is added to the lymph, will appear probable from the sudden alacrity to venery that happens after eating, and which is lessened by fasting. It is compounded of the liquor of the testicles and seminal vessels, the former indeed being more evident in some animals, and the coagulable milk of the prostate gland. That liquor, however, only secundates, which is generated in the testicles, as we see in eunuchs, who, tho' they have the seminal vessels and prostate, are yet barren. The seminal fluid is retained in the vesicles as long as a man neither exercises venery, nor sports in imaginary dreams. It is always a stimulus to the animal appetite, as long as it is there present in any quantity. Besides this, there is a considerable strong, volatile, and odorous, part, of the semen re-absorbed into the blood, where it produces wonderful changes as soon as it begins to be formed; such as the protrusion of the beard, the covering of pubes, a change of the voice and passions, horns in cattle, &c. for these changes in the animal are not the consequences of age, but of the seminal fluid, and are always absent in eunuchs. The courage and vigour of castrated animals are constantly diminished; and, in like manner, the fierceness of their temper, and the strong smell of their whole body, are remarkably weakened. And, from the example of some animals, and even of mankind, it appears that the irritation of this fluid has occasioned death, by exciting convulsions. A retention of the semen may follow from a narrowness of the excretory duct, a schirrhosity of the prostate, and other causes not sufficiently known.

The quantity of semen expelled at one time from the human vesicles is but small, more especially in a man who has not long abstained from venery; and it is natural to think that the liquor can be but slowly produced from so small an artery. Its generation is accelerated by love, by the presence of the beloved woman; so that it defends the vessels with a sense of pain. Nature herself, therefore, enjoins venery, both for preserving the human race, and the health of every individual. That it comes from the testicle, is shewn by diseases; in which, the *vas deferens* being obstructed, a swelling of the testicle has ensued. The vesicles are never emptied, except by venereal actions and appetites. In order that the semen, which is only in a small quantity, should be projected with a considerable force, it is previously mixed with another fluid from the prostate. This gland prepares a thick, white, soft, cream-like, liquor, in large quantity, which is poured out at the same time, and from the same causes, with the semen itself, into a little channel at each side of the openings of the seminal vesicles, where, mixing with the seminal fluid, it imparts the white colour and viscosity which the semen possesses.

It was necessary for the canal of the urethra to be firm and capable of a direct figure, that it might be able to throw out the semen with sufficient vigour; and therefore a threefold cavernous body surrounds it. Into the cavernous body of the urethra, the blood is poured from the arteries, which come from deep branches sent off from the external hæmorrhoidals; the truth of which is demonstrated by the injection of any kind of fluid, which, being urged through the arteries, easily flows into those cellular spaces surrounding the urethra. These cells are not naturally turgid with blood, because there are veins open, and numerous enough in proportion, to receive and return what is poured in by the arteries; but, if the return is impeded by compressing those veins, the blood is then retained within the cellular spaces, while the arteries continue to carry it more swiftly and strongly than the veins

return

return it. Thus the stagnant blood distends the bulb of the urethra, together with its cavernous body, and the glans itself. This distension is generally performed at the same time, when the other cavernous bodies of the penis, with which this of the urethra has no communication, are likewise rigidly distended.

These cavernous bodies of the penis, having their spongy fabric distended in coition by the blood retained by the veins, and still propelled by the arteries, becomes rigidly turgid, and sustain the otherwise flaccid or but weakly filled urethra, in such a manner that it may be able to conduct the semen into the uterus. All this is demonstrated from the dissection of brute animals in the act of venery, from an artificial erection, and from the injection of liquid matters into the vessels of the penis. The causes of this erection are love; the desire of pleasure; the friction of the glans; various irritations of the bladder, testicles, femoral vessels, and urethra, from the urine, from abundance of good feed, from the venereal poison, from cantharides, whipping the parts, and, lastly, from convulsion of the nerves. The proximate cause of this distension remains still to be explained.

In order to distend the penis, there must be either a compression of the vein bringing back the blood from the cavernous bodies of the penis or urethra; or at least it is necessary that there should be a constriction of the smaller veins that every where open within the cavernous bodies, to hinder them from absorbing and returning the blood from the arteries. The first, however, may be effected by the levator, drawing up the prostate and bladder: but it is very probable, that, as we see in the nipples of the breasts, in the loose pendulous gills of the turkey-cock, and in the blushing or redness of the face from passions of the mind, erection may be produced without the immediate interposition of any peculiar muscle. This supposition is confirmed by brute animals, which all couple without the use of any erector muscle; by the erections which take place in animals totally different from man, and especially those which take place in birds very quickly; and by the inactivity of the erector muscles themselves in the libidinous erection of the penis, and from their unsuitableness for compressing the veins. It is also probable, that an erection may be produced by the numerous ramifications of the nerves exciting a convulsive constriction of the veins; while, at the same time, the arteries, by an increased velocity of the blood, bring more blood to the parts than the veins can carry off. The cause of this convulsion is perhaps inherent in these nervous sphincters themselves, and depends either on a mechanical irritation of the nervous fibres, or on the force of the imagination.

A long-continued and violent erection is at last accompanied with an expulsion of the semen; and this requires much greater force than is requisite for the erection only. For the semen is expelled when the irritation of the nerves is arrived at its greatest height: and in natural venery, when, at length, the cellular spaces of the urethra and its continuous glans, which are at last filled, become so far distended with a large quantity of warm blood, that the nervous papillæ, stretched out in the latter, become violently affected from the irritating or pleasing cause. The seminal vesicles are emptied by the levator muscles of the anus, which press them against the resisting bladder with a convulsive motion, excited either by a voluptuous imagination, or by the exquisite sensibility of the nerves of the glans, principally in its lower part, which is in the neighbourhood of the frenum. Hence the semen is never discharged with any of the urine in an healthy man; because the expulsion of it requires the bladder to be closed or drawn up firmly together; for, while lax, it affords little or no resistance to the seminal vesicles. The transverse muscles seem to dilate the canal of the urethra for the reception of the semen expressed from the vesicles. Soon afterwards the powers constricting the urethra are, from the irritation of the very sensible fabric of that canal, put into action. To this constriction conduces principally the

accelerator, which makes a powerful concussion of the bulb and adjacent part of the urethra, so as to propel its contents more swiftly. But that this may act firmly, the sphincter of the anus, together with that of the bladder, must be well shut. The accelerator muscle seems also principally concerned in the erection, by compressing the veins of the corpus cavernosum of the urethra. At the same time the *erectores penis*, as they are called, arising from the tubercles of the ischium, become tense, and are inserted into the cavernous bodies, sustaining the penis as a sort of medium between the transverse and perpendicular direction. Thus the semen is driven into the vagina, in a prolific coition: the whole action of which is very impetuous, and comes near to a convulsion; whence, if too often repeated, it wonderfully weakens the habit, and greatly injures the whole nervous system, as the maladies arising from thence, in consequence of the affection of the nerves, without which the semen cannot be expelled, seem to indicate.

The PARTS of GENERATION in FEMALES.

These are some of them external, and some internal; and they are all of them subordinated to one principal internal part, called the *uterus*, or *womb*. The other internal parts are the tubæ Fallopianæ, ovaria, vasa spermatica, ligamenta lata, the ropes or bands called *ligamenta rotunda*, and the canal of the uterus. The external parts are the pubes, the *alzæ nymphae*, clitoris, orifice of the urethra, and the orifice of the vagina. The uterus lies between the bladder and the intestinum rectum. It is a body inwardly hollow, outwardly of a whitish colour, of a solid substance, and, except in time of pregnancy, of the figure of a flat flask. The broadest portion is termed the *fundus*, and the narrowest the *neck*, which terminates at the extremity by a transverse opening. This opening is termed the *internal orifice of the uterus*; and, in the natural state, is so narrow, that only a small probe can be passed through it. The inner surface of the cavity of the uterus is lined by a very fine membrane, which at the fundus or broad portion is smooth and even; but, in the narrow portion which leads to the orifice, it is wrinkled in a particular manner. The portion of this membrane, which covers the bottom of the cavity, is perforated by a great number of considerable holes, through which small drops of blood may be observed to pass when the whole uterus is compressed; and sometimes it appears to have very small hairs or villi. These villi and holes are observed to be more or less tinged with blood in women who die in the time of their menses.

The uterus is covered by a portion of the peritoneum, which serves it for a coat, and is the continuation of that which covers the bladder and rectum, running up from the lower and posterior part of the bladder, over the anterior part of the uterus, and from thence over the fundus, and down the posterior side, and afterwards going to the rectum. On each lateral part or edge of the uterus this portion of the peritoneum forms a broad duplicature, which is extended on each side, more or less directly to the neighbouring lateral parts of the pelvis, forming what are termed the *broad ligaments*. The laminae of these duplicatures are connected by a cellular substance; and they contain the Fallopian tubes, the ovaria, a part of the spermatic vessels, and of those that go to the body of the uterus, the ropes called the *round ligaments*, the nerves, &c.

The ovaria are two whitish, oval, flat, oblong, bodies, situated on the sides of the fundus uteri, to which they are fixed by a kind of short round ligament. They are composed of a compact spongy substance, and of several little balls, or transparent vesiculae, called *ova*. The Fallopian tubes are two flaccid, conical, and vermiform, canals, situated more or less transversely on each side of the uterus, between the fundus and the lateral parts of the pelvis. Each of them is fixed by its narrow extremities in the corner of the fundus uteri, into which it opens, though by so narrow a duct as hardly to admit a large bristle. From thence their diameter augments by degrees all the way to the other extremity, where it is about one-third part of an

an inch. The body of the tubæ goes in a winding course, and their large extremity is bent towards the ovaria.

The blood-vessels of these parts are of different kinds, viz. the hypogastric arteries and veins, the ramifications of which belong chiefly to the body of the uterus; the spermatic vessels, and the two vascular ropes, called *ligamenta rotunda*, which might be more properly termed the *vascular ropes of the uterus* or of the *ligamenta lata*. The hypogastric branches are arterial and venal ramifications, arising from the artery and vein of the same name; which having reached the lateral edges of the uterus, are distributed to all its parts, both internal and external, forming a great number of incurvations and particular intertextures.

The spermatic vessels have nearly the same origin in females as in males, and likewise the same course and intertextures; but they never pass out of the abdomen, being wholly distributed to the ovaria and tubes; and they communicate with the uterine hypogastrics, and with the vascular ropes of the *ligamenta lata*. The veins are very large in proportion to the arteries, and these vessels send out lateral ramifications which seem to communicate with the *meseraicæ* and *vena portæ*. The vascular ropes, commonly called the *round ligaments*, are two long small fasciculi of arteries, veins, and ligamentous fibres, interwoven and connected together by a fine cellular substance; and they run in the great duplicature of the *ligamenta lata*, from each corner of the fundus uteri, as far as the annular openings of the abdominal muscles.

The pubis is that broad eminence at the lower part of the hypogastrium, between the two inguina, on which the hairs grow at a certain age. This eminence is owing to a particular thickness of the *membrana adiposa* which covers the fore-part of the ossa pubis, and some small portions of the neighbouring muscles. The longitudinal cavity which reaches from the middle and lower part of the pubes, within an inch of the anus, was by the ancients termed *sinus*; and they called the lateral parts of the cavity *alæ*, which is a more proper name than that of *labia*, commonly given to them. The *alæ* are more prominent, and thicker below than above. They are chiefly composed of the skin, cellular substance, and fat. The exterior skin is a continuation of that of the pubes and inguina. It is more or less even, and furnished with a great number of glandular corpuscles, from which a whitish ceruminous matter may be expressed; and after a certain age it is likewise covered in the same manner as the pubes. The inner side of the *alæ* is something like the red portion of the lips of the mouth; and it is distinguished every where from the external side by a kind of line, in the same manner as the red portion of the lips from the rest of the skin, being likewise thinner and smoother than the outward skin. A great number of pores are observable in it, and also numerous glandular corpuscles, which furnish a liquor more or less sebaceous; and these corpuscles are larger near the edges than in the other parts.

Near the inner edge of the inner surface of the *alæ*, on each side of the orifice of the vagina, we find a small hole more visible than the rest. These two holes are termed *lacunæ*, and they communicate by two small ducts with the same number of follicular bodies lying in the substance of the *alæ*, and which may be considered as small prostates, answering to the glandulæ prostaticæ inferiores in males. The other external parts are situated in the sinus, and hid by the *alæ*. Directly under the superior commissure lies the clitoris, with its cover, called *præputium*. A little lower is the orifice of the urethra; and below that is the orifice of the vagina, or great canal of the uterus. The circumference of this orifice is bordered, either by a membranous circle called *hymen*, or by fleshy portions, termed *caruncula myrtiformes*. On each side of the clitoris begins a very prominent fold, like a crista, which runs down obliquely on each side of the orifice of the urethra. These folds are termed *nymphae*, and they might likewise be named *crista clytoridis*. The clitoris appears at first sight like a small imperforated glans. Its upper and lateral sides are covered

by a kind of *præputium*, formed by a particular fold of a portion of the inner side of the *alæ*, which appears to be glandular, and to discharge a certain moisture, and its inside is granulated. By dissection, we discover in the clitoris a trunk and two branches, as in the penis, consisting of a spongy substance, and of very elastic coats, but without any urethra. The trunk of the clitoris is sustained by a *ligamentum suspensorium* fixed in the symphysis of the ossa pubis, and containing this trunk in its duplicature, nearly as in the other sex.

The *nymphae*, *cristæ clytoridis*, or, as they may likewise be termed, *alæ minores sive internæ*, are two prominent folds of the inner skin of the great or external *alæ*, reaching from the *præputium* of the clitoris to the two sides of the great orifice of the uterus. They begin very narrow, and, having increased in breadth in their course downward, they are again contracted at their lower extremity. They are of a spongy substance, intermixed with glands, several of which may be perceived by the naked eye. Their situation is oblique, their upper extremities lying near each other, and the lower at a much greater distance. In married women they are more or less flaccid and decayed.

By the urethra in females, we mean the urinary duct, the orifice of which is between the *nymphae*, below the glans of the clitoris. The body of the urethra is a spongy duct of the same structure as in males, but much shorter, situated directly under the trunk of the clitoris, and above the great canal of the uterus, adhering to each of these canals, between which it lies, by membranous filaments. It passes under the cartilaginous arch of the ossa pubis, and terminates by an oblique opening at the neck of the bladder, being bent a little downwards between its two extremities.

The vagina, or great canal, formerly called the *neck of the uterus*, is situated below the urethra, and above the extremity of the *intestinum rectum*, a little obliquely, being more raised on the inner and back-part than on the outer and fore-part. Its inner or posterior extremity joins the extremity of the body of the uterus, and surrounds its orifice. The anterior extremity forms the great orifice, which lies under that of the urethra, and above the fossula of the inferior commissure of the *alæ*. Its inner or concave surface has several transverse rugæ, and is covered by a particular membrane. The rugæ are formed by oblong narrow eminences, incurvated like portions of arches, placed very near each other, and disposed in such a manner as to divide the cavity of the canal into an upper and lower side. In general, these arches are very considerable in young persons; become gradually more superficial in married women, and are quite lost in time of delivery.

The exterior or anterior extremity of the great canal in virgins, and especially before the first eruption of the menses, is commonly bordered by circular membranous folds of different breadths, more or less smooth, and sometimes semilunar; which, in some subjects, leaves but a very small opening, in others a larger opening; and, in all, renders the external orifice narrower than the rest of the cavity. This fold, called *hymen*, is formed by the union of the internal membrane of the great canal with that on the inside of the *alæ*, and represents a membranous circle of different breadths, and sometimes uneven. This membranous circle is commonly ruptured in the consummation of marriage; is quite lost in delivery, and afterwards only some irregular portions of it remain; which, from their supposed resemblance to myrtle-leaves, have been termed *caruncula myrtiformes*. This circle may likewise suffer some disorder by too great a flux of the menses, by imprudence, levity, and other particular accidents.

MENSTRUATION.

The descriptions hitherto given of the female parts, are in common to all ages of the sex; but about the thirteenth year, or later, nearly at the same time when semen begins to form itself in the male, considerable changes are likewise produced in the female. For at this time the whole mass of blood begins to circulate with an increased force,

the breasts swell, and the pubes begins to be clothed: at the same time the menses in some measure make their appearance by a common law of nature, although in different countries both the time and quantity of the flux is different. But, before the menstrual flux commences, various symptoms of pain are excited in the loins; and pains resembling the cholic, an increased pulse, head-achs, cutaneous pustules, and a discharge of a whitish liquor, generally pronounce its approach. For now the fleecy vessels of the uterus, which in the state of the fœtus were white, and transfused a sort of milk, as in the young girl they transfused a serous liquor, now begin to swell with blood; the red parts of which are deposited through the vessels into the cavity of the uterus. This continues some days, while in the mean time the first troublesome symptoms abate, and the uterine vessels, gradually contracting their openings, again distil only a little serous moisture as before. But then the same efforts return again at uncertain intervals in tender virgins; till at length, by degrees, they keep near to the end of the fourth week, when the flux of blood follows, as before, which is periodically continued till between the forty-fifth and fiftieth year; though the diet, country, constitution, and way of life, cause a great variation in this discharge.

Since none but the human species are properly subject to this menstrual flux, (although there are some animals who, at the time of their vernal copulation, distil a small quantity of blood from their genitals,) and since the body of the male is always free from the like discharge, it has been a great inquiry in all ages, what should be the cause of this sanguine excretion peculiar to the fair sex? The attraction of the moon, which is known to raise the tides of the sea, has been, in all ages, supposed to produce this effect; other authors have referred it to a sharp stimulating humour, secreted in the genital parts themselves, the same which is the cause of the venereal disease. But, if the moon produces this effect, it would appear in all women at the same time, which is contrary to experience, since there is never a day in which there are not many women seized with this flux; nor are there fewer in the decrease than in the increase of the moon. As to any sharp ferment seated in the uterus, it will be always inquired for in vain, where there are none but mild mucous juices, and where venery, which expels all these juices, neither increases nor lessens the menstrual flux: for women deny that, during the time of their menses, they have any increased desire of venery; for at that time most of the parts are rather pained and languid; and the seat of venereal pleasure seems rather at the entrance of the pudendum than in the uterus, from which last the menses flow. Besides, that the menstrual blood is forced out by some cause exciting the motion of the blood against the vessels, appears most probable; because, by a retention, the courses have been known to break through all the other organs of the body, where no vellicating ferment could be seated, so as to burst open the vessels of each organ; and because the effect produced by the retention of the blood is not confined to those parts which pour out the venereal humour.

Nature has, in general, given women a more delicate body, and solids that are less elastic; their muscles are also smaller, with a greater quantity of fat interposed both between them and their fibres; the bones too are slenderer, and their surfaces have fewer processes and asperities, than in males. Moreover the pelvis of the female is, in all its dimensions, larger; the ossa ilia spread farther from each other; and the os sacrum recedes more backward from the bones of the pubes, while the ossa ischia depart more from each other below: however, the angle in which the bones of the pubes meet together to form an arch, is in the female considerably larger; which differences are confirmed by the observations of the best anatomists, and from necessity itself, which requires a greater space for a greater number of viscera in the pelvis.

The female infant new-born has her lower limbs very small; and the greater part of the blood, belonging to the

iliac arteries, goes to the umbilicals, sending down only a small portion to the pelvis. Hence the pelvis is small, and but little concave; so that the bladder and uterus itself, with the ovaries, project beyond the brim of the pelvis. But when the fœtus is born, and the umbilical artery tied, all the blood of the iliac artery descends to the pelvis and lower limbs, which of course grow larger, and the pelvis spreads wider and deeper; so that, by degrees, the womb and bladder are received into its cavity, without being any longer compressed by the intestines and peritonæum, when the abdominal muscles press upon the lower parts of the abdomen. When the increase is perfect, or nearly so, then in general we find those arteries of the uterus largest, and easily injected with wax, which in the fœtus were least; and all things are so changed, that the hemorrhoidal artery is now in place of the hypogastric, when formerly the umbilical had been the trunk of that artery. More blood, therefore, at that time comes into the uterus, vagina, and clitoris, than formerly used to do. At the same time, when the growth of the body begins considerably to diminish, and the blood, finding easy admittance into the completed viscera, is prepared in a greater quantity; and the appetite being now very sharp, in both sexes, a plethora consequently follows. In the male, it vents itself frequently by the nose, from the exhaling vessels of the pituitary membrane being dilated to so great a degree without a rupture, as to let the red blood distil through them; and now the semen first begins to be secreted, and the beard to grow. But in the female, the same plethora finds a more easy vent downward; being directed partly by the weight of the blood itself, to the uterine vessels now much enlarged, of a soft fleecy fabric, and seated in a loose hollow part, with a great deal of cellular fabric interperfed, which is very yielding and succulent, as we observe in the womb: for these causes, the vessels being easily distensible, the blood finds a more easy passage through the soft exhaling vessels, which open into the cavity of the uterus, as being there less resisted than in its return by the veins, or in taking a course through any other part; and at the same time the return of the blood from the uterus is impeded, both because the flexures of the arteries, from the increased afflux of the blood, become more serpentine and fit for retarding the blood's motion, and likewise because it now returns with difficulty through the veins. The blood is, therefore, first collected in the vessels of the uterus, which at this time are observed, in dissections, to be swelled; it is also accumulated in the arteries of the loins and the aorta itself, which, urging on a new torrent of blood, augments the force, so far as to discharge the red blood into the serous vessels of the uterus, which at first transmit an increased quantity of warm mucus, afterwards a reddish-coloured serum; and by suffering a greater distension, they at last emit the red blood itself. The same greater impulse of blood, determined to the genital parts, drives out the hitherto latent hairs, increases the bulk of the clitoris, dilates the cavernous plexus of the vagina, and whets the female appetite to venery. Accordingly we find, that the quantity of the menstrual flux, and the earliness of their appearance, are promoted by every thing that either increases the quantity or momentum of the blood with respect to the body in general, or directs the course of the blood more particularly towards the uterus; such as joy, lust, bathing of the feet, rich diet, warm air, and lively temperament of the body. It is diminished by those things which lessen plethora and the motion of the blood, as want, grief, cold air, sloth, and antecedent diseases.

When five or six ounces of blood have been thus evacuated, the unloaded arteries exert a greater force of elasticity, and, like all arteries which have been overcharged with blood, gradually contract themselves to a less diameter, so as at length to give passage only to the former thin exhaling moisture; but the plethora, or quantity of blood, being again increased from the same causes, a like discharge will always more easily ensue through the vessels of the uterus, after they have been once thus opened, than

than through any other part. Nor is there any occasion to perplex ourselves about the cause, why this periodical discharge is, for the most part, nearly regular or menstrual; for this depends upon the proportion of the quantity and momentum of the blood daily collected, together with the resistance of the uterus, which is to yield again gradually to the first course. This critical discharge of the blood, therefore, never waits for the interval of a month, but flows sooner or later, according as the greater quantity of blood in plethoric women is determined, by lust or other causes, towards the uterus. Finally, they cease to flow altogether, when the uterus, like all the other solid parts of the body, has acquired so great a degree of hardness and resistance, as cannot be overcome by the declining force of the heart and arteries, by which the blood and juices are driven on through all the vessels. This increased hardness in the old uterus is so remarkable in the arteries and ovaries, that it easily discovers itself both to the knife and the injections of the anatomist. But, in general, brute animals have no menses; because, in them, the womb is in a manner rather membranous than fleshy, with very firm or resisting vessels: besides, the difference of their posture never permits a natural hemorrhagy from the nostrils or other parts. They are wanting in men, because in that sex there is no spongy organ fit for retaining the blood; and likewise because the arteries of the pelvis are both harder, and less in proportion, than the veins; and thus the impetus of the blood is directed to the lower limbs, where the vessels are larger in proportion as those of the pelvis are smaller.

It will, perhaps, be demanded, why the breasts swell at the time of the approach of the menses? We are to observe, that the breasts have many particulars in their fabric common with the uterus; as appears from the secretion of the milk in them after the birth of the fœtus, which increases or diminishes in proportion as the lochial flux is either increased or diminished; from the similitude of the ferous liquor to milk or whey, which is found in the uterus of those who do not suckle their children; it is of a thin white consistence, and appears very evidently in the brute animals; also from the turgescence or erection of the papillæ or nipples of the breast by friction, analogous to the erection of the clitoris. The same causes, therefore, which distend the vessels of the uterus, likewise determine the blood more plentifully to the breasts; the consequence of which is an increased bulk and turgescence of the conglomerate glandules and cellular fabric which compose them.

OF HERMAPHRODITES.

Thus far we have considered the generative organs under their natural and proper conformation. But it sometimes happens in the human structure, and very frequently in that of brute animals, that from a *lusus naturæ*, or redundancy of parts, that mixture of conformation is produced, which is called *hermaphrodite*; a word formed of the Greek *Ἑρμαφροδίτη*, a compound of *Ἑρμης*, Mercury, and *Ἀφροδίτη*, Venus; q. d. a mixture of Mercury and Venus, i. e. of male and female. For it is to be observed, *Hermaphroditus* was originally a proper name, applied by the heathen mythologists to a fabulous deity, whom some represent as a son of *Hermes*, Mercury, and *Aphrodite*, Venus; and who, being desperately in love with the nymph *Salmacis*, obtained of the gods to have his body and hers united into one. The Greeks, therefore, call *hermaphrodites* *ανδρογυναι*, *androgyni*, q. d. men-women; whence persons formed with this plurality of sex are called *Androgynes*.

In a treatise by Mr. Hunter, in the 69th volume of the Philosophical Transactions, hermaphrodites are divided into *natural*, and *unnatural* or monstrous. The first belongs to the more simple orders of animals, of which there are a much greater number than of the more perfect. The unnatural takes place in every tribe of animals having distinct sexes, but is more common in some than in others. The

human species, Dr. Hunter supposed to have the fewest; but in the horse, sheep, and black cattle, they are very frequent. In the horse Dr. Hunter dissected, the testicles had come down out of the abdomen into the place where the udder should have been, and appeared like an udder, not so pendulous as the scrotum in the male of such animals. There were also two nipples, of which horses have no perfect form; being blended in them with the sheath or prepuce, of which there was none here. The external female parts were exactly similar to those of a perfect female; but instead of a common-sized clitoris, there was one about five or six inches long; which, when erect, stood almost directly backwards.

A foal ass very similar to the above was killed, and the following appearances were observed on dissection. The testicles were not come down as in the former, possibly because the creature was too young. It had also two nipples; but there was no penis passing round the pubes to the belly, as in the perfect male ass. The external female parts were similar to those of the she-ass. Within the entrance of the vagina was placed the clitoris; but much longer than that of a true female, being about five inches long. The vagina was open a little farther than the opening of the urethra into it, and then became obliterated; from thence, up to the fundus of the uterus, there was no canal. At the fundus of the common uterus it was hollow, or had a cavity in it, and then divided in two, viz. a right and a left, called the *horns* of the uterus, which were also pervious. Beyond the termination of the two horns were placed the ovaria, as in the true female; but the Fallopian tubes could not be found. From the broad ligaments, to the edges of which the horns of the uterus and ovaria were attached, there passed towards each groin a part similar to the round ligaments in the female; which were continued into the rings of the abdominal muscles; but with this difference, that there were continued with them a process or theca of the peritonæum, similar to the tunica vaginalis communis in the male ass; and in these there were found the testicles, but no vasa deferentia could be observed passing from them.

Concerning hermaphrodites of the human species much has been written, and many laws enacted about them in different nations. Dr. Parsons, in a treatise on this subject, endeavours to explode the notion as a vulgar error. According to him, all the hermaphrodites that have appeared were only women whose clitoris from some cause or other was overgrown; and, in particular, that this was the case with the Angola woman shewn at London as an hermaphrodite some time ago. The same opinion hath likewise been held by many eminent anatomists, namely, that those persons called hermaphrodites are only females whose clitoris protrudes beyond the nymphæ. The French anatomists, however, seem not only to have removed all doubts about the matter, but have defined the several varieties of this *lusus naturæ* that have yet been known to occur in the human subject. This defect, or perhaps redundancy, in the animal structure, is described by them as follows. "There is a depravation in the form of the parts intended by nature for propagation, when, besides those concealed parts that are found necessary for the discharge of prolific functions, the *puenda* of the other sex likewise appear. This monstrous production of nature is diversified in four different ways; of which three appear in males, and one in females. In men, the female pudendum, clothed with hair, sometimes appears contiguous to the perinæum; at other times, in the middle of the scrotum; at other times, which constitutes the third diversity, thro' that part itself which in the midst of the scrotum exhibits the form of a male pudendum, urine is emitted, as it were, from female parts. Near that which is the test of puberty, and above the pudendum, in females, the masculine genitals appear, conspicuous in all their three forms, one resembling the *vineam* or yard, the other like the two testicles: but for the most part it happens, that, of the two instruments of generation, one is feeble and inert; and

it is extremely rare that both are found sufficiently valid and proper for seats of love; nay, even in a great many, both these members are deficient and impotent, so that they can perform the office neither of a male nor of a female."

With respect to them, it appears, from a collation of all the circumstances which have been observed, that no perfect *androgynæ*, or real *hermaphrodite*, possesses the genuine powers of both sexes, in such a manner as to be qualified for performing the functions of either with success: the irregularity of their fabrication almost always consists in something superfluous added to one of the two sexes, which gives it the appearance of the other, without bestowing the real and characteristical distinction; and every *hermaphrodite* is almost always, in effect, a very woman. Since this monstrous exhibition of nature is not such as to abrogate the rights or destroy the character of humanity among human beings, this involuntary misfortune implies no right to despise those upon whom it is inflicted by nature, or to make them the sport and ridicule of the illiberal and licentious.

The Anatomical Plate VI. affords an accurate View of the Male and Female Parts of Generation, and of the *Lusus Naturæ* constituting the Hermaphrodites or Androgynes.

Fig. 1, represents the male organs. *aa*, The kidneys. *bb*, The ureters. *cc*, The renal glands. *d*, The trunk of the vena cava. *e*, Trunk of the aorta. *ff*, The emulgent arteries and veins. *gg*, The spermatic arteries and veins. *hh*, The iliac arteries. *ii*, The iliac veins. *kk*, The hypogastric arteries and veins, which run down upon the bladder and penis. *l*, The bladder. *m*, The bulb of the urethra. *n*, The penis. *oo*, The vasa deferentia. *pp*, The epididymes. *qq*, The testicles.

Fig. 2, represents the female parts. *1*, The womb. *2, 2*, The Fallopian tubes. *3, 3*, The fimbriæ. *4, 4*, The ovaria. *5*, The mouth of the womb. *6, 6*, The ligamenta rotunda. *7*, The rugous inside of the vagina. *8*, The orifice of the vagina.

Fig. 3, 4, and 5, represent the hermaphrodite conformation of the male genitals, as described above; and fig. 6, represents that which more particularly appertains to the female.

OF THE ARTERIES.

The heart throws the blood into two great arteries; one of which is named *aorta*, the other *arteria pulmonalis*. The *aorta* distributes the blood to all parts of the body, for the nourishment of the parts, and for the secretion of the different fluids. The *arteria pulmonalis* carries the venal blood through all the capillary vessels of the lungs. Both these great or general arteries are subdivided into several branches, and into a great number of ramifications.

The pulmonary artery goes out from the right ventricle of the heart; and its trunk having run almost directly upward as high as the curvature of the aorta, is divided into two lateral branches, one going to the right side, called the *right pulmonary artery*; the other to the left side, termed the *left pulmonary artery*. The right artery passes under the curvature of the aorta, and is consequently longer than the left. They both run to the lungs, and are dispersed through their whole substance by ramifications nearly like those of the bronchia, and lying in the same direction. From the pulmonary arteries the blood is returned by the veins; which, contrary to the course of the arteries, begin by very minute canals, and gradually become larger, forming at length four large trunks called *pulmonary veins*, which terminate in the left auricle.

The *aorta* is divided into the *aorta ascendens* and *aorta descendens*, though both are but one and the same trunk. It is termed *ascendens*, from where it leaves the heart to the extremity of the great curvature or arch. The remaining part of this trunk from the arch to the os sacrum is named *descendens*. The large branches of the *aorta* are these: two *arteriæ subclaviæ*, two *carotides*, one *cæliaca*, one *mesenterica superior*, two *renales* or *emulgentes*, one *mesenterica inferior*, and two *iliacæ*. The small branches are chiefly

the *arteriæ coronariæ cordis*, *bronchiales*, *œsophageæ*, *intercostales*, *diaphragmaticæ inferiores*, *spermaticæ*, *lumbares*, and *sacræ*. From the upper part the *aorta* sends out commonly three, sometimes four, large branches, their origins being very near each other. When there are four, the two middle branches are termed *arteriæ carotides*, the other two *subclaviæ*; and both are distinguished into right and left. The *carotid arteries* run directly up to the head, each of them being first divided into two, one external, the other internal: the external artery goes chiefly to the outer parts of the head and *dura mater*, or first covering of the brain; the internal enters the cranium through the bony canal of the os petrosum, and is distributed through the brain by a great number of ramifications. The *subclavian arteries* separate laterally, and almost transversely, each running toward that side on which it lies, behind and under the *claviculæ*, from whence they have their name. The left seems to be shorter, and runs more obliquely than the right. The *subclavian* on each side terminates at the upper edge of the first rib; and there, as it goes out of the thorax, takes the name of *arteria axillaris*. During this course of the *subclavian artery*, taking in the common trunk of the right *subclavian*, several arteries arise from it, viz. the *mammaria interna*, *mediastina*, *pericardica*, *diaphragmatica minor* five superior, *thymica*, and *trachealis*. The *thymica* and *trachealis* on each side are, in some subjects, only branches of one small trunk which springs from the common trunk of the right *subclavian* and *carotid*. They are generally small arteries, which run sometimes separate, and sometimes partly separate and partly joined. The *subclavian* sends off likewise the *mammaria interna*, *vertebrales*, *cervicales*, and sometimes several of the upper *intercostales*. The *axillary artery*, which is only a continuation of the *subclavian*, from the place where it goes out of the thorax to the axilla, detaches chiefly the *mammaria externa* or *thoracica superior*, *thoracica inferior*, *scapulares externa*, *scapularis interna*, *humeralis* or *muscularis*, &c. Afterwards it is continued, by different ramifications, and under different names, over the whole arm, all the way to the ends of the fingers.

The superior portion of the *aorta* descendens gives off the *arteriæ bronchiales*, which arise sometimes by a small common trunk, sometimes separately, and sometimes do not come immediately from the *aorta*. It next sends off the *œsophageæ*, which may be looked upon as *mediastinæ posteriores*, and the *intercostales*, from its posterior part, which in some subjects come all from this portion of the *aorta*, in others only the lowest eight or nine. The inferior portion of the descending *aorta*, as it passes through the diaphragm, gives off the *diaphragmaticæ inferiores* or *phrenicæ*, which however do not always come immediately from the *aorta*. Afterwards it sends off several branches anteriorly, posteriorly, and laterally.

The anterior branches are *cæliaca*, which supplies the stomach, liver, spleen, pancreas, &c. the *mesenterica superior*, which goes chiefly to the mesentery, to the small intestines, and to that part of the great intestines which lies on the right side of the abdomen; the *mesenterica inferior*, which goes to the great intestines on the left side, and produces the *hæmorrhoidalis interna*; and lastly, the right and left *arteriæ spermaticæ*. The posterior branches are the *arteriæ lumbares*, of which there are several pairs, and the *sacræ*, which do not always come from the trunk of the *aorta*. The lateral branches are the *capsulares* and *adiposæ*, the origin of which often varies; the *renales*, commonly termed *emulgentes*, and the *iliacæ*. The *iliac artery* on each side is commonly divided into the external or anterior, and internal or posterior. The internal *iliaca* is likewise named *arteria hypogastrica*; and its ramifications are distributed to the viscera contained in the pelvis, and to the neighbouring parts, both internal and external. The *iliaca externa*, which is the true continuation of the *iliac trunk*, and alone deserves that name, goes on to the inguen, and then out of the abdomen, under the *ligamentum Fallopii*; having first detached the *epigastrica*, which goes

goes to the muscoli abdominis recti. Having quitted the abdomen, it is called arteria cruralis, which runs down upon the thigh, and is distributed by many branches and ramifications to all the lower extremity.

The arteries themselves have arteries which are more particularly spread through their external cellular coat, which spring on all sides from the next adjacent small arterial trunks: they are numerous, and like net-work; they are very minute, but plainly appear, even in the fœtus, without injection. Nerves also descend, for a long way together, through the surface of the artery, and at last vanish in the cellular substance of the vessel; of which we have a specimen in the external and internal carotids, and in the arch of the aorta; and Dr. Waller has shewn them in several arteries in the thorax and abdomen. Do not the arteries seem to derive from these nerves a muscular and convulsive force, very different from that of their simple elasticity? Does not this force shew itself plainly enough in fevers, faintings, palsies accompanied with atrophy, and passions of the mind? Haller considers the artery as being in a manner insensible and unirritable; and if it is constricted by the application of poisons, he says it has every property of the dead skin. This, however, is not agreeable to the opinions of the present physiologists. The *sections* of the arteries are circular, because they are elastic; and this is the reason why, from the small arteries of the teeth, hemorrhages are sometimes fatal. The aorta, indeed, of the thorax and abdomen, the carotids of the neck, and some other arteries of the dead body, from their lessened extension, appear somewhat flat or depressed; but their round figure, or circular section, is every where restored by injection. Their elasticity is also evident by that powerful compressure, which a segment of a large artery makes upon the finger that distends it, and which is much stronger in a dead than in a living body. In the living body, indeed, this force yields to that of the heart; but instantly recovers itself when the heart is relaxed, and restores the artery to its former diameter; and this makes the *pulse*, which all arteries possess, although the systole and diastole can be perceived by the finger only in the larger, not in the smaller ones. The *strength* of the arteries is considerable enough: but as the dense hard network of the outer cellular coat refuses to yield to a distending force, it breaks without much difficulty, and almost easier than the coats of the veins; and hence aneurisms arise. But, in general, the trunks are, in all parts of the body, weaker, and the branches stronger in their coats; whence the impulse of the blood may exert a considerable effect upon the former, but least of all on the arteries of the limbs. Hence it is, that aneurisms are most frequently formed near the heart.

Nature has dispersed the arteries through the whole animal body, except in a few membranes where they have not yet been observed. She hath disposed of the trunks, every where, in places of safety; because wounds in the smaller trunks are always dangerous, and in the larger trunks frequently mortal. The skin is spread with numerous short and small arterial branches; but the larger trunks, defended by the skin and muscles, creep along near the bones. In general, the arteries are in proportion to the parts of the body to which they are sent. The largest go to the secretory organs, the brain, and spleen; the smaller ones to the muscular parts. The extremities of the arteries, which are either cylindrical or nearly so, send off smaller branches in greater abundance than the large arteries do, and these extremely small ramifications anastomosing with one another form a kind of net-work; as we see more particularly in all membranes. By this means, tho' the passage from the heart to any part of the artery is obstructed, the blood may nevertheless flow through the arteries which are near the obstructed one. Thus a gangrene or languor of the part is very strongly prevented, and the obstruction is more easily resolved by the repulsion of the obstacle into the larger part of the trunk. The least arteries are either changed by a continuation of their canals

into veins, or else a branch, sent out at right angles from the artery, is inserted by a like angle into a branch of small veins. Both these kinds of mechanism are demonstrated to us by the microscope, and the easy return of injections, through the veins into the arteries. A large artery is never observed to open into a vein.

In the viscera, we find the small arteries disposed not so much in net-work as in a fabric of a peculiar kind, wherein the small branches descend very thick, or in clusters parallel to the trunk, so as to resemble brushes, a variety of little trees or bushes, small serpents, or threads, according to the various disposition of the parts. Sometimes the arteries end in another manner, namely, by being converted into vessels of the smaller kinds, which are continuous to the arteries, and indeed real arterial trunks; as may be observed in the ophthalmic artery, by tracing the arteries of the tunica choroides, or the colourless ones of the circle of the uvea and iris. In other places the smaller vessels seem to proceed laterally as branches from the trunks of the least sanguineous arteries; and these again are drawn out into trunks still smaller. These are called *excretory ducts*. It is with difficulty that these vessels are filled with red blood; of this, however, we have examples in the kidneys, the liver, and the breasts. Indeed the blood, when vitiated, penetrates the excretory ducts of the whole body, even without hurting the vessels; nor is that aberration found to be productive of any evil consequence after the disorder of the blood is cured.

Another termination of the arterial extremities is into the exhaling vessels; and this manner of their ending is very frequent in all parts of the body. The whole skin, all membranes of the human body which form any close cavity, all the ventricles of the brain, the anterior and posterior chambers of the eye, all the adipose cells and pulmonary vesicles, the whole cavity of the stomach and intestinal tube, and the trachea, are all of them replenished with exhaling arteries of this kind. These emit a thin, watery, gelatinous, humour, which, by congestion, stagnation, or excess, is converted into a watery but coagulable lymph, as we see in several diseases, and in death. The exhalants are easily demonstrable from the watery sweat, that ensues after injecting the arteries with any warm liquor. In some places they exhale indeed not a thin vapour, but blood itself, as we see in the heart, the cellular fabric of the penis, urethra, clitoris, and nipple of the female breast; in all which blood in its natural state is poured out.

The arteries, in a living person, are always full of blood; since the jet or stream from an artery is not interrupted by alternate stops, while the heart is inactive, but flows on in a continued thread. The microscope also shews the arteries, in living animals, to be full both in their systole and diastole; nor can the circular fibres of the arteries so far contract themselves as entirely to evacuate these tubes. Every contraction of the ventricle sends a new wave of blood into the arteries; this wave seldom exceeds two ounces, and consequently bears only a small proportion to the whole circulating mass, yet it is so forcibly propelled by the heart as to drive the preceding waves before it. In consequence of this propulsion, the dimensions of the cylindrical artery are augmented, the arterial coats are pressed near each other, and the serpentine flexures are considerably increased, as we often see in injections. This dilatation of the artery, whereby its capacity is changed from a less to a greater circle, is the *pulse*, the diastole of which is an expansion of the artery beyond its natural diameter. This action is the characteristic of life; it results from the heart only, and is in no wise natural to the arteries themselves. Hence, when the motion of the heart is intercepted, whether by aneurism, ligature, or otherwise, pulsation of the arteries is to be felt; and hence a sudden cessation of the pulse, by a wound through the heart. The artery is proportionally more dilated, the more the velocity of the new wave exceeds that of the former one.

The blood's velocity in the arteries is diminished during the heart's systole, but increased during its diastole; at a medium its motion is somewhat less than one foot in a second of time. The constant plenitude of the arteries renders it impossible for us to perceive any succession in the pulses of different arteries; whence all the arteries of the body seem to beat at one and the same instant, whilst the heart strikes against the breast: and yet there is certainly a succession in the systole of the arteries, by which the aorta seems to contract successively, as it is filled with blood expelled from the heart; so that the part of the artery next the heart is first constricted, and thence the arterial contracting force gradually proceeds to the extremities. We have an instance of this in the intestines; and very evidently in insects, who have a long fistulous and knotted heart, manifestly contracting in a succession from the beginning to the end; but in the human arteries the successions are so quick as to be imperceptible.

The pulse is continued to, and ends in, the expillary and cylindrical arteries, or the originations of the veins. We have already mentioned the velocity with which the blood comes from the heart; but that velocity continually decreases. The transverse sections of all the arteries at a distance from the heart, are in one sum greater than the section of the aorta; and the aggregate area of their sections increases, but in an uncertain proportion, as the distance from the heart increases: the velocity will consequently decrease as the distance increases, for it must always be inversely proportional to the area of the tube through which the fluid runs. A considerable allowance must also be made for the great viscosity or tenacity of the blood, which entirely coagulates by rest; its circulatory motion alone overcomes the mutual attraction of its parts, and prevents it from adhering to the sides of the vessels in a coagulated state, as we see in aneurisms and wounds of the arteries, and after death. The opposition which the blood meets with in the branches, lessens its velocity in the trunk: and the opposition of torrents of blood to one another in the anastomoses of vessels also destroys some parts of its motion. We may easily perceive the amount of this retardation will be very considerable, although it be difficult to estimate it justly. In the larger trunks the blood of a living animal flows with the rapidity of a torrent: but, in the least branches, it creeps along very slowly, and begins to coagulate. It is also well known to surgeons, that a small branch of an artery near the heart bleeds more dangerously than a much larger one at a greater distance. The weight of the incumbent atmosphere, of the muscles and fleshy parts lying above the artery, and the contractile power of the vessel itself, also make a resistance to the heart; but they do not lessen the velocity of the blood, for they add as much in the diastole as they diminish in the systole. The pulse therefore ensues, because the anterior wave or column of blood moves on slower, while the subsequent or posterior wave comes faster; so that the preceding is an obstacle to the consequent blood. But since the force of the heart weakens as the blood goes on, and the contractile power of the arteries increases, the excess of the celerity of the consequent wave pushed on by the heart, above the celerity of the antecedent wave pushed on by the contractile power of the artery, will grow continually less and less; and, when the blood arrives to a certain distance, the celerities of both waves become equal, and the pulsation ceases. This place of equality in motion cannot be in the larger and more conspicuous arterial branches: for in them the wave last coming from the heart moves quicker than what went before. The inflammatory pulsation of the small arteries of the eye shews that they have a pulse. We may however safely conclude, that in the least red arteries the pulse at length begins to vanish. This is evident from the equable motion of the blood, as seen by a microscope, through the arteries of a frog. In the larger vessels, however, such as may be about the sixth part of a line in diameter, the pulse becomes imperceptible. In the least veins there is

no sensible pulsation or accelerated motion of the blood, whilst the heart contracts, demonstrable either by the microscope or any other experiment.

That the blood presses against the sides of the veins, appears from the furrows made on the bones over which they pass, and the swelling of the veins on being tied. Why then do not the veins beat? The reason seems to be, that the blood is more retarded immediately on its leaving the heart, than it is in the smallest vessels. Hence, the difference of the velocities of the consequent and antecedent waves is greatest at the heart, and grows gradually less, till it at last totally vanishes. The pulse is therefore the measure of the powers which the heart spends on the blood; because it is the immediate and full effect of those powers. Hence, *ceteris paribus*, the pulse is slow in the most healthy people, where there is no stimulus, nor any unnatural resistance; and where the heart is at liberty to propel the blood with ease. We must except those cases where there is some obstacle which prevents the blood from entering the aorta. For this reason the pulse in asthmatic people is slow. A debility or insensibility of the heart, when the usual stimulus is not capable of exciting it to contraction, also occasions a slow pulse. A strong full pulse is caused by the arteries being full, and the heart at the same time vigorous and powerful; a small pulse by the emptiness of the arteries, and a smaller wave of blood sent from the heart. A hard pulse denotes some obstacle or stimulus: or else that the heart's force, the thickness of blood, or the rigidity of the artery, are increased. A quick pulse denotes some stimulus, obstacle, or greater sensibility or irritability of the heart. The pulse is best felt where the artery lies exposed bare to the touch, upon some resisting bone; but obstructions sometimes render the pulse perceptible where it is never so naturally.

The pulse is slower in animals as they are larger or more bulky; because their heart, in proportion to the rest of the body, is less than that of smaller animals; it is also less irritable, and is obliged to propel the blood to a greater distance; whence, in large animals, the proportion between the resistances to be overcome and the force of the heart is less than the small ones. Hence, small animals are more voracious than large ones; as the whale and elephant. The pulse of a healthful person, in the morning, beats at least 65 in a minute; but, after the fatigue of the day, it will beat 80; and again, by the night's rest or sleep, it will become gradually less frequent, till in the morning you will find it returned to its primitive number of 65. For the motions of the muscles, and actions of the external and internal senses, the warmth of the atmosphere, and the action of the aliments, urge the venal blood on to the heart, whence a more than ordinary stimulus and a greater number of contractions. Hence also those paroxysms, or fits of increase, observable in all fevers towards the evening. Sleep retards the motion not only of the blood, but of all the other humours and actions in the body whatever.

A frequent and a quick pulse are often confounded; but they are in reality very different. The pulse is quicker in children, and becomes afterwards slower in persons as they grow older. The salient point beats 134 in a minute: the pulse of new-born infants, 120; and of old people, 60. A feverish pulse is usually between 96 and 120, to which number indeed it is often increased by laborious exercises alone; if it is increased to 130 or 140, (which last number we have never known it exceed,) the patient seldom recovers. The pulse beats slower in winter, and quicker in summer, by about ten strokes per minute; and, under the torrid zone it often increases to 120. The different passions of the mind variously accelerate, retard, and disturb, the pulse. Whatever obstructs the circulation is also found to accelerate the pulse; not from the laws of hydrostatics, or on account of the canal being made narrower, nor from the action of the soul; but by the strenuous and more frequently repeated contractions of the heart, in order to free itself from an irritating stimulus: thus an irritation from acrid blood is the cause of the frequent pulse in fevers.

In a healthy person, using sufficient exercise of body, the blood moves with such a velocity, as suffices to deliver as much of it by the vena cava to the heart, as is sent out by the aorta. But rest or inactivity of body, and a weakness of the contracting fibres of the heart and other muscles, frequently render the motion of the venal blood more difficult. Hence follow the varices in women with child, and the piles; which latter are also partly owing to the deficiency of valves in the vena portarum. Hence also the menses. And, when the veins return their blood too slowly to the heart, the subtle vapours stagnate; whence that frequency of œdematous swellings in weak people. The time in which an ounce of blood, sent out from the left ventricle of the heart, returns to the right, and which is commonly reckoned the time in which the greater circulation is performed, is uncertain. Suppose the quantity of blood thrown out of the heart at every pulsation to be $1\frac{1}{2}$ ounces, and the whole quantity of the blood to be 336 ounces, then a complete circulation is performed in the time of 224 pulsations; that is, in about three minutes!

OF THE VEINS.

The blood distributed through the body by the aorta and arteria pulmonaris, returns to the heart by three kinds of veins, called *vena cava*, *vena porta*, and *vena pulmonaris*. The vena cava carries back to the right auricle of the heart the blood conveyed by the aorta to all parts of the body, except what goes by the arteria coronaria cordis. It receives all this blood from the arterial ramifications in part directly, and in part indirectly. The vena portæ receives the blood carried to the floating viscera of the abdomen by the arteria cæliaca and the two mesentericæ; and conveys it to the vena hepatica, and from thence to the vena cava. The venæ pulmonares convey to the pulmonary sinus, or left auricle of the heart, the blood carried to the lungs by the arteria pulmonaris. And to these three veins two others might be added, viz. those which belong particularly to the heart, and to its auricles, and the sinuses of the dura mater.

The vena cava goes out from the right auricle of the heart by two large separate trunks, almost directly opposite to each other, one running upward, called *vena cava superior*; the other downward, called *vena cava inferior*. The vena cava superior is distributed chiefly to the thorax, head, and upper extremities, and but very little to the parts below the diaphragm. The vena cava inferior is distributed chiefly to the abdomen and lower extremities, and but very little to the parts above the diaphragm. The ancients called the superior vena cava *ascendens*; and the inferior, *descendens*; having regard only to the great tubes, and to their division into trunks and branches. Several moderns have retained these names, but in a contrary signification, to accommodate them to the motion of the blood, which descends by the vena cava superior, and ascends by the vena cava inferior.

The *superior* vena cava runs up from the right auricle of the heart, almost in a direct course for about two fingers breadth, lying within the pericardium, in the right side of the trunk of the aorta, but a little more anteriorly. As it goes out of the pericardium, it is inclined a little to the left hand, and then runs up a little higher than the curvature of the aorta. At this place it terminates by a bifurcation or division into two large branches or subordinate trunks, one of which runs towards the left side, the other towards the right. These two branches are named *subclavia*, as lying behind, and, in some measure, under the claviculæ, both in the same manner. They are of unequal lengths, because the trunk of the vena cava does not lie in the middle of the thorax, but towards the right side, where the left subclavian arises as well as the right; and consequently the left is the longest. The trunk of the superior cava, from where it leaves the pericardium to the bifurcation, sends out anteriorly several small branches, which sometimes arise separately, and sometimes by small common trunks. These branches are the vena mediastina, pericardica, diaphragmatica superior, thymica, mamma-

interna, and trachealis; the last of which go out sometimes behind the bifurcation. All these small branches from the trunk of the vena cava superior are termed *dextra*; and their fellows on the other side, called *sinistra*, do not arise from the trunk, because of its lateral situation, but from the left subclavian. Posteriorly, a little above the pericardium, the trunk of the superior cava sends out a capital branch, called *vena azygos*, or *vena sine pari*, which runs down on the right side of the bodies of the vertebrae dorsi, almost to the diaphragm; giving off the greatest part of the venæ intercostales and lumbares superiores. The two subclaviæ run laterally or toward each side; and terminate as they go out of the thorax, between the first rib and clavícula, immediately before the anterior insertion of the musculus scalenus. The right subclavian, which is the shortest of the two, commonly sends out four capital branches; the jugularis externa, jugularis interna, vertebralis, and axillaris; which last is rather a continuation than a branch of the subclavia. The left subclavian gives off the small veins on the left side, answering those on the right side that come from the trunk of the superior cava, viz. the mediastina, pericardica diaphragmatica superior, thymica, mamma interna, and trachealis. Next to these small veins called *sinistra*, it detaches another small branch called *intercostalis superior sinistra*; and then four large branches like those from the right subclavian, viz. the jugularis externa, jugularis interna, vertebralis, and axillaris; which are all termed *sinistra*. The external jugular veins are distributed chiefly to the outer parts of the throat, neck, and head; and send a small vein to the arm, named *cephalica*, which assists in forming a large one of the same name. The internal jugular veins go to the internal parts of the neck and head, communicating with the sinuses of the dura mater, and in several places with the external jugular veins. The vertebral veins pass through the holes in the transverse apophyses of the vertebrae of the neck, sending branches to the neck and occiput. They form the sinus venales of these vertebrae, and communicate with the sinuses of the dura mater. The axillary veins are continuations of the subclaviæ, from where these leave the thorax to the axillæ. They produce the mammae internæ, thoracicae, scapulares or humerales, and a branch to each arm; which, together with that from the external jugularis, forms the vena cephalica. Afterwards the axillary vein terminates in the principal vein of the arm, called *basilica*; which, together with the cephalica, is distributed by numerous ramifications to all parts of the arm, forearm, and hand.

The portion of the *inferior* vena cava, contained in the pericardium, is very small, being scarcely the twelfth part of an inch on the fore-part, and not above a quarter of an inch on the back-part. From thence it immediately perforates the diaphragm, to which it gives the venæ diaphragmaticæ inferiores or phrenicæ. It passes next behind the liver, through the great sinus of that viscus, to which it furnishes several branches, termed *venæ hepaticæ*. In this course it inclines a little towards the spina dorsi and aorta inferior; the trunk and ramifications of which it afterwards accompanies in the abdomen, all the way to the os sacrum; the arteria cæliaca and the two mesentericæ only excepted. Thus the inferior cava sends out on each side, in the same manner with the aorta, the venæ adiposæ, renales, spermaticæ, lumbares, and sacrae. Having reached to the os sacrum, it loses the name of cava; and, terminating by a bifurcation, like that of the descending aorta, it forms the two venæ iliacæ. These iliac veins having given off the hypogastricæ, with all their ramifications, to the viscera of the pelvis, and to some other external and internal neighbouring parts, go out of the abdomen, under the ligamentum Fallopii, and there take the name of *venæ crurales*. Each crural vein sends off numerous ramifications to all the lower extremity; besides the vena saphena, which goes out near the origin of the cruralis, and, running along this whole extremity, detaches many ramifications all the way to the foot.

Thus

Thus the veins, in many particulars, resemble the arteries. There are six; of which two answer to the aorta, and the remaining four to the pulmonary artery. Some count a seventh trunk, by taking in the *venæ hepaticæ*. Their basis is in the auricles of the heart, and their apices in the extremities of each branch through all parts of the body, excepting one instance in the liver; or we may reverse this order, and say the veins terminate in the heart. They often run parallel with, and accompany, the arteries. The fabric of the veins is tender, every where smooth, difficultly separable into distinct coats or membranes, like the arteries; and the cellular texture surrounding them is very easily distended. The veins both above and below the heart are surrounded, except in one place, with muscular fibres; every where, however, their substance is lax, like the cellular texture which joins the arteries to the adjacent parts; the veins are, nevertheless, every where sufficiently firm, and do not easily burst with inflated air; being in most instances stronger than the arteries themselves. But they burst much more easily in living than in dead animals, as appears from morbid instances in the arm, face, leg, thigh, &c. They do not preserve their cylindrical form after having been cut, but collapse together, so as to make their capacity appear like a slit; except they are sustained, and hindered from thus collapsing, by some strong cellular substance placed round them, as we see in the liver and womb. They are only slightly irritable, unless the stimulus be of the chemical or more acrid class; for, in that case, they contract themselves with a convulsive force greater than that of the arteries. They have no pulsation, unless the venous channel is somewhat obstructed; or when, in dying people, the blood is thrown back again from the right auricle into the descending and ascending cava, or when falling back from the brain.

The veins are much larger than their corresponding arteries, having the square of their diameter often double or triple, or almost quadruple; as may be seen near the emulgents and vessels of the kidneys. In general, however, the diameter of the veins is to that of the arteries as nine to four; yet the capacity of the capillary veins but little exceeds that of the arteries which accompany them. They differ likewise from the arteries in their division, having more numerous trunks and branches; for to one artery in the limbs, we usually meet with two veins: and there are many veins, as the external jugular, *vena portarum*, *azygos*, cephalic, basilic, and saphena, with which there are no corresponding arteries. The larger veins are also branched in a more net-like disposition, by forming more frequent anastomoses with one another than the arteries do. Many of the veins run near the surface of the body, especially in the limbs, neck, and head; they run a long way covered with little more than the bare skin, which is a circumstance we very rarely observe in arteries; and, for the same reason, they often separate from the arteries; following the surface of the parts next the skin, without their corresponding artery, which descends to a considerable depth, attended in its course by some small venous branch. In the smaller branches of the vessels, where they make net-like dispositions in the membranes and the internal fabric of the viscera, the veins and arteries commonly run contiguous one to the other; but here the veins have generally a less serpentine or inflected course than the arteries.

In the larger sanguiferous veins, *valves* are found in great plenty. The innermost membrane of the vein, being doubled, rises into the cavity of the vessel like a curtain, stretching itself farther along the vein every way, so as to form what may be called a kind of crescent; but the basis, which is the part that sustains the weight of the blood, is strongest, and grows out of the vein in the shape of a circular segment. The valve intercepts a space, of which the outer side is the vein itself, and the inner the valve; which, by its convexity, projects within the bore of the vein, so that the parabolic space or hollow mouth of the valve is always turned towards the heart. They are found in all the subcutaneous veins of the limbs, in those of the

neck, face, tongue, and penis: at the origin of the larger branches, there are two, three, four, and sometimes five, of them together, while in the smaller branches they are only single. These valves are wanting in the veins of the deep-seated viscera; namely, the brain, lungs, heart, and liver, and through the whole system of the *vena portarum*. They are also wanting in the kidneys and womb, (except one or two valves in the spermatic vein;) and, lastly, in those small blood-vessels which are less than the twelfth part of an inch in diameter. Sometimes, though rarely, they are found in the branches of the *vena azygos*, and at the mouths of the hepatic and renal veins; where Dr. Haller has sometimes observed a sort of wrinkles in the place of valves. In the smaller venous branches there are a set of long sharp-pointed or parabolical valves, of a more extended figure as the vein is smaller, which seem to resist the return of the blood more powerfully than the larger valves.

The veins have their origin, as we said before, from the terminations of the arteries. They sometimes arise by a continuation from the inserted branches, or from a reflection of recurved trunks of the smallest arteries. Others, again, are continued from veins less than those which carry blood; and also, in Dr. Haller's opinion, from the absorbing veins; but, as absorption by the red veins is now denied, that opinion must be rejected. Yet, that there are veins of a smaller class, but resembling those which convey blood, appears from the same experiments which demonstrate the pellucid arteries; thus there are small veins in the iris, and in the adnata tunica of the eye; nor is it to be doubted, that, in a healthy subject, small pellucid veins may be found in the vitreous body of the eye itself. Such have been sometimes seen by Wrisberg and others, after a fine injection or inflammation in the capsules of the lens and vitreous humour.

The Anatomical Plate VII. represents a just delineation of the HEART and BLOOD-VESSELS; and of which the following is an explanation.

FRONT VIEW.

A, The heart. B, The aorta ascendens. C, A trunk from which the right subclavian and right carotid arteries are sent off. (Those on the left side come off separately.) The subclavian artery passes over to the arm behind the subclavian vein. The carotid artery runs up to the head, partly covered by the internal jugular vein. D, The facial artery, which sends off the coronary arteries of the lips. E, The deep temporal artery. F, The descending aorta. G, The right common iliac artery, which divides into the external and internal iliacs. H, The femoral artery, which is a continuation of the external iliac artery. I, The anterior tibial artery, sending branches to the fore-part of the leg and upper-part of the foot.

1, The frontal vein running down to form 2, The facial vein. 3, Deep temporal vein. 4, Occipital vein. 5, The external jugular vein. 6, The internal jugular vein, lying on the outer and fore-part of the common carotid artery. 7, An arch on the palm of the hand, which runs partly to 8, The radial vein, and partly to 9, The ulnar vein. (The two last veins run close by the sides of their corresponding arteries.) 10, The cephalic vein. 11, The basilic vein, cut: on the left side it is entire. 12, Branches running up to form 13, The humeral vein. 14, The external thoracic veins running along with their arteries. (In many parts, the vessels are so small, that one trunk must represent both artery and vein.) 15, The axillary vein. 16, The subclavian vein, receiving the jugular and other veins from the head and neck. 17, The vena cava superior. 18, Veins from the upper-part of the foot forming 19, The anterior tibial vein, which lies close by the side of the corresponding artery. 20, The *venæ profundæ* femoris. 21, The upper part of the *vena saphena*. 22, The femoral vein. 23, The common iliac veins, formed of the external and internal iliacs. 24, Vena cava inferior. 25, The renal veins covering the arteries. 26, The diaphragmatic veins.

BACK

BACK VIEW.

A, The occipital vessels. B, The deep temporal vessels. C, The cervical vessels. D, The scapular vessels. E, F, Deep humeral branches communicating with others at the elbow. G, The posterior interosseous vessels. H, Intercoastal vessels. I, Arteriæ & venæ gluteæ. K, Sciatic vessels. L, Arteria & vena poplitea. M, Posterior tibial vessels. N, Fibular vessels. The vessels being so small, both vein and artery are represented by one trunk.

OF THE ABSORBENT SYSTEM.

The absorbent system, besides the glands, is divided into three parts, viz. the lacteals, the lymphatic vessels, and the thoracic duct. The lacteals belong to the intestinal tube; the lymphatics, to all the other parts of the body; and the thoracic duct is the common trunk which receives both the lacteals and lymphatics. We shall give a particular description of these, chiefly from Hewson, Mascagni, and Cruikshank, by whose industry this part of anatomy has been so greatly illustrated.

LYMPHATICS OF THE LOWER EXTREMITIES.—These may be divided into two kinds, viz. a superficial, and a deep-seated. The superficial consist of numerous vessels that lie between the skin and the muscles, and belong to the surface of the body or the skin, and to the cellular membrane which lies immediately under it. Numerous large branches of them can be readily enough discovered in the limbs of dropical subjects. Many of them run upon the top of the foot; one of which is represented in the annexed Anatomical Plate VIII. *Fig. 1. 10*; others are generally to be found just under the inner ankle; tubes have been introduced into two of them, whereby they have been filled the whole length of the lower extremity, as is seen in this figure.

The lymphatic glands of the groin are six, seven, eight, or upwards; they vary much in number: of these, some lie in the very angle between the thigh and the abdomen, and others lie a few inches down on the fore-part of the thigh. The lymphatic vessels enter the lowermost of these glands, which in the subject of this figure are four in number, viz. 15, 15; 16, 16. One or more of these branches, however, frequently avoids the glands, as at 17; which afterwards bends over it at 18 to the gland 19; from which vessels go to the other lymphatic glands 20, 20, that lie in the angle between the thigh and the abdomen, and sometimes a few enter no glands till they reach those on the inside of Poupart's ligament. Numerous lymphatics also pass into the inguinal glands from the superficial parts of the abdomen and pelvis. It is into these upper glands alone that the lymphatic vessels of the genitals enter, so that the venereal bubo, which arises in consequence of an absorption of matter from the organs of generation, is always seated in those upper glands; and the lower glands, 15, 15; 16, 16; are never affected, except by the regurgitation of the matter, or from their vicinity to the glands first diseased, which very seldom happens. And, as the upper glands are affected by the absorption of matter from the genitals, so the lower are commonly first affected from the absorption of the acrid matter of an ulcer, diseased joint, or carious bone, in the parts below these glands; a circumstance that may assist us in the diagnosis of these two kinds of buboes: remembering, however, that this rule may be liable to an exception from one or more of the lymphatic vessels passing the lower glands, and only entering at the upper, as is seen at 17, in the same figure.

In the penis three principal vessels commonly take their origin from the prepuce. These soon unite, but afterwards separate upon the middle of the dorsum penis into two parts; one of which goes to the inguinal glands on the right side, the other to those of the left. The deep-seated lymphatics arise from the glands and body of the penis, and accompany the arteries into the lower part of the pelvis. Hence, if venereal matter be absorbed by these vessels, the constitution may be affected without our being aware of it. The lymphatic vessels of the testicle are nu-

merous and very large for the size of this organ. They arise from its coats, from the body of the testicle, and from the epididymis; and, after running along the spermatic cord, they terminate in the lumbar glands. In their course they have few communications with each other. The lymphatics of the scrotum, which are also numerous, go chiefly to the glands of the groin, though some pass along with those of the testicle to the lumbar glands. The lymphatic vessels of the penis and scrotum having joined those of the thigh, a net-work is formed, which enters the abdomen under the edge of the tendon of the external oblique muscle, called *Poupart's ligament*: one of these vessels is seen in *Fig. 5. 24*. This plexus on the inside of Poupart's ligament consists of many branches; some of which embrace the iliac artery, of which one is seen at 27, but the greatest number of them pass up on the inside of the artery, as is seen in *Fig. 1. 21, 22*; and in *Fig. 5. 27*.

The superficial lymphatics of the inferior extremity are the trunks of those vessels which absorb from the skin and the cellular membrane immediately under it; but they likewise communicate with the deep-seated absorbents: and the same thing is to be observed with respect to the lymphatics on all the other parts of the surface of the body. Upon these vessels, from the foot to the groin, there are commonly no other lymphatic glands than those of the ham. But this rule has likewise some exceptions: for, even at the lower part of the leg, there is a very small one in the subject from which this plate was taken, as represented in *Fig. 1. 13*, and in another subject Mr. Hewson saw a small lymphatic gland near 14; from which it may be concluded, that the lymphatic glands, even in the human body, are in number and situation different in different subjects.

Besides these superficial lymphatic vessels which lie above all the muscles, there are others deeper seated, that lie among the muscles, and accompany the arteries; and like the veins, one lies on each side of the artery. Of these the principal trunks can be discovered by cutting down to the posterior tibial artery, near the inner ankle. By introducing tubes into these parts, they may be injected; as hath been done in several subjects, one of which is represented in *Fig. 2. of the same plate*. From the inner ankle at 13, these vessels pass up along with the posterior tibial artery, being hid among the muscles on the back-part of the tibia. About the middle of the leg they sometimes, though rarely, enter a small gland at 15, which has been supposed to exist more frequently than it really does. Afterwards they are seen in the back-part of the ham, still lying close to the artery, and in the ham they pass through two or three glands which are commonly found there, viz. 18, 19, 20. But, after they have passed these glands, they commonly divide into two or three branches, which accompany the crural artery, and pass with it through the perforation in the triceps muscle. The muscle is divided in the preparation from which this figure was taken, in order to give a better view of the lymphatics; and the cut ends of the muscle appear at 6, 6, though not very distinctly, from their being shrunk by drying. The lymphatic vessels having perforated the triceps, pass up with the artery, as is seen at 22, 23, and sometimes enter a gland 24, which is deeper seated than those that appear in the groin: from this gland they pass into the superficial glands, represented at 15, 15; 16, 16; where the lymph of the deep-seated and of the superficial lymphatics is mixed, and is conveyed into the body by the vessels seen just above in the same figure. At this part likewise the lymph from the penis and scrotum is mixed with that brought by the two sets of lymphatics from the lower extremities; and the whole enters the abdomen, under Poupart's ligament, by the plexus of vessels represented in *Fig. 1. 21*, and in a part of it in *Fig. 5. 24*.

Fig. 1. represents the lower extremity, with its more superficial lymphatic vessels; No. 1, is the spine of the os ilium; 2, the os pubis; 3, the iliac artery; 4, the knee. The other references have been explained in the course of

the description. *Fig. 2.* gives a back view of the lower extremity, dissected so as to shew the deeper-seated lymphatic vessels which accompany the arteries. 1, The os pubis. 2, The tuberosity of the ischium. 3, That part of the os ilium which was articulated with the os sacrum. 4, The extremity of the iliac artery appearing above the groin. 5, The knee. 6, 6, The two cut surfaces of the triceps muscle, which was divided to shew the lymphatic vessels that pass through its perforation along with the crural artery. 7, The edge of the musculus gracilis. 8, The gastrocnemius and soleus, much shrunk by being dried, and by the folcus being separated from the tibia to expose the vessels. 9, The heel. 10, The sole of the foot. 11, The superficial lymphatic vessels passing over the knee to the thigh. 12, The posterior tibial artery. 13, A lymphatic vessel accompanying the posterior tibial artery. 14, The same vessel crossing the artery. 15, A small lymphatic gland through which this deep-seated lymphatic vessel passes. 16, The lymphatic vessel passing under a small part to the soleus, which is left attached to the bone, the rest being removed. 17, The lymphatic vessel crossing the popliteal artery. 18, 19, 20, Lymphatic glands in the ham, through which the lymphatic vessel passes. 21, The lymphatic vessel passing with the crural artery through the perforation of the triceps muscle. 22, The lymphatic vessel, after it has passed the perforation of the triceps, dividing into branches which embrace the artery. 24, A lymphatic gland belonging to the deep-seated lymphatic vessel. At this place those vessels pass to the fore-part of the groin, where they communicate with the superficial lymphatic vessels. 25, A part of the superficial lymphatic vessels appearing on the brim of the pelvis.

ABSORBENT VESSELS of the TRUNK.—The lymphatics of the lower extremities having now reached the trunk of the body, and having passed under Poupart's ligament, appear upon the sides of the ossa pubis near the pelvis, at *Fig. 5.* 24, 24. A part of them passes up along with the iliac artery upon the brim of the pelvis; and another part dips down into the cavity of the pelvis, and joins the internal iliac artery near the sciatic notch. At this place they are joined by the lymphatics from the contents of the pelvis, particularly from the bladder and the vesiculæ seminales in the male, and from the uterus in the female; and there are likewise several branches which pass through the sciatic notch from the neighbourhood of the glutæi muscles. The lymphatic vessels of the uterus, like its blood-vessels, are much enlarged, and therefore easily distinguished, in the pregnant state of that organ. Besides those lymphatic vessels which dip down into the cavity of the pelvis on the inside of the external iliac artery at 27, there are others which keep on the outside of that artery upon the psoas muscle, some of which are seen on the left side in the same plate at 28. Of these, one part passes up to the loins at 32, and goes under the aorta in different branches, getting from the left side to the right, and joining the thoracic duct. Another part passes under the iliac arteries, and appears upon the os sacrum at 30, making a beautiful net-work, joining the lymphatics of the right side, and passing under the iliac artery, to form the network 31, upon the upper part of the right psoas muscle. The lymphatic vessels of the right side, joined by some from the left, having now reached the right lumbar region, appear there in the form of a plexus of large vessels, and pass through several glands, which occupied the spaces 33, 33; but, not being injected in the subject, they are not represented. At this part likewise they receive large branches, under the aorta, from the plexus on the left side of the loins, as is mentioned before; and having at last got up as high as the second, or more frequently the third, lumbar vertebra, they all join, and form a single trunk called the *thoracic duct*, which is seen at 36. At this part they are likewise joined by the lacteals, which shall be next described.

The lacteal vessels, so called from their commonly con-

veying a fluid that is of the colour of milk, are found in two sets which communicate with each other; the internal begin from the inner surface of the intestines, where each lacteal is at first formed upon the surface of the villi by numerous small radiated branches, with orifices destined to imbibe the nutritious fluid or chyle: from the cavity of the intestines these vessels pass obliquely through their coats, uniting as they go, so as to form larger branches. These branches run on the outside of the intestines, to get to that part which is next the mesentery. From the intestines they run along the mesentery and mesocolon, towards the spine; passing through the lacteals in their way to the conglobate or mesenteric glands. These glands divide the lacteals into two regions: from the intestines to the glands these vessels are called *lacteæ primi generis*; and from the glands to the thoracic duct, *lacteæ secundi generis*. The lacteals of the *jejunum* are larger and more numerous than those of the *ilium*. Those of the small intestines, as they run upon the mesentery, commonly accompany the superior mesenteric artery, and unite, as they proceed, into larger branches; so that by the time they arrive at the root of the mesentery, they are of a considerable size, as may be seen in *Fig. 5.* 34. From the mesenteric artery they descend by the sides of the aorta, and open at last into the thoracic duct 36; the lacteals, or rather the lymphatics of the large intestines, run somewhat differently. Into the thoracic duct at 36, likewise enters the lymph of the other abdominal viscera. The lymphatics of the glandulæ renales, or renal capsulæ, terminate in the renal plexus. The lymphatic vessels of the spleen pass from the concave side of that viscus, along with the splenic artery in the sinuosity of the pancreas, by the lymphatic vessels of which they are joined. Two sets of lymphatic vessels belong to the stomach, the one running upon its smaller, and the other upon its greater, curvature. Of these, the former accompanies the coronary artery, and passes through some lymphatic glands that lie by its sides. The other set passes from the great curvature of the stomach, partly to the left and partly to the right side. Several branches proceed under the duodenum, and others over it; which all open into the thoracic duct, near the termination of the large trunk of the lacteals, as seen at 36. The thoracic duct is therefore the common trunk which receives the absorbent vessels of the lower extremities, the lacteals, and the lymphatics of the abdominal viscera. The lymphatics of the liver, like those of the other viscera, are in two sets; one of which lies upon the surface of the organ, and the other accompanies the large blood-vessels in its centre. The lymphatics on the concave surface run towards the portæ, where they join those which come from the centre of the liver along with its large blood-vessels. After they get from the liver, they are found to be very numerous. They pass into glands on the vena portarum; and afterwards end in the thoracic duct, near the root of the superior mesenteric artery. It is remarkable, that the valves of those lymphatic vessels which run upon the surface of the liver, can readily be made to give way, so that they may be injected from their trunks to their branches, with great minuteness.

The thoracic duct, which receives all the vessels that we have yet described, differs in its size in different subjects; but it is always smaller in its middle than at its beginning, as is seen in the plate. Sometimes its lower part 36, is larger in proportion than there represented: and that enlargement has been called *receptaculum chyli*; it is considerable in some quadrupeds, in turtle, and in fish: but many anatomists have denied that there is any part of the thoracic duct in the human subject that deserves the name of *receptaculum*, having never seen any thing like a pyriform bag, as it has been described, but merely an enlargement not unlike a varix, and that only in few subjects; it generally appears only a little larger at its middle than at its ends. This lower extremity of the thoracic duct is formed by the union of two or three very large trunks or lymphatic vessels, which are spread out upon the spine, those of the right

right side lying below the right crus diaphragmatis, and those of the left passing between the aorta and the spine; whilst the thoracic duct itself lies at first behind the aorta; but afterwards passes from that upwards, and a little to the right side, till it gets before the first vertebra of the loins.

The superficial lymphatics of the lungs form a beautiful net-work, the larger branches running chiefly between the lobules, the smaller passing over them; and here, as well as on the liver, and other parts, there are numerous valves, the existence of which has been denied by some authors. From the surface they pass to the root of the lungs, and there they go through the bronchial glands. At this place they are joined by the deep-seated absorbents, which creep along the branches of the trachea, and likewise on those of the pulmonary artery and vein. Having left the glands, the principal part of those from the left lung form a trunk which terminates in the thoracic duct, behind the division of the trachea into its right and left branches. The rest of the absorbents of the left lobe pass through glands behind the arch of the aorta, and which are likewise common to those of the heart. They run at last into the thoracic duct near its termination in the red veins. After leaving the bronchial glands, the absorbents of the right lung form three or four principal trunks; one of which commonly ascends on the fore-part of the vena cava superior, and opens into the lymphatic trunk, that terminates in the veins of the right side of the neck. The rest of these trunks go into the thoracic duct at the root of the lungs; and near this place the absorbents of the right and left lungs communicate pretty freely together.

The absorbents of the heart, which have been known only by the latest anatomists, come from its superficial and deep parts. These afterwards form principal trunks which accompany the coronary arteries and veins, and like them the largest belong to the left ventricle. The absorbent accompanying the right coronary artery passes into the trunk, which terminates in the right subclavian vein; while the other, accompanying the left artery, goes to the upper end of the thoracic duct. The thoracic duct, after receiving the vessels before mentioned, passes behind the ascending aorta, and goes to the left side, terminating in the angle between the jugular and subclavian vein. But, just before its termination, it generally goes higher up than the angle, and then bends down towards it; as seen in *Fig. 5. 42, 43.* Sometimes, though rarely, there are two thoracic ducts instead of one. Sometimes the duct splits near the upper part of the thorax; and the two branches, after spreading out from one another, commonly unite again at their termination in the angle between the jugular vein and the subclavian veins.

LYMPHATICS OF THE HEAD AND NECK.—The lymphatics of the head, like those in other parts of the body, are in two sets; one belonging to the outer, the other to the inner, parts. Those on the outside of the head accompany the blood-vessels, and pass through glands in their way to the neck. Those accompanying the temporal artery go through small glands at the root of the zygomatic process, while the absorbents of the occiput pass through others behind the mastoid process of the temporal bone. From the different parts of the face, the lymphatics chiefly accompany the branches and trunk of the facial artery. They come from the inner angle of the eye, from the nose, lips, and cheeks. Some of these pass through small glands on the outside of the buccinator muscle, while the principal branches go through larger glands on the outer and under side of the lower jaw, near the corresponding blood-vessels, and the inferior maxillary gland. Others run through the glands on the upper and under end of the parotid gland. The lymphatics of the inner side of the nose run principally with the internal maxillary artery, and pass through the glands behind the angle of the lower jaw, where they are joined by others from the inner part of the mouth. Deeper than this, and near the internal jugular vein, the lymphatics of the tongue, and parts about the os hyoides, pass through the glands which belong likewise

to those of the deep parts of the head. The glandula thyroidea has many lymphatic vessels, which can be inflated by blowing air into the cells of the gland: these vessels pass on each side of the trachea, one part going into the trunk, which terminates in the right subclavian and jugular, and the other joining the thoracic duct upon the left side near its termination.

In the plate of Absorbent Vessels, *Fig. 5.* exhibits the trunk so prepared as to shew the lymphatics and the thoracic duct: 1, Is the neck. 2, The shoulder. 3, The arm. 4, The outer end of the clavicle. 5, The extremity of the first rib. 6, The subclavian muscle. 7, The rib. 8, The trachea. 9, The aorta ascendens. 10, The spine. 11, Vena azygos. 12, The aorta descendens. 13, The celiac artery. 14, The superior mesenteric artery. 15, The right crus diaphragmatis. 16, The kidney. 17, The right emulgent artery. 18, The common iliac artery. 19, The division of the common iliac into the external and internal iliac arteries. 20, The cavity of the pelvis. 21, The spine of the os ilium. 22, The groin. 23, A lymphatic gland in the groin, into which lymphatic vessels from the lower extremity are seen to enter. 26, The psoas muscle with lymphatic vessels lying upon its inside. 27, A plexus of lymphatics, which having passed over the brim of the pelvis at 25, having entered the cavity of the pelvis, and received the lymphatic vessels belonging to the viscera contained in that cavity, next ascends, and passes behind the iliac artery to 29, 29, The right psoas, with a large plexus of lymphatics lying on its inside. 30, 30, The plexus lying on each side of the spine. 31, 31, 31, Spaces occupied by the lymphatic glands; which are not here represented, not having been injected in the subject. 32, The trunk of the lacteals lying on the under side of the superior mesenteric artery. 33, The same, dividing into two branches; one of which passes on each side of the aorta, that of the right side being seen to enter the thoracic duct at 34. 34, The thoracic duct beginning from the large lymphatics. 38, The thoracic duct passing under the curvature of the aorta to get to the left subclavian vein. 39, A plexus of lymphatic vessels passing upon the trachea from the thyroid gland to the thoracic duct. 40, The upper part of the thoracic duct lying between the left carotid and the left jugular vein, and passing behind that vein downwards and outwards towards the angle between the left jugular and the left subclavian. 41, The extremity of the thoracic duct entering the angle between the left jugular and the left subclavian vein. 46, That network passing under the right subclavian vein, and under the subclavian muscle, the clavicle being removed. The other numbers are explained in the course of the descriptions.

LYMPHATICS OF THE UPPER EXTREMITIES.—Like the leg, each arm has two sets of lymphatic vessels: one set, which lies immediately under the integuments, belongs to the skin and the cellular membrane connecting it to the muscles; the other accompanies the large arteries, and belongs to the parts deeper seated. The superficial set of lymphatic vessels are numerous, and may be discovered in emaciated dropical subjects, by a careful dissection on the fore and back part of the arm. Of the deep-seated lymphatics of the arm, two commonly accompany each artery, in the same manner as the veins do: having reached the upper end of the arm, they go through the axillary glands, where they are joined by the lymphatics from the mamma and side of the thorax, and also by those from the shoulder. From these glands larger branches run under the clavicle, and form a trunk, which receives those from the head and neck already described. In *Fig. 3.* some of the lymphatics are seen running on the back-part of the fore-arm at 6, 6, most of them passing on its outside, and twisting to the fore-part, near the head of the radius, as at 7. But in this representation, there is a vessel which passes towards the inside, under the inner condyle of the os humeri at 8, and sends a branch amongst the muscles; which branch perforates the interosseous ligament, getting between the radius and ulna to the fore-part, where it joins a deep-seated

one that had accompanied the radial artery. In this figure, which exhibits a back view of the fore-arm and hand, 1, Is the hand. 2, The lower extremity of the radius. 3, The lower extremity of the ulna. 4, The muscles on the back of the fore-arm turned aside to exhibit a deep-seated lymphatic vessel which perforates the interosseous ligament to get to the fore-part. 5, The olecranon. The vessels have been already referred to.

In *Fig. 4.* the lymphatic vessels are seen on the fore-part of the upper extremity; those superficial branches which passed on the outside of the back of the fore-arm appearing now on the fore-part at 8; and ascending under the skin that covers the supinator longus, and the biceps, they enter some glands in the axilla at 12, 12, whilst that vessel which passed on the inside of the back of the fore-arm under the internal condyle, appears on the fore-part at 9, and just above the condyle enters a gland 10, and then passes up on the inside of the arm, communicating with a lymphatic from the fore-part of the wrist, and passing to the axillary glands. A superficial lymphatic is seen under the skin, on the fore-part of this extremity just above the wrist; a pipe was introduced at 7, and the vessel thereby injected with mercury. Passing under the integuments over all the muscles, this vessel joins the lymphatic from the back-part of the fore-arm at 11, and there forms a plexus which passes under the integuments, on the inside of the arm, to the axillary glands at 12. Besides these superficial lymphatics upon the upper extremity, others lie near the radial artery; one is injected with a pipe fixed at 13. This vessel accompanies the radial artery, and passes 14, first under the interosseous, and then under the ulnar, artery, which in this subject runs over the muscles. Near the part where it passes under the interosseous artery, it receives the branch from the back of the fore-arm. After passing under these arteries, this lymphatic appears on the inside of the brachial artery at 15, where it is deep-seated. Ascending close to that artery, and near the middle of the arm, it passes through the two glands 16, 16; after which it appears considerably enlarged, goes under one of the arteries anastomoticæ at 17, 18, and then ascends to the lymphatic glands in the axilla 19, 19. In this figure, which exhibits a fore view of the upper extremity, 1, Is the scapula. 2, The clavicle. 3, The extremity of the brachial artery. 4, The muscles lying on the inside of the arm. 5, The inner condyle of the os humeri. 6, The lower extremity of the radius. The subsequent numbers denoting the vessels have been explained in the description.

These vessels, however, as they here appear, although represented from a successful injection, are only a part of the large lymphatic vessels of the arm; and there are some accompanying the ulnar and interosseous arteries, that are not here injected. They should moreover be considered as only trunks of the lymphatics; since it is probable, that every (even the smallest) part of this, as well as all other parts of the body, has some of these vessels adapted to absorption. That this is the case seems to be proved by the experiments made with the variolous matter; for at what part soever of the arm that matter is inserted, the lymphatic vessels take it up and carry it into the body, as can be traced by its inflaming the conglobate glands thro' which these vessels pass. In *Fig. 5.* the termination of all the lymphatic vessels is exhibited. Two of the trunks of those of the left arm are seen at 42. They pass under the clavicle, whose cut end is seen at 4; and under the subclavian vein. Here, having joined, they form the large trunk 43, which appears just above the left subclavian vein, and joins the extremity of the thoracic duct at its entrance into the angle between that vein and the jugular. The lymphatic vessels of the right side form four considerable trunks, which join near their termination. These trunks are, 1. One from the upper extremity, which appears at 47, lying above the clavicle between the subclavian artery and vein: this trunk is formed by the lymphatics 44, which come up with the brachial artery, and the plexus 45, which likewise belongs to the arm, and passes

under the subclavian vein. 2. The trunk of the lymphatic vessels of the right side of the head and neck, which passes down on the outside of the jugular vein, as is shewn at 48. 3. A lymphatic from the thyroid gland: this vessel is seen at 49, passing under the right jugular vein to get to the others. 4. A trunk from the lungs of the right side: this trunk is distinctly traced under the subclavian vein to its termination, in common with the others, at the union of the jugular and subclavian veins.

OF THE CHYLE.

The chyle is a white juice extracted from the aliments, and afterwards mixed with the blood. That its principal composition is of water and oil, seems evident from the sweetness of its taste, from the whiteness of its colour, from its ascendent and coagulable nature, and from its lightness, by which it swims on the blood; in all which properties in very much resembles an emulsion. It is composed of a vegetable farina, with animal lymph and oil. It every where retains the properties of the volatile and oily aliments. It changes into milk with very little alteration. But afterwards it becomes more manifestly glutinous; since the pellucid serum it contains, either by exhaling the watery part, or by applying an intense heat, coagulates into a kind of jelly. Haller has attributed the first cause of motion in the chyle, and of its absorption, chiefly to the attraction of the capillary vessels, which observe alternate pulses with the peristaltic contraction of the intestine. The attractive force fills the villosity; the peristaltic force empties the villosity, and moves the chyle farther forward. The rest of its motions seem to depend on the strength of the membrane of the lacteal vessel itself, which, even after the death of the animal, expels the chyle, so that the vessels become pellucid which before were milky. The alternate compressing force of the diaphragm is also of some efficacy in this case. The chyle, mixed with the blood, does not immediately change its nature, as we learn from the milk which is afterwards made of it; but after it has circulated through the body, fomented with heat, and mixed with a variety of animal juices, it is at length so changed, that a part of it is deposited in the cellular substance under the denomination of fat; a part of it is configured into the red globules; another part changes into serum; and the watery parts go off, in some measure, by urine, in some measure by perspiration; while a small part is retained in the habit to dilute the blood.

OF ABSORPTION.

As there is a secretion upon the different surfaces, and into the different cavities of the body, for the purposes of the constitution, so there is likewise an inhalation or an absorption. For example: if food be taken into the stomach and intestines, it is there digested, and, being converted into chyle, it is in that form taken into the blood-vessels. If garlic be applied to the skin, it gets into the body, and is smelt in the breath with as much certainty as when taken into the stomach, where its juices are absorbed by the lacteals. So, likewise, terebinthinate medicines applied to the skin are soon smelt in the urine; and cantharides in a blister affect the urinary passages. In the same manner fluids are taken from different cavities of the body into the vascular system. Thus the water of an *ascites* and an *anasarca* are occasionally taken up and carried by the blood-vessels to the intestines and kidneys, and evacuated by stool or by urine. And the pus of an abscess is sometimes absorbed and carried to different parts of the body, and there deposited, or is evacuated by the intestines or urinary passages. So also fluids injected into cavities, as that of the chest or belly of living animals, soon find their way into the blood-vessels. These circumstances are admitted by anatomists amongst the unquestionable facts of physiology. Nor do anatomists differ in their opinions about the mode in which these fluids are taken up; for it is universally allowed to be by absorption, or that there

are small orifices adapted to imbibe them: the only question is, what the vessels are to which these orifices belong, whether to the lymphatic system, or to the common veins?

That the common veins did the office of absorbing both the chyle and the lymph, was the opinion of anatomists before Asellius discovered the lacteals; but after his time few doubts were entertained of the lacteals absorbing at least a part of that fluid. Yet many anatomists have been so tenacious of the old opinion, as still to believe that the veins partly performed that office, or absorbed some of the chyle, and carried it to the liver. However, upon taking a review of all the arguments in favour of the doctrine that the common veins are the instruments of absorption, that doctrine appears to have no other support than respect for the authority of our predecessors. And, although this idea was formerly so generally received, yet there were even then some physiologists who reasoned better on the subject; and amongst the first of these was Glisson, who attributes to those vessels the office of carrying back to the blood-vessels the lymph which had lubricated the cavities of the body. M. Noguez, likewise, speaks of absorption by the lymphatics. Hambergerus also seems to have had this idea of their office: and Frederic Hoffman has expressed the doctrine of the lymphatics being absorbents very completely, in his *Medic. Ration. System. lib. i. sect. 2. cap. 3.* This opinion has also been adopted, and supported with additional arguments, by doctors Hunter and Monro; who, besides shewing the fallacy of the experiments brought in favour of the common veins doing the office of absorption, have advanced the following arguments to prove that the lymphatics perform it. First, Their great analogy with the lacteals, with which they agree in their coats, in their valves, in their manner of ramifying, in their passage through the lymphatic or conglobate glands, and in their termination in the thoracic duct, and in short in every circumstance with regard to their structure. Secondly, The passage of the venereal, variolous, and other, poisons, into the constitution; these poisons first making an ulcer, and then being absorbed along with the matter of the ulcer and infecting the whole body. That in such cases they are not absorbed by the common veins, but by the lymphatics, appears from their inflaming these lymphatics in their course, and by their generally inflaming a conglobate gland before they enter the system; a strong argument in favour of their being taken up by the lymphatic vessels which pass through these glands in their way to the thoracic duct. Such, then, seems to be the purpose for which the lymphatic vessels were provided; that is, to do the office of absorption; an office of the greatest importance to the animal: no wonder, therefore, that there should be a system set apart for performing it, and not only in man and quadrupeds, but also in birds, fish, amphibious animals, and perhaps even in insects of the minutest kind.

OF THE NERVES.

THERE are forty pair of nerves in all, of which ten come from the encephalon, and the other thirty have their origin from the spinal marrow. Of the ten pair which come from the encephalon, the first is the *olfactory*, which long had the name of the *mamillary processes* of the brain; because in cows and sheep, which were most commonly dissected by the ancients, the anterior ventricles of the brain are extended forwards upon these nerves, and adhere so firmly to them, that they seem to make the upper side of the nerves. Each of them being large where it begins to be stretched out, and gradually becoming smaller as it approaches the cribriform bone, was imagined to resemble a nipple. The tender structure and sudden expansion of these nerves on such a large surface, render it impossible to trace them far; which has made some authors deny them to be nerves; but, when we break the circumference of the cribriform lamella, and then gently raise it, we may see the distribution of the nerves some

way on the membrane of the nose, where they form a beautiful net-work.

The *second* pair of nerves are the *optic*, which make a large curve outwards, and then run obliquely inwards and forwards, till they unite at the fore-part of the sella turcica; they then divide, and each runs obliquely forwards and outwards to go out at its proper hole in the sphenoid bone, accompanied with the ocular artery, to be extended to the globe of the eye, within which each is expanded into a very fine cup-like web, that lines all the inside of the eye, to within a little distance of the edge of the crystalline lens, and is universally known by the name of *retina*. The retina of a recent eye, without any preparation, appears a very fine web, consisting of fibrils so extremely small, that each expanded optic nerve cannot exceed in diameter the 32,400th part of a hair! There are also some blood-vessels arising from its centre to be distributed on it: and if these vessels lose their tone, and remain preternaturally distended; no object affects our retina, though the eye externally appears sound; or this may be one cause of an amaurosis or gutta serena. From a partial distention of these vessels, or paralysis of a part of the retina, the central part, or the circumference, or any other part, of objects may be lost to one or both eyes.

The *third* pair rise from the anterior part of the process annularis; and, piercing the dura mater a little before and to a side of the ends of the posterior clinoid processes of the sphenoid bone, run along the receptacula, or cavernous sinuses, at the side of the ephippium, to get out at the foramina lacera: after which each of them divides into branches; one of which, after forming a little ganglion, is distributed to the globe of the eye; the others are sent to the musculus rectus of the palpebra, and to the atollens, adductor, depressens, and obliquus minor, muscles of the eye-ball. These muscles being principal instruments in the motions of the eye-lid and eye-ball, this nerve has the name of *motor oculi*. The distention of a considerable branch of the carotid, which passes over this nerve near its origin on each side, may possibly be the reason of the heaviness in the eye-lids and eyes, after drinking hard, or eating much.

The *fourth* pair, which are the smallest nerves of any, derive their origin from the back-part of the base of the testes; and then making a long course on the side of the annular protuberance, enter the dura mater a little farther back than the third pair, to run also along the receptacula, to pass out at the foramina lacera, and to be entirely spent on the muscoli trochleares, or superior oblique muscles of the eyes. These muscles being employed in performing the rotatory motions, and the advancement of the eye-balls forward, by which several of our passions are expressed, the nerves that serve them have the name of *pathetici*.

The *fifth* pair are large nerves, rising from the annular processes, and then sinking close by the receptacula at the sides of the sella turcica, each becomes in appearance thicker, forms a distinct ganglion, and goes out of the skull in three great branches. The first branch is the *ophthalmic*, which runs through the foramen lacerum to the orbit, having in its passage thither a connection with the sixth pair. It is afterwards distributed to the ball of the eye with the third; and to the nose with the olfactory. The small fibres which this first branch of the fifth and third pair of nerves send to the eye-ball, being situated on the optic nerve, and, after piercing the sclerotic coat, running along the choroid coat on the outside of the retina in their course to the uvea or iris, may be a cause of the sympathy between the optic nerve and the uvea; by which we more readily acquire the habit of contracting the iris, and thereby lessen the pupil, when too strong a light is excluded; and, on the contrary, enlarge the pupil when the light is too faint. This, with the sympathy which must arise from some of the nerves of the membrane of the nostrils being derived from this first branch of the fifth pair of nerves, may also be the cause, why an irritation

of the retina, by too strong light, may produce sneezing, as if a stimulus had been applied to the membrane of the nose itself; why pressing the internal canthus of the orbit sometimes stops sneezing; why irritation of the nose or of the eye causes the eye-lids to shut convulsively, and make the tears to flow plentifully; and why medicines put into the nose do great service in diseases of the eyes. In the *megrim*, all the branches of the nerves discover themselves to be affected: for the forehead is racked with pain; the eye-ball is pained, and feels as if it was squeezed; the eye-lids shut convulsively, and make the tears trickle down, and an uneasy heat is felt in the nose. Hence we can understand, where external medicines will have the best effect when applied to remove this disease, to wit, to the membrane of the nose, and to the forehead; why alternate pressure near the superciliary hole of the frontal bone, or sneezing, sometimes gives immediate relief in the *megrim*; why the sight may be lost by an injury done to the supra-orbital branch; and how it may be restored by agitation of that branch of this nerve. The second branch of the fifth pair of nerves may be called *maxillaris superior*, from its serving principally the parts of the upper jaw. It goes out at the round hole of the sphenoid bone, and sends immediately one branch into the channel on the top of the antrum maxillare; the membrane of which and the upper teeth are supplied by it in its passage; as are likewise the cheek, upper lip, and nostril. Hence a pain in the teeth of the upper jaw occasions a gnawing pain deep-seated in the bones of the face, with swelling in the eye-lids, cheek, nose, and upper lip; and, on the other hand, an inflammation in these parts, or a *megrim*, is often attended with a sharp pain in the teeth. Hence, an obstruction in the duct of the maxillary sinus, which obliges the liquor secreted there to find out a preternatural route for itself, may be occasioned by the pain of the teeth. Hence, the upper lip often suffers when the palate or nose is ulcerated. The third, or *maxillaris inferior*, branch of the fifth pair going out of the oval hole of the sphenoid bone, serves the muscles of the lower jaw, and the muscles situated between the os hyoides and jaw. All the salivary glands, the amygdalæ, and the external ear, have branches from it. It has a large branch lost in the tongue, and sends another through the canal in the substance of the lower jaw, to serve all the teeth there, and to come out at the hole in the fore-part of the jaw, to be lost in the chin and under-lip. Hence a convulsive contraction of the muscles of the lower jaw, or the mouth's being involuntarily shut, a great flow of spittle or salivation, a pain in the ear, especially in deglutition, and a swelling all about the throat, are natural consequences of a violent irritation of the nerves of the lower teeth in the tooth-ach; and pain in the teeth and ear is as natural a consequence of an angina. Hence alternate pressure on the chin may sometimes relieve the violence of a tooth-ach. Hence destroying the nerves of a tooth by actual or potential cauteries, or pulling out a carious tooth, so often removes immediately all these symptoms. Hence no cure is to be found for some ulcers in the upper or lower jaw, but by drawing a tooth. Hence in cancers of the upper lip, the salivary glands are in danger of being affected, or the disease may be occasioned in the lip by its beginning in the glands.

The *sixth* pair, which is the smallest except the fourth, rises from the fore-part of the corpora pyramidalis; and each, entering the dura mater behind the posterior clinoid process of the sphenoid bone, has a long course below that membrane, and within the receptaculum at the side of the sella turcica, where it is immersed in the blood of the receptacle. It goes afterwards out at the foramen lacerum into the orbit, to serve the abductor muscle of the eye. A defect in this nerve may therefore be one cause of strabismus. In the passage of this nerve below the dura mater, it lies very contiguous to the internal carotid artery, and to the ophthalmic branch of the fifth pair of nerves. At the place where the sixth pair is con-

tiguous to the carotid, a nerve either goes from each of them in an uncommon way, to wit, with the angle beyond where it rises obtuse, to descend with the artery, and to form the beginning of the intercostal nerve, according to the common description; or, according to other authors, this nerve comes up from the great ganglion of the intercostal, to be joined to the sixth here.

The *seventh* pair comes out from the lateral part of the annular process, behind where the medullary processes of the cerebellum is joined to that tuber; and each being accompanied with a larger artery than most other nerves, enters the internal meatus auditorius, where the two large bundles of fibres, of which it appeared to consist within the skull, soon separate from each other: one of them entering by several small holes into the vestibule, cochlea, and semicircular canals, is stretched on this inner camera of the ear in a very soft pulpy substance; and being never seen in the form of a firm cord, such as the other part of this and most other nerves become, is called the *portio mollis* of the auditory nerve. The other part crosses the cavity of the tympanum, where it has the name of *chor-da tympani*. It also pierces through the parotid gland, and divides into a great many branches, which are dispersed in the muscles and teguments that cover all the side of the upper part of the neck, the whole face and cranium, as far back as the temples, including a considerable part of the external ear. Its branches having thus a considerable connection with all the three branches of the fifth pair, and with the second cervical, occasion a considerable sympathy of these nerves with it. Hence in the tooth-ach, the pain is sometimes very little in the affected tooth, compared to what it is all along the side of the head and in the ear. Hence probably the relief of the tooth-ach from blisters applied behind or before the ear, or by a hot iron touching the antihelix of the ear. By this communication or connection possibly too it is, that a vibrating string held between one's teeth, gives a strong idea of sound to the person who holds it, which no body else can perceive. Perhaps too the distribution of this nerve occasions the head to be so quickly turned upon the impression of sound on our ears.

The *eighth* pair of nerves rise from the lateral bases of the corpora olivaria in separated fibres; and, as they are entering the anterior internal part of the holes common to the os occipitis and temporum, each is joined by a nerve which ascends within the dura mater from the tenth of the head, the first, second, and inferior, cervical nerves: this has the name of the *nervus accessorius*. The eighth pair gives nerves to the tongue, larynx, pharynx, and ganglion of the intercostal nerve; and, being disjoined from the ninth and intercostal, runs straight down the neck behind the internal jugular vein, and at the external side of the carotid artery. As it is about to enter the thorax, a large nerve goes off from each side: the branch of the right side turns round from the fore to the back part of the subclavian artery, while the branch of the left side turns round the great curve of the aorta; and both of them mounting up again at the side of the œsophagus, to which they give branches, are lost at last in the larynx. These are called the *recurrent nerves*, which we are desired to shun in the operation of bronchotomy. The muscles of the larynx being in a good measure supplied with nerves from the recurrences, it is to be expected, that the cutting of them will greatly weaken the voice, though it will not be entirely lost so long as the superior branches of the eighth pair are entire. The recurrences themselves often send off small nerves to the pericardium, and to join with the branches of the intercostals that are distributed to the heart. After these branches are sent off, the par vagum on each side descends behind the great branch of the trachea, and gives numerous filaments to the lungs, and some to the heart in going to the œsophagus. The one of the left side running on the fore-part of the œsophagus, communicates by several branches with the right one in its descent to be distributed to the stomach.

stomach. From the distribution of this *par vagum*, we may learn, how tickling the fauces with a feather or any such substance, excites a nausea and inclination to vomit; why coughing occasions vomiting, or vomiting raises a cough. Hence we see how the nervous asthma, the tussis convulsiva, and chin-cough, are attended with a straitening of the glottis; why food difficult to digest occasions the asthma to weakly people; and why emetics have frequently cured the asthma very speedily; why an attempt to vomit is sometimes in danger of suffocating asthmatic people; why the superior orifice of the stomach is so sensible as to be looked on as the seat of the soul by some anatomists; why people subject to distensions of the stomach have so often the sensation of balls in their breast and throat; why the *globus hystericus* is so often attended with a violent stranguation at the glottis.

The *ninth* pair of nerves comes from the inferior part of the corpora pyramidalia, to go out of the skull at their proper holes of the occipital bone. After their egress they adhere for some way firmly to the eighth and intercostal; and then sending a branch, that in many subjects is joined with branches of the first and second cervical nerves, to be distributed to the thyroid gland, and muscles on the fore-part of the trachea arteria, the ninth is lost in the muscles and substance of the tongue. Some authors have thought this nerve, and others have esteemed the third branch of the fifth pair of nerves, to be the proper gustatory nerve.

The *tenth* pair rises in separate threads from the sides of the spinal marrow, to go out between the os occipitis and first vertebra of the neck. After each of them has given branches to the great ganglion of the intercostal, eighth, ninth, and first, cervical nerves, it is distributed to the straight oblique, and some of the extensor, muscles of the head. As the intercostal is about to enter the thorax, it forms another ganglion, from which nerves are sent to the trachea and to the heart; those designed for the heart joining with the branches of the eighth, and most of them passing between the two great arteries and the auricles to the substance of that muscle. The intercostal after this consisting of two branches, one going behind, and the other running over the fore-part of the subclavian artery, forms a new ganglion, where the two branches unite below that artery; and, then descending along the sides of the vertebrae of the thorax, receives branches from each of the dorsal nerves; which branches appearing to come out between the ribs, have given the name of *intercostal* to the whole nerve. The almost universal connection and communication which this nerve has with the other nerves of the body, may lead us to understand the following and a great many more phenomena: Why tickling the nose causes sneezing; why the too great quantity of bile in the cholera occasions vomiting as well as purging; why people vomit in cholics, in inflammations or other irritations of the liver, or of the ducts going from it and the gall-bladder; why a stone in the kidneys, or ureters, or any other cause irritating those organs, should so much more frequently bring on vomiting and other disorders of the stomach, than the stone or any other stimulating cause in the bladder does; why vomiting is a symptom of danger after child-birth, lithotomy, and other operations on the parts in the pelvis; why the obstructions of the menses are capable of occasioning stranguations, belching, cholics, stomach aches, and even convulsions in the extremities; why vesicatories, applied from the ears to the clavicles of children labouring under the tussis convulsiva, are frequently of great service; why worms in the stomach or intestines excite an itching in the nose, or grinding of the teeth; why irritations in the bowels or the belly occasion sometimes universal convulsions of the body.

The SPINAL NERVES rise generally by a number of separated fibres from both the fore and back part of the medulla spinalis; and soon after form a little knot, or ganglion, where they acquire strong coats, and are extended into firm cords; but the ganglion is entirely form-

ed by the posterior bundle. They are distinguished by numbers, according to the vertebrae from between which they come out; the superior of the two bones forming the hole through which they pass, being the one from which the number is applied to each nerve. There are generally said to be thirty pair of them: seven *cervical*, which come out between the vertebrae of the neck; twelve *dorsal*, between the vertebrae of the back; five *lumbur*, between the vertebrae of the loins; and six pair from the false vertebrae.

The *first* cervical pair of the nerves sends its largest branches backwards to the extensor muscles of the head and neck; and many fibres advance so far as to be connected with the portio dura of the auditory nerve. Hence possibly it is, that a clavus hystericus changes suddenly sometimes from the forehead to a violent pain and spasm in the back-part of the head and neck. The *second* cervical has a large branch that comes out at the exterior edge of the sterno-mastoideus muscle, and it is afterwards distributed to the integuments of the side of the neck and head, parotid gland, and external ear, being connected to the portio dura of the auditory nerve, and to the first cervical. The remainder is spent on the levator scapulae and the extensors of the neck and head. The irritation of the branches of this nerve in an inflammation of the parotid gland, is probably the cause why the neck is pained so far down as the clavicle, the head is drawn towards the shoulder of the affected side, and the chin is turned to the other side. The *third* pair of the neck passes out between the third and fourth cervical vertebrae; having immediately a communication with the second, and sending down a branch, which, being joined by a branch from the fourth cervical, forms the *phrenic* nerve. This nerve enters the thorax between the subclavian vein and artery; and then, being received into a groove formed for it in the pericardium, it has its course along this capsula of the heart, till it is lost in the middle part of the diaphragm. The other branches are distributed to the muscles and integuments at the lower part of the neck and top of the shoulder. No wonder then that an inflammation of the liver or spleen, an abscess in the lungs adhering to the diaphragm, or any other cause capable of irritating the diaphragm, should be attended with a sharp pain on the top of the shoulder, as well as wounds, ulcers, &c. of this muscle itself. If the irritation of this muscle is very violent, it may occasion that convulsive contraction of the diaphragm which is called a *hiccough*; and therefore an hiccough in an inflammation of the liver has been justly declared to be an ill symptom. An irritation of the thoracic nerves which produces sneezing may sometimes free the phrenic nerves from any spasm they occasion: so that sneezing sometimes takes away the hiccough; and a derivation of the fluid of the nerves any other way may do the same thing; or the hiccough may also be sometimes cured by drawing up into the nose the smoke of burning paper or other acrid fumes, swallowing pungent or aromatic medicines, and by a surprise, or any other strong application of the mind in thinking, or in distinguishing objects: or, when all these have failed, it has been put away by the brisk stimulus of a blistering plaster applied to the back. The *fourth* cervical nerve, after sending off that branch which joins with the third to form the phrenic, and bestowing twigs on the muscles and glands of the neck, runs to the arm-pit, where it meets with the fifth, sixth, and seventh, cervicals, and first dorsal, that escape in the interstices of the muscoli scaleni, to come at the arm-pit, when they join, separate, and re-join, in a way scarcely to be rightly expressed in words; and, after giving several considerable nerves to the muscles and integuments which cover the thorax, they divide into several branches, and are distributed to all the parts of the superior extremity. The situation of these branches in the axilla may let us see how a weakness and atrophy may be brought on the arms by long-continued pressure of crutches, or such other hard substances, on this part; and

and the course of them from the neck to the arm may teach us how much better effects vesicatories, or stimulating nervous medicines, would have, when applied to the skin covering the transverse processes of the vertebrae of the neck, or at the axilla, than when they are put between the shoulders, or upon the spinal processes, in convulsions or palsies of the superior extremities, where a stimulus is required.

The *twelve* dorsal nerves of each side, as soon as they escape from between the vertebrae, send a branch forward to join the intercostal, by which a communication is made among them all; and they soon likewise give branches backward to the muscles that raise the trunk of the body, their principal trunk being extended outwards to come at the furrow in the lower edge of each rib, in which they run toward the anterior part of the thorax, between the internal and external intercostal muscles, giving off branches in their course to the muscles and integuments of the thorax. The *six* lower dorsal nerves give branches to the diaphragm and abdominal muscles. May not the communications of all these nerves be one reason, why the parts they serve act so uniformly and conjunctly in respiration, and conspire together in the convulsive motions of coughing, sneezing, &c. The twitching spasms that happen sometimes in different parts of the muscles of the abdomen, by an irritation on the branches of the lower dorsal nerves, are in danger of occasioning a mistake in practice, by their resemblance to the cholic, nephritis, &c. The communications of these lower ones with the intercostals, may serve to explain the violent effort of the abdominal muscles in a tenesmus, and in child-bearing.

The *five* lumbar nerves on each side communicate with the intercostal and with each other, and give branches backwards to the loins. Branches of the second, third, and fourth, make up one trunk, which runs along the fore-part of the pelvis; and is spent on the adductor muscles, and on the integuments on the inside of the thigh. This nerve is called the *obturator*, or *posterior crural nerve*. Whoever attends to the course of these lumbar nerves, and of the spermatic vessels and nerves upon the psoas muscle, with the oblique passage of the ureter over that muscle, will not be surpris'd, that when a stone is passing in this canal, or even when it is inflamed, the trunk of the body cannot be raised erect, without great pain; or that the skin of the thigh becomes less sensible, and the thigh is drawn forward, and that the testicle often swells and is drawn convulsively towards the ring of the abdominal muscles.

The *six* pair of the false vertebrae consist each of small posterior branches sent to the hips, and of large anterior branches. The first, second, and third, after coming through the three upper holes in the fore-part of the os sacrum, join together with the fourth and fifth of the loins, to form the largest nerve of the body, which is well known by the name of *sciatic* or *ischiatric* nerve. This, after sending large nerves to the different parts of the pelvis, and to the external parts of generation and the podex, as also to the muscles of the hips, passes down to the bone of the thigh at its back-part, giving off nerves to the neighbouring muscles and integuments. A little above the ham, where it has the name of *popliteus nervus*, it sends off a large branch that passes over the fibula, and, sinking among the muscles on the anterior external part of the leg, runs down to the foot, to be lost in the upper part of the larger toes, supplying the neighbouring muscles and integuments every where in its passage. By attending to the particular distribution of the nerves of the inferior extremities, we may see why people with fractured legs, especially where there are splinters, should be subject to convulsive startings of the fractured member: Why, upon tying the blood-vessels in an amputation of the leg, the patients should sometimes complain of violent pain in their toes; why such patients should also be troubled with startings; why, for a considerable time after the amputation of the diseased limb, when the sup-

uration is well advanced, they should complain of pain in the fore which occasioned the amputation.

The branches of the four last cervical nerves, and of the first dorsal, which are bestowed on the superior extremities, and the two crurals, with the sciatic, which are distributed to the inferior extremities, are much larger proportionally to the parts they serve, than the nerves of the trunk of the body, and especially of the viscera; and for a very good reason, that in the most common necessary actions of life, a sufficient quantity of fluid, on which the influence of nerves seems to depend, may be supplied to the muscles there, which are obliged to perform more frequent and violent contractions than those of any other parts. The size of the nerves of the inferior extremities seems larger proportionally than in the superior extremities; the inferior extremities having the weight of the whole body to sustain, and that frequently at a great disadvantage. What the effect of the nerves here being injured is, we see daily. When people happen, by sitting wrong, to compress the sciatic nerve, they are incapable for some time after to support themselves on the affected extremity; and this is still more remarkable in the sciatica or hip-gout, in which the member is not only weakened, but gradually shrivels and wastes.

The NERVES of the HUMAN BODY are represented in the Anatomical Plate IX. of which the following is an explanation, viz.

FRONT VIEW.

1, The first branch of the fifth pair of nerves. 2, The second branch of the fifth pair. 3, The third branch of the fifth pair. 4, The trunk of the eighth pair cut. 5, The recurrent nerve. 6, The great sympathetic nerve. 7, The uppermost ganglion of the great sympathetic nerve. 8, The ramus splanchnicus of the great sympathetic nerve. 9, A branch of the sub-occipital, or tenth pair of the head, joining with the great sympathetic nerve. 10, The first cervical nerve. 11, The seventh cervical nerve; the intermediate cervicals come out in a similar manner. 12, The phrenic nerve. 13, The axillary plexus. 14, The muscular nerve of the arm. 15, The articular nerve. 16, The spiral nerve. 17, The radial nerve. 18, The ulnar nerve. 19, The first intercostal nerve. 20, The last intercostal nerve: the other ten come out in the same manner. 21, The first lumbar nerve. 22, The last lumbar nerve: the three intermediate lumbar nerves come out in a similar way. 23, Branches from the external thoracic nerves running down upon the side of the thorax. 24, Branches sent off from the intercostal and lumbar nerves to supply the outer part of the thorax and abdomen. 25, Nerves of the os sacrum. 26, The obturator nerve. 27, The anterior crural nerve. 28, A branch of the anterior crural nerve, which runs near the vena saphena major. 29, The anterior tibial nerve running down to the foot.

BACK VIEW.

1, The recurrent nerve. 2, A branch of the fourth cervical nerve, joining the recurrent one before it terminates on the musculus trapezius. 3, Branches of the fifth pair, perforating the scalenus medius to be spent upon the rhomboid muscles. 4, Branches of the sub-occipital nerve, running to the small muscles at the under and back part of the head. 5, Posterior branches of the cervical nerves. 6, Posterior branches of the dorsal nerves. 7, Posterior branches of the dorsal and lumbar nerves running to the erector muscles of the back. 8, Posterior branches of the dorsal nerves, penetrating the intercostal muscles. 9, Branches from the last dorsal, and from the lumbar nerves, supplying the lumbar and abdominal muscles. 10, Branches from some of the lower cervical nerves, running to the muscles on the back-part of the scapula. 11, The articular nerve. 12, A branch from the axillary plexus running to the musculus latissimus dorsi. 13, Another branch from the axillary plexus running to the latissimus dorsi and serratus magnus. 14, The spiral nerve. 15, The

15, The ulnar nerve. 16, Small branches coming through the holes in the back-part of the os sacrum running to the muscles, &c. there. 17, A small branch running out between the os sacrum and os coccygis. 18, The end of the cauda equina running through the canal at the back-part of the os sacrum. 19, The sciatic nerve. 20, Branches from the sciatic nerve to the muscles on the back-part of the pelvis. 21, Branches from the sciatic nerve to the muscles, &c. about the anus. 22, Branches from the sciatic nerve to the glutæus maximus and muscles, at the upper and back part of the thigh. 23, Trunk of the sciatic nerve, sending off branches to the muscles on the back-part of the thigh. 24, The fibular nerve sent off from the sciatic one. 25, The posterior tibial nerve, which is a continuation of the sciatic nerve.

The Nerves of the Eye-ball are shewn in a separate figure.

OF THE NERVOUS FLUID.

The nature and properties of the fluid or liquor which passes through the nerves, hath been a subject of considerable debate among physiologists. Some have imagined the liquor of the nerves to be capable of vast explosion like gun-powder, or of violent sudden rarefaction like air, or of strong ebullition like boiling water, or of effervescence like the mixture of acids with alkaline liquors. But, as the mass of blood from which this fluid is derived is not possessed of any such properties, we cannot suppose the blood to furnish what it has not in itself. Besides, all these operations are too violent for the brain or nerves to bear; and, when they are once begun, they are not so quickly controuled or restrained, as experience teaches us the nerves can, which may be suddenly made to cease from acting. We are not sufficiently acquainted with the properties of an æther, or electrical effluvia, pervading every thing, to apply them justly in the animal œconomy; and it is as difficult to conceive how they should be retained or conducted in a long nervous cord. These are difficulties not to be surmounted. The surest way of judging what kind of liquor this of the nerves must be, is to examine the liquors of similar parts of the body. All the glands separate liquors from the blood much thinner than the compound mass itself; such is the liquor poured into the cavity of the abdomen, thorax, ventricles of the brain, the saliva, pancreatic juice, lymph, &c. Wherever there is occasion for secreted liquors being thick and viscid, in order to answer better the uses they are intended for, nature has provided reservoirs for them to stagnate in, where their thinner parts may be carried off by the numerous absorbent veins dispersed on the side of those cavities; or they may exhale where they are exposed to the open air. The mucus of the nose becomes viscid by stagnation; for, when it is immediately secreted, it is thin and watery, as appears from the application of sternutatories, &c. The cerumen of the ears is of a watery consistence, when just squeezing out. The mucus of the alimentary canal grows thick in the lacunæ. The bile in the hepatic duct has little more consistence than lymph; that in the gall-bladder is viscid and strong. The urine is much more watery as it flows from the kidneys, than when it is excreted from the bladder. The seed is thin in the testicles, and is concocted in the vesiculæ seminales, &c. Hence we may safely conclude, that a thin liquor is secreted in the cortex encephali or spinal marrow; and seeing the thinness of the secreted liquors is generally, as the divisions of the vessels, into small subtle branches, and that the ramifications within the skull are almost infinitely subtle, the liquor secreted in the encephalon may be determined to be among the finest or thinnest of fluids.

The liquor or fluid in the nerves moves constantly, equally, and slowly, unless when its course is altered by the influence of the mind, or by the pressure of some neighbouring active organ. We have not, however, and perhaps cannot have, any idea of the manner in which the mind and body act upon each other; but, if we al-

low that the one is affected by the other, which none deny, and that the fluid of the nerves (whatever name people please to give it) is a principal instrument which the mind makes use of to influence the actions of the body, or to inform itself of the impressions made on the body, we must allow that the mind can direct this instrument differently, particularly as to quantity and celerity, tho' we must remain ignorant of the manner how many phenomena, depending on this connection of mind and body, are produced. Thus we would in vain attempt to account for animals continuing, after their heads were struck off or their hearts were cut out, to perform actions begun before they suffered any injury.

All objects of sense, when applied to their proper organs, act by impulse; and this action is capable of being increased by increasing the impelling force. In tangible objects, it is clearly evident, that the closer they are pressed to a certain degree, the more distinct does the perception come. Odorous particles need the assistance of air moved rapidly to affect our nose: sapid substances, that are scarcely sufficient to give us an idea of their taste by their own weight, are assisted by the pressure of the tongue upon the palate: the rays of light collected drive light bodies before them: sound communicates a vibration to all bodies in harmonic proportion with it. The impulses made thus by any of these objects on the nerves, which are full of liquor, press their sides or extremities, and their liquor is prevented from flowing so freely as it did. The canals being all full, this resistance must instantaneously affect the whole column of fluids in the canals that are pressed, and their origins, and have the same effect as if the impulse had been made upon the origin itself. To illustrate this by a gross comparison, Let any one push water out of a syringe, through a long flexible pipe fixed to the syringe; and he is sensible of resistance or a push backwards, the moment any one stops the orifice of the pipe, or closes the sides of it with his fingers. This impulse made on the nerves, and thus communicated to their origin, varies according to the strength or weakness, the quickness or slowness, the continuance or speedy removal, the uniformity or irregularity, the constancy or alteration, &c. with which objects are applied to the nerves. The various kinds of impulses which the different classes of objects make, occasion in animals, which ought to have accurate perceptions of each object, a necessity of having the different organs of the senses variously modified, so that the several impulses may be regularly applied to the nerves in each organ; or, in other words, we must have different organs of the senses fitted to the different classes of objects. As the objects have one common property of impulse, so all the organs have most of the properties of the organ of touching in common with the papillæ of the skin. This is evident in the nose and tongue: we can also perceive it in some operations of the eyes, as we may likewise do in some cases where matter is collected in the internal ear.

These properties common to the different objects and organs, occasion frequently uncommon effects in the application of an object to an organ proper to another object of sensation; for, sometimes we have the same idea as if the object had been applied to its own proper organ; at other times the object is as it were changed, and we have the idea as if the organ had had its own proper object applied to it. Thus, for example, light is the proper object to be applied to the eye, to give us an idea of colours; yet, when all light is excluded from the eyes, an idea of light and colours may be excited in us by coughing, sneezing, rubbing or striking the eye-ball. A cane vibrating, so as not to excite sound perceptible to the ear, applied to the teeth, raises a strong idea of sound; as a little insect creeping in the meatus auditorius also does. The fingers applied to two rough surfaces, rubbing on each other, are sensible of the sound they make; surgeons of any practice in the cure of fractured bones can bear witness to the truth of this. The fingers dipped in acid

and several other acrid liquors, have a sensation very like to tasting. Smelling and tasting, every body knows, are subservient and assisting to each other. From such examples we have further proof of one general cause of our sensations, to wit, impulse from the objects; and of such a similarity and relation in the organs, as might give reason for imagining that any one of them would be capable of producing the effect of another, if the impulses of the different objects could be regularly applied to each. Hence light and sound may affect insects and other animals that have not eyes or ears. If the impulse of an object is applied with due force, but irregularly, a confused idea of the object is raised. If the application of the impulse is regular, but the force with which it is applied too weak, our perception of the object is too faint. One may whisper so low as not to be heard. If the application of objects is too violent, and there is any danger of the tender organs of our senses being hurt or destroyed, an uneasy sensation we call *pain* is raised, whatever may be the organ thus injured. The object of feeling affects every organ; thus pressure, stretching, cutting, pricking, acrid salts, pungent oils, great heat, violent cold, &c. occasion pain, wherever they are applied. Besides, every particular organ can be affected with pain by the too violent application of its own proper object. Too much light pains the eyes; very loud sounds stun the ears; very odorous bodies and too rapid objects hurt the nose and tongue. This is a sure proof that the objects of our senses all act, and that the organs are all impressed, in nearly the same way.

Whenever the uneasy sensation, *pain*, is raised by the too strong application of objects, a sort of necessity is as it were imposed upon the mind, to endeavour to get free of the injuring cause, by either withdrawing the grieved part of the body from it, as one draws back his hand when his finger is pricked or burnt; or the injuring cause is endeavoured to be forced from the body, as a tenesmus excites the contraction which pushes acrid faeces out of the rectum. In both these operations, a convulsive contraction is immediately made in the part hurt, or in the neighbourhood of it; and, if the irritation is very strong or permanent, the greater part of the nervous system becomes affected in that spasmodic or convulsive way. Is it this necessity which obliges the mind to exert herself in respiration, or in the action of the heart, when the lungs or heart are gorged with blood? or the iris to contract the pupil, when the eye is exposed to a strong light? or sneezing to be performed when the nose is tickled, &c. Will not a stimulus of any nerve more readily affect those with which it is any where connected, than the other nerves of the body? May not this sympathy serve as a monitor of the mind to employ the organs furnished with nerves thus connected, to assist in freeing her of any uneasy sensation, rather than to make use of any other organs? Will not this in some measure account for many salutary operations performed in the body, before experience has taught us the functions of the organs performing them?

This nifus of the mind to free the body from what is in danger of being hurtful, may serve to explain the phenomena of a great many diseases, after we are acquainted with the distribution of the particular nerves; and from this we can understand the operation of medicines that stimulate; and may learn how, by exciting a sharp but momentary pain, we may free the body of another pain, that would be more durable; and that, by having it thus in our power to determine a flow of the liquor of the nerves to any particular part, for the benefit of that part, or the relief of any other diseased part, we can do considerable service by a right application of the proper medicines.

OF THE BURSAE MUCOSÆ.

AS the *bursæ mucosæ* are organs which form a very curious part of our structure, a perfect knowledge of them will frequently be found useful in practice; yet, notwith-

standing the necessity of being well acquainted with these material parts of the human frame, anatomists, even the latest and most accurate, have not paid that attention to the subject which its importance seems to require. It is well known that the tendons of the muscles, at the wrists and ankles, and in their course along the fingers and toes, are conducted in sheaths. Winslow observed, that these sheaths were lined with thin and smooth membranes; and Albinus remarked, that where these ligamentary sheaths were absent, sacs were frequently interposed between the tendons and the bones over which these tendons moved. To these sacs, he gave the name of *bursæ mucosæ*; and in his admirable work, the History of the Muscles, he describes several of them. Dr. Monro thinks, and not without just grounds, that Winslow had not sufficiently examined the extent and structure of the membranes lining the ligamentous sheaths of the tendons; and he also makes it appear, that Albinus did not perceive, as is really the case, any similarity between these membranes and the sacs which he described under the name of *bursæ mucosæ*. Some of the later anatomists, professor Monro thinks, have not sufficiently attended to Albinus's discovery; and that others, especially the learned Haller, have mistaken the nature of the *bursæ*, supposing them to be formed of cellular membrane, like that which covers the belly of the muscles; while the greater number of the later writers on anatomy have contented themselves with repeating the description given by Albinus, and have never attempted to throw farther light on the subject.

The *bursæ mucosæ* are only to be found in the extremities of the body; they are in all 140, *thirty-three* in each superior, and *thirty-seven* in each inferior, extremity. Many of them are placed on the inner sides of the tendons, between these and the bones. Many others cover not only the inner but the outer sides of the tendons, or are interposed between the tendons and external parts, as well as between those and the bones. Some are situated between the tendons and external parts only or chiefly; some between contiguous tendons, or between the tendons and the ligaments of the joints. A few are interposed where the processes of bones play upon the ligaments, or where one bone plays upon another.

Where two or more tendons are contiguous, and afterwards separate from each other, we generally find a common *bursa* divided into branches, with which it communicates; and a few *bursæ* of contiguous tendons communicate with each other. Some *bursæ*, even in young and healthy children, communicate with the cavities of the joints; and in many old persons such communications are often formed by use or worn by friction, although there had been no lameness nor complaint of pain made by the person on that account during life. There is some little difference, in different persons, as to the manner in which contiguous sacs communicate with each other, or with the cavities of the joints. And, particularly, we have observed, that a *bursa* as large as a hen's egg, which is placed behind the tendon of the extensors of the leg, in some persons has no communication with the cavity of the joint of the knee; but, in the greater number of children, as well as adults, we find the opening large enough to allow one or two fingers to pass from the *bursa* into the joint.

We are at first sight struck with the resemblance which the structure of the *bursæ* bears to that of the capsular ligaments of the joints; and, the more attentively we pursue the comparison, the more just and perfect their agreement will be found. 1. The internal membrane of the ligaments of the joints, like that of the *bursæ*, is thin and dense. 2. It is connected to the external ligaments by the common cellular substance. 3. Between it and the bones, layers of cartilage or the articular cartilages are interposed. 4. At the sides of the joint, where it is not subjected to violent pressure and friction, the adipose substance is connected with the cellular membrane. 5. Within the cavities of the joints we observe masses of fat projecting which are covered with similar blood-vessels, and with similar
fimbriae

fimbriae or fringes hanging from their edges. 6. In the knee we may observe the upper part of such a mass of fat, forming what has been called the *muclaginous gland of the joint*; and the under part of it projecting into the bursa, behind the ligament which ties the patella to the tibia. 7. The liquor which lubricates the bursa has the same colour, consistence, and properties, as that of the joints; and both are affected in the same manner by heat, mineral acids, and ardent spirits. 8. In some places the bursa constantly communicate with the cavities of the joints; in others they generally do so: from which we may infer a sameness of structure.

Mr. Gooch, in his Treatise, takes notice of a wound into one of these bags on the side of the knee, which from the discharge he concluded to have been in the burfal ligament, but it healed kindly, and gave him to suspect that these bags may be the seat of disorders not yet adverted to. He hath also given the following list of as many of them as had fallen under his observation: 1. *Deltoides*: a large one situated under this muscle, upon the acromion scapulae. 2. *Biceps brachii*: a small one investing the tubercle of the radius, both on the side where the tendon is fixed, and also on the other side, where there is no tendon. It adheres strongly to the whole tubercle, and loosely to part of the supinator brevis, under which it lies, as well as under the tendon of the biceps. 3. *Iliacus internus & psoas*: a large thin and pliable one is found upon the ischium, beneath the tendons of the iliacus internus and psoas, as they pass down to their insertions in the os femoris. It is attached to these tendons, and to the anterior surface of the capsular ligament; and this sacculus sometimes communicates with the joint. 4. *Latissimus dorsi & teres major*: one is situated between the extremities of the tendons of these muscles, adhering strongly to them. 5. *Gluteus maximus*: a large thin one, firmly connected by a small part of it to the back of the trochanter, immediately under the termination of the gluteus medius, and is loosely attached to the rest of the trochanter, and the tendon of the gluteus maximus. 6. *Gluteus medius*: a small one situated between the termination of its tendon and that of the pyriformis, adhering to both. 7. *Gluteus minimus*: a small thin one, attached to its tendon and the trochanter major. 8. *Gemini*: a small one between them and the termination of the obturator internus, connected to both, and to that part of the capsula of the joint which lies under the gemini. 9. *Biceps cruris*: one is situated between the end of its tendon exteriorly, and the capsular ligament of the knee, adhering to both. 10. *Seminembranosus*: a small one lies between its tendon, which runs between the inner condyle of the tibia, and the capsular ligament of the joint. 11. *Cruralis & vasti*: behind the tendons of the cruralis and vasti there is a thin but large one, connected to those tendons before they join, and after their junction it is fixed to the patella; it also adheres to the capsula of the joint that expands itself over the bone. 12. *Gracilis, sartorius, & semitendinosus*: under the extremities of the tendons of these muscles is a large one, adhering to them on one side, and on the other to the capsular ligament of the knee, and on the side where these tendons play. 13. *Gemellus*: a large one lies under its inner head, firmly attached to its tendinous origin, also to the extremity of the semitendinosus, and the capsula of the knee near the anterior condyle. 14. *Soleus*: the tendon of the soleus passes over the upper part of the os calcis, between which and the bone lies a large sacculus, and near that is found a glandular body, which furnishes a mucous fluid for the more effectual lubrication of these parts, that are in such constant motion in walking. 15. *Tibialis anticus*: a small one is fixed to the tendon a little before its termination, where it plays on the top of the foot. 16. *Peroneus longus*: one lies under the tendon of this muscle, where it plays over the os cuneiforme, on the outside of the foot.

The admission of air into these cavities is productive of the worst consequences; this hath led Dr. Monro into ma-

ny arguments, which prove the absolute necessity, where any operation requires an opening of these cavities, of preventing, as much as possible, any admission of air; and the directions which he gives for conducting the operation so as to avoid this inconvenience, are admirable. Among other operations on which he enlarges, is that for the reduction of the incarcerated hernia. He shews that the cutting of the peritonæum, or tendons of the abdominal muscles, contributes little to the fatal consequences which frequently attend the operation; but that all, at least the most dangerous, of the bad symptoms, arise from the opening of the hernial sac, and the consequent admission of air. He therefore justly condemns the common mode, universally recommended, of opening the hernial sac before cutting the tendons of the abdominal muscles. After the integuments are cut through, and the sac is exposed to view, he advises to cut the tendon, and to reduce the hernia without opening it. His arguments for the propriety of this practice, and the answers which he gives to objections that may be made against it, are well supported.

OF NUTRITION, GROWTH, LIFE, and DEATH.

THERE appear many concurring causes why growth is continually rendered less and less. Many vessels seem to be stopped up, both because they are compressed by the neighbouring torrent of blood flowing through the great arterious tube, and because the blood, being now become more viscid, more easily coagulates. But the harder kind of food that is used, throws into the blood more terrestrial parts; which, being carried through the whole body along with the nutritious juice, renders all the parts harder, as the bones, teeth, cartilages, tendons, ligaments, vessels, muscles, membranes, and cellular texture; so that an increase of hardness may be perceived in them, even by touching them with the finger. Wherefore, since the blood flows from the heart through fewer canals, and since all parts which should be lengthened or distended grow harder, it necessarily follows, that those which ought to increase in bulk, will yield less and less to the impulse of the heart.

But the heart likewise, which is the part that is first consolidated among all the soft ones, increases less than any other part of the whole body; and, while the much more tender limbs and softer viscera are distended, the proportional bulk of the heart to the rest of the body grows continually less and less, till at last its proportion to the body of the adult becomes eight times less than what it was in a new-born infant. At the same time, from that very density which it has so quickly acquired, it becomes less irritable, and is contracted less frequently within a given time. Thus, while the resisting forces are augmented, the distending ones are at the same time diminished.

There will therefore, sooner or later, be an end of the increase of bulk; and that will happen so much the sooner as the heart has had the more frequent and vivid contractions: but this cessation of growth will take place when the cartilaginous crusts of all the bones are become so thin, that they cannot yield to the increase of the bony part. In women, the menses seem to put an earlier than usual stop to the growth. In cartilaginous fishes, the growth is perpetual. There is no state in which nature by a perennial progress induces a continual decrease from the first conception. It is said however to take place, when there is neither any increase of bulk, nor yet does any visible decrease take place. For we are all perpetually consuming. Nor do we only lose the fluid parts of our bodies, but in short even those which are reckoned to be the most solid. For even the bones are changed; and the teeth, which are harder than the bones, increase in bulk when the attrition of the opposite teeth has ceased to wear them away, and therefore their elements are changed: even the fibres of ivory in an elephant's tooth, after having been divided by the entrance of a leaden bullet, have grown

grown in a curve direction, and completely inclosed the ball. The bony juice likewise is changed; for in some cases the bones grow soft, in others they swell out in bony tumours; even cicatrices themselves have a manifest growth, otherwise they would not be sufficient in an adult person to close up a wound which he had received when a boy; and a great quantity of the earthy part of our bodies goes off by urine, as is seen in some diseases.

The cause of the destruction of the solid parts is in their perpetual extension and retraction, at every pulse of the heart, of which there are an hundred thousand every day; and by this motion even metals themselves are worn. Other causes are from the friction of the fluid against the solid parts; from the wearing away of all the membranes which cover moveable parts, either on the surface or in the internal cavities of the body; in the alternate swelling and subsiding of the muscles; and in the attraction and pressure which our fleshy parts exert. But all the parts of our body are the sooner worn away, in proportion as they are composed of a greater quantity of gluten and a less quantity of earth; for that gluten when it is extended, if the extension has been a little superior to the force of its cohesion, must of necessity fall away and be carried off from the earthy parts. Thus wrinkles or furrows are generated; such as are visible in the arteries of old men. The cellular texture, which otherwise would be dissolved into water or jelly, is worn away by the impetus of the blood pressing against the neighbouring blood-vessels and muscles, by friction, and by perpetual alternate flexion and extension.

The decrease would be very quick, and indeed there would be no great distance between the beginning of our life and its end, unless these losses were repaired. The fluids are quickly restored by food, as appears from the example of a chicken, in which blood is generated out of its aliment within two days. The fat, however, and red globules of blood, are formed out of the fat; the lymphatic juice from jelly; the mucus from mucus; and the rest of the humours from these and water. A gelatinous juice is brought from the aliments, through the arteries, to all parts of the body, and exudes into all parts of the cellular texture. The furrows, which we might imagine to be made in the inmost arterial membrane by the impetus of the blood, are filled up by a viscid matter brought into them by the lateral pressure; nor is it possible that these furrows can be overfilled, because every exuberant particle of nutritious juice must necessarily be carried off by the current of the blood. This juice will not be deficient while there is a sufficient quantity of aliment; and while there is more rest, and less resistance, in the bottom of the furrow than elsewhere, which must always be the case, because the bottom is that part of the vessel which is at the greatest distance from the main current of the blood flowing through it. There seem to be certain powers in the air, by which the aliment is attached to the solid parts, although we are ignorant of the manner in which they act.

The decrease of the cellular texture arising from attraction or pressure, will be repaired by the viscid vapour exhaled from the artery, and pressing towards those places which stand in need of reparation by the force of the neighbouring arteries and compressing muscles, its aqueous part being pressed out and reformed. The gluten repairs most of the organic parts, tendons, and membranes; being formed into a new cellular texture, as in the fœtus. The waste which takes place in moveable parts adhering by their other extremity to the rest of the body, can be repaired by protrusion alone, while the lymph fills up the intervals or hollows that are thus produced.

When the growth of the body can proceed no farther, obesity is produced, which is a kind of imitation of real growth. This proceeds from the fat generated by the aliment; which by reason of the impetus of the blood being lessened, and its entering the smallest vessels with more difficulty, is carried to the sides of the vessels; enters the lateral ones and the inorganic pores of the arteries; exudes

into the cellular texture; and there, the power of coagulation of the blood, and the absorption by the veins, being now diminished, the fat is consequently collected.

We feel the beginnings of decay even in youth itself. Even in that blooming season, the solid elements of the body are augmented, the chinks through which the humours flow are lessened, small vessels are obliterated, and the greater attraction of the cellular texture has added a density to the whole body. Throughout the whole body, that hardness occasioned by age is very conspicuous, in the bones now wholly brittle, in the skin, in the tendons, in the conglobate glands, in the arteries, and likewise in the weight of all the parts, and of the brain itself. The parts most exercised by motion soonest grow rigid, as is observable in those limbs of mechanics which are most used in their several occupations. Moreover, the arteries also continue to become more dense, more narrow, and even to be quite filled up, as well by the internal pressure of the blood flowing through the large arterial tube, as by the attraction of the cellular texture of which the greater part of the artery consists. An infinite number of parts of the cellular texture cease to be nourished; for the smallest arteries, which hitherto brought them nourishment, are now obliterated, and cease to convey more nourishment. The extending force being removed, the cellular floculi draw themselves together, contract the little spaces intercepted between them, degenerate into membranes, or substances of a hard texture, which intercept, and as it were choke up, other vessels. The gelatinous vapour likewise concretes in the small hollows of the cellular texture, and unites with the sides of these hollows into a hard solid. The muscles degenerate into hard dense tendons destitute of all irritable power, because the blood which they contained is expelled, and their fibres are condensed.

At the same time the nerves become more and more callous to the impressions of the senses, and the muscles grow less sensible to the solicitations of the animal powers; thus the contractile force of the heart, the frequency of its pulsations, and consequently the whole force which drives the blood into the smallest vessels, are diminished. The quantity of humours is diminished in a dense body, as is evident in the perspiration, semen, humours of the eye, and of the conglobate glands; the vapour also which bedews the solid parts of the body every where decreases. For this reason, nutrition now languishes, because there are more parts of the body which require nourishment, and less nutritious juice. Nor is the quantity of humours only diminished; they themselves are likewise corrupted. They were mild and viscid in children: but these same humours are in old men acrid, salt, scetid, with a great quantity of earth. This circumstance is owing to the use of salt or putrid food, which generate acrimony in the fluids; and the acrimony by a continual use of vitiated aliments perpetually increases, being at the same time augmented by a decreased perspiration and alvine evacuation necessary for carrying off the putrid liquamen. Hence the fetor of the urine, of the breath, and the difficult healing of wounds. But the worst quality of the humours is, that they abound with earthy particles, which are either such as are collected insensibly from the aliments after the secretions have become less free, or such as are carried off from the solid parts and returned into the blood; as is proved by the presence of earth in some diseases, and by the nature of the gouty earth. The quantity of this earth is continually increasing, especially if the nutritious liquor abounds with it: hence the brittleness of the bones, and the hardness of all the other parts, increases. This earth is likewise every where deposited in the cellular texture, but chiefly in the coats of the arteries, and produces crusts, which are at first callous, and then of a bony or stony nature.

The hardness or rigidity of the whole body, the decrease of the muscular powers, and the debility of the senses, constitute old age,—an evil, alas! which sooner or later

later attends every mortal. It makes an earlier attack on those who have been subjected to violent labour, or given themselves up to pleasure, or lived upon unwholesome diet; than on those who have followed a moderate way of life, and used temperance in their diet, or if they have removed from a cold to a warm country. If these causes continue their operation of rendering the matter of the body more dense, of diminishing its irritability, and augmenting the quantity of earth, it is not possible but decrepid old age must follow. In it the senses are almost destroyed, the natural power of the muscles is extremely weak, the limbs lose their strength, the feet especially are not sufficient for supporting and directing the body. The callous insensibility of the nerves cannot be incited to perform the office of generation; the very intestines become inactive, and refuse to answer to the accustomed solicitations: by the induration of the cartilages interposed between the vertebrae, the body bends forward; by the falling out of the teeth, the jaws but ill support the wrinkled lips; and lastly, the heart loses one half of the frequency of its pulsation, which it had in the infant state.

Thus, at last natural death necessarily follows; but very many people are carried off before this time by diseases. Scarcely one in a thousand exceeds the age of ninety: one or two perhaps may be found in a century that live to the age of 150. Man is long-lived when compared with other animals; he is also more tender than any of them, has looser flesh, and softer bones. Among the long-lived people, it is not easy to say what was the cause of that privilege. England seems to excel all other nations in producing old men: and in general the inhabitants of temperate climates live longest. The commonalty has almost solely afforded these rare examples of longevity; as indeed, from the more numerous class, we might expect a greater number of examples. Sobriety; a moderate and not very rich diet; a mildness of manners; a mind not endowed with very great vivacity, but cheerful, and little subject to care; all conduce to long life. Among animals, fowls are longer lived than many others, but fishes the most of all; the latter have the smallest heart, and the slowest growth, and their bones are never hardened.

Death happens sometimes, but rarely, from mere old age. This we say happens when the powers, first of the muscles subject to the will, then of those that are subservient to the vital functions, and lastly, of the heart, gra-

dually fail; so that old men cease to live through mere weakness, rather than through the oppression of any disease. We have often observed the same kind of death in brutes. The heart becomes unable to propel the blood to the extremities, the pulse and heart desert the feet and hands; yet the blood continues to be sent from the heart into those arteries that are next to it, and to be again carried back to it: thus the flame of life is supported for a little while; but it is soon extinguished, for the heart itself being totally deprived of its powers, and not irritable by the blood to any effectual motion, cannot drive the blood through the lungs, that the aorta may receive its due quantity. The utmost force of respiration is exerted in order to open a passage to the blood through the lungs, until even the powers, given by nature for performing the action of inspiration, become unequal to their task, and cease altogether. The left side of the heart neither receives blood, nor is irritated, and therefore remains at rest; the right ventricle, and lastly the auricle of the same side, for a while receive the blood brought by the veins from the cold and contracted limbs, and being thus irritated they continue to beat weakly. But lastly, when the rest of the body has become perfectly cold, and the fat itself congealed, even this motion ceases, and death becomes complete.

We would call that death, when the whole irritable nature has left the heart; for the mere resting of the heart is not without hope of a revival of motion: neither does the putrefaction of any part of the animal body demonstrate the death of the whole animal; nor does its insensibility or coldness do so; but all these circumstances joined together, and perpetually increasing, with the stiffness which follows the coagulation of the fat by rest and cold, can only be admitted signs of death in any doubtful case.

The dead body now hastens to putrefaction. The fat, water, and gluten, in consequence of separation and dissolution, evaporate: the earth, deprived of its bonds of union, insensibly moulders away, and mixes itself with the dust: the spirit departs whither God hath destined it. By death it is indestructible; as may be proved by an attention to the following fact, that many dying people, though their bodily powers are wasted, and their bodies are even decayed, give evident signs of a serene, vigorous, and happy, mind.

ANATOMY OF THE GRAVID UTERUS.

TO investigate what happens in the interior parts of a female during the production of a new living animal, is indeed a very arduous undertaking. We shall first relate what experience shews to be true, and then add the hypotheses by which the learned have endeavoured to supply what she does not teach. How few particulars are yet attained, and how difficultly they are attainable, in so obscure a speculation, must be obvious to every candid and impartial mind.

To throw the utmost light upon so delicate a subject, we shall begin with the most simple animals, and afterwards take notice of what nature has added in others whose fabric is more compounded. The smallest animals, then, which have very few or no limbs, the least distinction of parts, the shortest life, and the vital functions both few and very familiar to one another, bring forth young ones like themselves, with no distinction of sexes; all of them are fruitful, and none imparts fecundity to the rest. Some animals exclude their young through a certain cleft of their bodies; from others, limbs fall off, which are completed into animals of a kind similar to those from which they have fallen. This kind of generation is extended very wide, and comprehends the greater part of animal life. Those again, which are a little more compounded,

all bring forth their young; yet in such a manner, that a certain particle peculiar to themselves is generated in their bodies, dissimilar to the whole animal, and contained in some involucre, within which lies the germ that is afterwards to become similar to its parent; this is commonly called the *ova*, or *egg*.

Animals that are still more complex have both eggs, and male semen besides; so that both sexes are joined in the same individual; and this class is the most numerous. The *male semen* is that active substance which it is necessary to sprinkle on eggs to render them prolific, although it never grows alone into a new animal. In this class, therefore, a juice is prepared by its own proper organs, which is likewise poured on the eggs through organs proper to itself, but different from the former, in order to generation. Those animals are much more numerous which have both a male juice and female eggs; yet cannot fecundate themselves, but require true coition. For two animals of this kind must so agree in the work of fecundation, that each impregnates the other with its male organs, and again suffers itself to be impregnated in its female ones by the male parts of the other.

Approaching nearer and nearer to man, we come next to that class, of which, some individuals have only male
S A organs,

organs, and the same males sprinkle their seed on the female eggs of others. Several of the animals with cold blood sprinkle their seed upon the eggs after they are poured out of the body of the mother. Warm animals inject their semen into the uterus of the female. If eggs are generated in the female, she expels the lifeless embryo included in shells or membranes; but, if a living foetus, she then retains it so long as that it may be born free from any involucre. The difference between these oviparous and viviparous animals is so small, that in the same class, and the same genus, some animals lay eggs, others produce live foetuses; and lastly, the same animal sometimes lays eggs, and sometimes brings forth live young.

From this speculation it appears, that all animals are produced from others similar to themselves; many form a part only of a similar one; others from an egg of a peculiar structure; but that all these have no need of male semen. Lastly, the more moveable and lively animals only, whose bodies are of a more complicated structure, are endowed with a double system for generation; and the difference of sexes seems to be added for the bond of social life, and for the safety of a less numerous progeny. For the effusion of this male juice into the female organs, both sexes are inflamed with the most vehement desires; the male indeed has the most lively ones; for, since the female is always prepared for the venereal congress, it was necessary for the male to be more strongly excited, especially at the time when he abounded with good and prolific seed, which indeed is the principal incentive to venery in him. In females, of the brute kind especially, some inflammation in the vagina, which excites an intolerable itching, seems the principal cause of venereal desire.

Nature has added to the womb, both in women and in quadrupeds, a vagina, or round membranous cavity, easily dilatable, which, as we have already seen, embraces and surrounds the projecting mouth of the uterus; it descends obliquely forward under the bladder, resting upon the rectum, with which it adheres, and lastly opens under the urethra, with an orifice a little contracted. This opening, in the foetus and in virgins, has a remarkable wrinkled valve, formed of the skin and cuticle of the vagina, under the denomination of *hymen*, which serves to exclude the air or water: since only the human race have this membrane, it is perhaps not without some kind of moral use. It is circular; except that a part of it is sometimes wanting under the urethra, and it is broader behind. Being insensibly worn away by copulation, its lacerated portions at last disappear. The caruncles, which are called *myrtiformes*, are partly the remains of the shattered hymen, and partly the rugæ and the valves of the mucous lacunæ hardened into a kind of flesh.

At the entrance of the vagina are prefixed two cutaneous appendages, called *nymphæ*, continued from the cutis and gland of the clitoris; and these, being full of cellular substance in their middle, are of a turgescient or distensible nature; they are jagged and replenished with sebaceous glandules on each side, such as are also found in the folds of the prepuce of the clitoris. Their use is principally to direct the urine, which flows between them both from the urethra, that it might run off and not trickle down the skin, in which office the nymphæ are drawn together with a sort of erection. These membranous productions descend from the cutaneous arch surrounding the clitoris, which is a part extremely sensible, and wonderfully prurient; it is composed, like the penis, of two cavernous bodies, arising from the same bones, and afterwards conjoining together in one body, but without including any urethra. It is furnished with blood-vessels, nerves, and levator muscles, and a ligament sent down from the synchondrosis of the os pubis; like the penis in men, the clitoris grows turgid and erect in the time of coition, but less so in modest women; from friction, however, the clitoris always swells up and is erected. The muscle, termed *osii vaginae constrictor*, rising from the sphincter ani and receiving an accession from the

os ischium, covers the venal plexus, comes forward by the sides of the labia, and is inserted into the crura of the clitoris; it seems to compress the lateral venal plexuses of the vagina, and to retard the return of the venal blood. The transverse muscle of the urethra, and the bundle from the sphincter inserted into it, have the same situation as in men.

When a woman is invited either by moral love, or a lustful desire of pleasure, and admits the embraces of the male, the penis, entering the vagina, rubs against its sides, until the male seed breaks out and is poured into the uterus. In like manner, as in the male, the attrition of the very sensible and tender parts excites a convulsive constriction of all the parts of the vagina. By these means the return of the venous blood being suppressed, the clitoris, especially in salacious women, grows turgid and erect, the nymphæ on each side swell, as well as the venal plexus, which almost surrounds the whole vagina, and the pleasure is increased to the highest pitch: in consequence of which there is expelled, by the muscular force, but not perpetually, nor equally in all women, a quantity of lubricating mucous liquor, of various kinds. The principal fountains of this are seated at the opening of the urethra, where there are large mucous sinuses placed in the protuberant margin of this uriniferous canal. Moreover, at the sides of the urethra in the bottom of the sinuses which are formed by the membranous valves sulcated upwards, two or three large mucous sinuses open into the vagina. Lastly, at the sides of the vagina, between the bottoms of the nymphæ and the hymen, there is an opening, on each side, from a very long duct; which, descending towards the anus, receives its mucus from a number of very small follicles.

But the same action which, by increasing the pleasure to the highest degree, causes a greater conflux of blood to the whole genital system of the female, occasions a much more important alteration in the interior parts. For the hot male semen, penetrating the tender and sensible cavity of the uterus, which is itself now turgid with influent blood, there excites, at the same time, a turgescence and distention of the lateral tubes, which are very full of vessels creeping between their two coats, and distended with a great quantity of blood. These tubes, thus copiously filled and florid with red blood, become erect, and the ruffle or fringed opening of the tube ascends and is applied to the ovary. In the truth of all these changes, we are confirmed by dissections of the human body and brute animals, and from the appearances of the parts when diseased.

But, in a female of ripe years, the ovary is extremely turgid, with a lymphatic coagulable fluid, with which also the vesicles are distended. In a prolific copulation, some one of the more ripe vesicles is burst, a manifest cleft appears, which at length pours out a clot of blood. Within this vesicle, after copulation, a kind of flesh grows up, at first flocculent, then granulated, and like a conglomerate gland, consisting of many kernels joined together by a cellular substance; which flesh, by degrees becoming larger and harder, fills the whole cavity of the vesicle, and is hardened into the nature of a schirrhus, in which, for a long time, a cleft, or a vestige of one, remains. This is the *corpus luteum*, common to all warm quadrupeds, in which some late celebrated anatomists have said they found a sort of juice before copulation; which, however, experience does not admit, since there is no corpus luteum before that event. Nor is the vesicle, which is the human ovum, contained in a vessel like a cup.

The tube compressing the ovarium in prolific coition, is said to press out and absorb a mature ovum, from a fissure in the outer membrane, from whence it is continued down, by the peristaltic motion of the tube, to the uterus itself; which peristaltic motion begins from the place where the first contact was made, and urges the ovum downward successively to the opening in the fundus uteri; from which time conception may be said to have taken place. All this is performed, not without extreme pleasure

ture to the future mother, nor without a peculiar sort of grateful sensation of the internal parts, which become thereby highly irritated or convulsed, in a degree threatening to induce a swoon. From this moment *conception* may be said to take place, and the outlines of a new animal begin to be evolved by the gravid uterus.

Dr. Hunter having made an elegant Dissection of the Pelvis, and Female Parts, we have annexed a faithful representation of the same, in Plate I. of the GRAVID UTERUS, of which the following is an explanation:—A, The mons veneris. BB, The section of the skin and adipose substance, which was thrown open to shew the pelvis. C, The cartilaginous surface of the sacrum, by which it was joined to the os ilium. DD, The os pubis, cut thro' near the symphysis. E, The external muscles, on the back-part of the pelvis, cut through. F, The muscles which lie on the outside of the os pubis, cut through. G, The crus clitoridis, where it was fixed to the ischium, which is removed. H, The sphincter vaginae. I, The transverse muscle of the perinaeum. K, The sphincter ani. L, The bladder, almost empty, compressed between the anterior part of the womb and the upper side of the vagina. M, The levator ani and coccygeus muscles, by dissection turned down from the contents of the pelvis over the cut surface. N, The whole substance of the vagina, cut from the neck of the womb and bladder, and turned down over the rectum, to shew the orifice of the womb. O, The anterior lip of the orifice. P, The posterior lip of the same. When the vagina was thus opened, the lateral support being removed, the os uteri pushed out exactly as represented in the plate.

What we have hitherto advanced, coming under the testimony of our senses, may be either confirmed or corrected. What follows is rather conjectural; and its development is the more difficult, as we have few experiments to determine the facts, and even those experiments we have are discrepant with one another. At the first outset a difficult question immediately presents itself. Whence proceed the first stamina of the animal? Are they from each parent, and is the new animal formed by a junction of the seeds? The similarity of the offspring to both parents seems to confirm the opinion. If analogical reasoning might be permitted, we might adduce numerous examples from the vegetable kingdom which clearly shew that the offspring is a compound of each parent. The opinion is still farther confirmed by morbid and vicious habits being conveyed from both parents to their children. On the other hand, we have no certain proof that seed exists in the female; and again, animals may be propagated without any mixture of seeds. Lastly, the resemblance of the young animal to its father seems only to shew, that in the male seed there is some power, which alone can form the soft matter of the little embryo; in like manner this same power, in peculiar animals, lengthens the pelvis, dilates the thorax, expands the horns, &c.

Some anatomists have attributed every thing to the father, especially after the noted animalcula system came under the microscope, whose figure perfectly agreed with that of the embryo in all animals. But then there is wanting a proportion between these animals and the number of foetuses produced. Another objection to this doctrine is, that in most of the animal tribes animalcula are not to be found. And lastly, there is too great a similarity between these animalcula and those commonly found in other fluids, which always preserve their own peculiar shape, and are never observed to be changed by growth from a simple worm into a handsome articulated animal, wholly dissimilar from themselves. Other anatomists, not less celebrated or less worthy of credit, have taught that the foetus existed in the mother and maternal ovary; which the male semen might enliven and variously modify, so that, at length, it might be brought into the world a perfect animal. Certainly the male must give some addition to that sex which produces the foetus from its own body; which addition is necessary in some tribes of ani-

mals, but in others, even the most fruitful, may be wanting. This, however, concerns only the materials: but we are as much at a loss concerning the formation; namely, by what means the rude and shapeless mass of the first embryo is fashioned into the beautiful shape of the human body. We readily reject such causes as a fortuitous concurrence of atoms, the blind attractions between the particles of the nutritious juices, and the strength of ferments, not knowing the reasons how they operate; the soul is certainly an architect unequal to the task of producing such a beautiful fabric; and, as we can never form any adequate ideas of the internal models, we shall refer them to those hypotheses, which the desire of explaining what we ardently wish to know has produced. Experience indeed seems to agree with the following deductions which reasoning affords, namely, that this most beautiful frame of animals is so various, and so exquisitely fitted for its proper and distinct functions of every kind, and the offices and manner of life for which the animal is designed; that it must be calculated according to laws more perfect than any human geometry; that the ends have been foreseen in the eye, in the ear, and the hand; so that to these ends every thing is most evidently accommodated: it appears, therefore, certain, that no cause can be assigned for it below the infinite wisdom of the Creator himself. Again, the more frequently, or the more minutely, we observe the long series of increase through which the shapeless embryo is brought to the perfection necessary for animal life, so much the more certainly does it appear, that those parts which are observed in the more perfect foetus, have been present in the tender embryo, although their situation, figure, and composition, seem at first to have been exceedingly different from what they are at last; for an unwearied and laborious patience has discovered the intermediate degrees by which the situation, figure, and symmetry, are insensibly formed. Even the transparency of the primary foetus alone conceals many things which the colour afterwards added does not generate, but only renders conspicuous to the eye. And it sufficiently appears that those parts which eminent anatomists have supposed to be afterwards generated, and to be added to the primeval ones, have been all contemporary with the primeval parts, but only small, soft, and colourless. It is highly probable, that for a long time the latent embryo neither increases, nor is agitated, except by a very gentle motion of the humours, which we may suppose to librate from the heart into the neighbouring arteries, and from these into the heart of the foetus. But we may also suppose, that the stimulus of the male semen excites the heart of the foetus to greater contractions, so that it insensibly evolves the complicated vessels of the rest of the body by the impulse of the humours, and propagates the vital motion through all the canals of the little body of the animal, quicker in some parts, and slower in others; and that thence some parts seem to be produced very early, others to supervene afterwards; and lastly, some do not appear until a long time after birth, as the vesicles of the ovaries, the vessels of the male testicles, the teeth, hairs of the beard, and horns of brute animals. In all animals, heat assists this evolution; in the more simple ones, whose vessels are few, and less complicated in their various organs, heat is the sole instrument of bringing it to perfection.

After the human ovum is brought down into the uterus, we become sensible of its change of shape in a few days. The ovum itself sends out every where soft branchy flocculi from the superficies of its membrane hitherto smooth, which adhere to, and inoculate with, the exhaling and resorbing flocculi of the uterus. This adhesion happens every where in the uterus; but chiefly in that thick part which is interposed between the tubes, and is called the *fundus uteri*. Thus the thin serous humour of the uterus, proceeding from its arterial villi, is received into the slender venous vessels of the ovum, and nourishes it together with the foetus. Before this adhesion, if at any time it does not adhere, it is nourished either by its own or by absorbed

absorbed juices. At this time, the ovum abounds with a great proportion of a limpid watery liquor, which, like the white of an egg, hardens by heat, or by mixture with alcohol. The foetus remains long invisible, being never seen before the seventeenth day, when it is an unformed mass of mere mucus in a cylindrical shape. When some distinction of parts is visible, it has a very great head, a small slender body, no limbs, and is fixed by a broad flat navel to the obtuse end of the ovum. Henceforward the foetus continually increases as well as the ovum, but in an unequal proportion: for while the arterial serum is conveyed by more open passages into the vessels of the ovum, the foetus, which seems to receive, by its very capacious umbilical vein, the greatest part of the nourishment, increases very fast. The ovum also increases, but in a less degree; and the proportion both of it and its water to the foetus continually diminishes. The fleshy productions of the ovum lessen, they do not cover so much of its surface, and are gradually covered with a continued membrane. Those, however, which sprout from the obtuse end of the ovum increase, and are by degrees formed into the *placenta*.

Such is the general appearance of the ovum in the second month; from which time it changes only by increasing in bulk. That part of the ovum fixed to the uterus makes about a third of its whole surface, and is in the form of a flat round dish or plate; succulent, fibrous, full of protuberances, but throughout perfectly vascular; these tubercles change into others of the same kind; it is for the most part accurately, and often inseparably, connected with the uppermost part of the uterus. This substance, called the *placenta*, is remarkable for its large vessels, is of a thin cellular texture, and collects the vessels every where, but chiefly in the circumference of its greatest circle; the exhaling arteries of the uterus corresponding with the veins of the placenta, and the arteries of the placenta with the veins of the uterus. In the common surface of the uterus and placenta, a communication is made, by which the uterus sends to the foetus, first that white serous liquor not unlike milk, and lastly, as it seems, red blood itself. This communication of the humours seems to be demonstrated by the suppression of the menses in women with child, whose blood must be turned into another channel; by the loss of blood which follows a separation of the placenta in a miscarriage; and by the blood of the foetus being exhausted from an hæmorrhage in the mother; by hæmorrhages that ensue from the navel-string, so as to kill the mother when the placenta has been left adhering to the uterus; and, lastly, by the passage of water, quicksilver, tallow, or wax, injected from the uterine arteries of the mother into the vessels of the placenta, as is confirmed by the most faithful observations of eminent anatomists. That blood is sent into the foetus is evinced by the magnitude of the sinuses of the uterus and placenta; the diameter of the serpentine arteries of the uterus; the hæmorrhage that follows, even when the placenta is very slightly hurt; but especially by the motion of the blood, which, in a foetus destitute of a heart, could only be given to the humours of the foetus by the blood of the mother.

The nourishment of the foetus, from the beginning to the end of its full time, is without doubt conveyed to it through the *umbilical vein*. This vein, arising from the exhaling vessels of the uterus, and from the umbilical artery with which it is continuous, makes the venous sinuses under the surface of the placenta; when all its branches are collected, it forms a large trunk that is twisted, though not so much as its concomitant arteries, into circular folds; it is sufficiently long to allow a free motion: after being surrounded with cellular mucus including also other vessels, and the whole being covered with a continuation of the amnios, it is known by the name of the *umbilical cord*. The umbilical vein, after forming some protuberances, enters through the navel, in an arch made by a parting of the skin and abdominal muscles, and goes to the proper sinus of the liver, into which the smaller portion of the blood that it conveys is poured through the

slender ductus venosus into the vena cava seated in the posterior fossa of the liver; but the greater part of its blood goes through the large hepatic branches, which constantly arise from its sulcus, and remain even in the adult; and the blood goes thence to the heart by the continuous branches of the vena cava. The sinus, or left branch of the vena portarum itself, is a part of the umbilical vein, and its branches bring the blood from the placenta to the cava, while the right branch alone carries the mesenteric and splenic blood through the liver.

But this is not all the use of the placenta; for the foetus sends great part of its blood to the placenta by two large *umbilical arteries*, which are continued in the direction of the aorta; and, after giving some slender twigs to the femorals, with still smaller arteries to the pelvis, they ascend reflected in the direction of the bladder, surrounded with the cellular plate of the peritonæum, and with some fibres spreading to them from the bladder and urachus; they then proceed on the outside of the peritonæum into the cord at the navel, in which, passing alternately in a strait and contorted course, they form various twistings and windings, somewhat sharper than those of the vein which they play round; and at last they arrive at the placenta, whose substance is entirely made up of their branches, in conjunction with those of their corresponding veins, and a slippery cellular substance following both vessels; so that the kernels themselves, that are conspicuous in the placenta, are convolutions of those vessels. By these branches the blood seems to pass through the minuter arteries of the placenta into the veins of the maternal uterus, that after undergoing the action of the lungs by the mother's respiration, it may return again in an improved state to the foetus. What other reason can be assigned for such large arteries, which carry off above a third part of the blood of the foetus?

But it will perhaps be asked, Whether the foetus is nourished by the mouth likewise? Whether it drinks the lymphatic liquor contained in the cavity of the amnios, which is coagulable unless putresced, and in the middle of which the foetus swims, and whose origin is not sufficiently known? Whether this opinion is not in some measure confirmed by the open mouth of the foetus, and the analogy of chickens, which are under a necessity of being nourished from the contents of the egg only? to which add the absence of a navel-string in some foetuses; the quantity of meconium filling the large and part of the small intestines; the similitude of the liquor found in the cavity of the stomach to that which fills the amnios; the proportionable decrease of the liquor amnii, as the foetus enlarges; the glutinous threads which are found continued from the amnios through the mouth and gula, into the stomach of the foetus; the true feces found in the stomach of the foetus of quadrupeds; the open mouth of the foetus, which we have accurately observed; the gaping of a chicken swimming in this liquor, and its attempts as it were to drink it up? Again, What are the fountains or springs from whence this lymph of the amnios flows? whether it transudes through the invisible vessels of the amnios, or through certain pores from the succulent chorion, which is itself supplied from the uterus? It must be confessed, that these inquiries labour under obscurities on all sides; notwithstanding which, says Haller, there seems more probability for them than otherwise, since the liquor is of a nutritious kind, at least in the first beginnings of the foetus, and is derived from the uterus.

The foetus continues to advance in growth; the limbs gradually sprout from the trunk, under the form of tubercles; and the other outworks of the human fabric are by degrees beautifully finished, and added to the rest. The manner in which all this is performed anatomists have not hitherto sufficiently described. We shall not therefore enter fully on the subject; yet it seems necessary to submit the following compendium to the reader's consideration.

The embryo which we first observed in the uterus of the mother was a gelatinous matter, having scarcely any properly-

perly-defined shape, and of which one part could not be distinguished from another. There was, however, in that gluten a heart, which was the cause of life and motion; there were vessels which generated the humour of the amnios; there were therefore vessels of the umbilicus, the little trunks of which, being received from the fœtus, are at that time very large. There was a head and spinal column, bearing a larger proportion to the other parts of the body than they do afterwards. There were likewise, without doubt, all the rest of the viscera, but, being pellucid and of a mucous nature, they were not so apparent as they would have been had they been more opaque and solid. But in the whole fœtus, an immense quantity of water is mixed together with a very little earth, as the cellular texture surrounds it in a state between fluid and solid, having large drops of water interposed between the particles of the solid parts. To this vivifying gluten, or white of the egg, which is of the nature of lymph, there is added in birds a yolk, which is of an oily nature: in man something of a milky nature, not altogether unlike the yolk of an egg, is added to the coagulable lymph. That the blood is perfected from the fat by the proper powers of the fœtus, we are persuaded from the example of birds. From it are insensibly prepared all the other humours; but all of them at first mild, glutinous, void of taste, colour, and smell. It is long before they acquire their peculiar nature and properties, and some of them are not produced till many years after birth, for instance the semen.

The vessels are the earliest or oldest parts of the body, and are prepared in the original delineation of the embryo. What first appears in an egg during the time of incubation, having any distinct form, are venous circles: and these veins produce the arteries, by which they both receive their juice, and the motion of that juice. They are not generated mechanically from an obstacle against which the arterial blood strikes. At first the trunks of the veins are conspicuous, afterwards the branches which convey the humours to the trunks. If they were produced from the arteries reflected, the branches would first be seen, and the trunks would be formed last. Neither could the arterial blood, driven back by an obstacle, form those most beautiful circles, and bring back the vessels into the heart. It would rather flow irregularly through the cellular texture. And the primeval heart would soon lose its life, unless as much of the humours returned to the heart as was sufficient to keep up its pulsations.

There are, therefore, in the primeval fœtus, such as we first observe it, some parts more perfect and conspicuous; and others involved, invisible, and very small. The heart is the most perfect; it is the only moveable and irritable part; although it is in many respects different from what it is in an adult person. The brain is large and fluid; the vessels first appear formed near the heart, and are visible in the back. The viscera, muscles, nerves, and limbs, are not yet to be seen; nor the bones, whose first appearance is a mucus, nor the vessels of the rest of the body. The other visible portion of the fœtus is the abdomen, of which the umbilical capsule is an immense hernia.

To this embryo is superadded motion, in man almost of the heart alone; as also in birds, whose formation does not take place without heat rather greater than that of the human body: yet, without the heart, heat destroys, instead of forming, the fœtus. In the beginning the proportion of the heart to the rest of the body is the greatest; and is ever after continually growing less. Its pulsations are also at this time the most frequent, and are very powerful for impelling the humours, and distending and producing the vessels of the soft and tender fœtus. The viscosity of the vital humours which collect the earthy elements is opposed to the force of the heart, and by that means the formation of the fœtus is assisted. For there is in the embryo both an impelling force, which extends the parts longitudinally; and a resisting force, which mo-

derates the increase, and regulates the lateral pressure, and thus the distention. By the force of the heart, the artery, with all its surrounding cellular texture, is lengthened; its folds are stretched, and the artery itself is dilated. The blood by its lateral pressure makes an effort against the almost-blind branches of the arteries, fills and evolves them, and sets them off at more obtuse angles: thus are produced spaces which make very little resistance, in which the gluten is deposited. In the very substance of the artery itself, while it is every where dilated, between its inconceivably small solid threads, are prepared little reticulated spaces like a stretched-out net, which are equally fit for receiving humours. The largest of these are framed round the heart and in the head, whither the impulse of the heart drives the humours in a straight direction; and in the placenta: the smaller ones are in the inferior parts of the body, whence the umbilical arteries subtract the greatest part of the blood.

The fœtus increases very quickly, as is most evident in the example of a chicken, whose length the twenty-second day is to its length the first day at least as 1,000,000 is to 1; and the whole increase of bulk in the bird during the remainder of its life does not exceed the fifth part of the increase of the egg the first day. For the fœtus has a larger and more irritable heart, vessels larger in proportion, and likewise more numerous and relaxed, and the solid parts are mucous and distensible. The breast is later of coming to perfection, being surrounded with membranes so fine that they cannot be seen. The embryo not only increases in bulk, but is so remarkably altered in shape, as to be brought forth totally unlike the appearance it had at first. It is probable, that the limbs are produced from the elongated arteries; that they are laterally knit together by a certain gluten; that they are separately evolved; that at first they sprout out very short, but afterwards increase by insensible degrees, and appear divided into distinct articulations; as the wings of a butterfly are formed from vascular net-work. Thus likewise the right ventricle of the heart is expanded by the blood coming to it in greater quantity; and, being increased by degrees, equals the left.

On the other hand, the cellular texture, from its glutinous aqueous nature, by earthy particles being continually brought to it, becoming insensibly harder, by a gentle attraction contracts its parts, which were before straight, into various flexures; and ties the auricles to the heart, from which they were as yet at a distance. So the muscles draw out processes from the bones by their continual pulling, and open small cavities into large cells: the same likewise incurvate the bones, and give them different shapes. Pressure also can do a great deal; to it we must attribute the descent of the testicles into the scrotum, after the irritable force of the abdominal muscles has taken place; to this also we must ascribe the repulsion of the heart into the breast, when the integuments of the breast are larger; to it we are to ascribe the length of the breast and the shortness of the abdomen, and the smaller size of the viscera of the latter; because the air received into the lungs dilates the cavity of the thorax. But even the bones are variously hollowed out by the pressure of the muscles, blood-vessels, and even of the very soft brain itself; and by the same means flesh is changed into a tendinous substance.

The power of derivation brings the blood into the pelvis and lower extremities from the closed umbilical arteries: this same power, when the foramen ovale is contracted by the auricles being drawn towards the heart, evolves the right ventricle of the heart. So when the vessels of the yolk have taken up the whole length of the egg, and can receive no farther elongation, it dilates the umbilical arteries of the chick, and produces a new membrane with incredible celerity. On the other hand, but still by the same power, after the blood has got an easy passage through some vessels of any part, the other parts which do not afford a like easy passage increase the less.

Thus the head grows less after the lower limbs have begun to increase in bulk.

Yet the head of the fœtus is large, every where membranaceous, in a few places cartilaginous on the earlier days of gestation, with a mouth deeply cut, and with very long jaws. In the fœtus come to maturity, there are also rudiments of the teeth, which have a great deal of membrane as an appendage; the brain, at first fluid, and always soft, is itself very large, with large nerves; the eyes are big, and the pupil shut by a membrane; the breast is very short, but capable of extension, on account of a great quantity of cartilage; the abdomen is large, surrounded with membranes, and contains a very large liver; the bile is insipid and mucous; the intestines are irritable, and full of soft green excrement. When the fœtus has at last arrived at its state of maturity, the kidneys are divided into lobes, are large, and have very big capsules; the pelvis is very small, so that the bladder, ovaries, and tubes, project from it; the genital system is dense, not yet evolved, nor preparing its juices; all the glands are large, particularly the conglobate ones, and full of a ferrous juice; the skin is at first pellucid, then gelatinous, and at last covered with a soft cuticle and sebaceous ointment; the fat is first gelatinous, and then grumous; the tendons soft, succulent, and not yet shining.

Those who have asserted that the fœtus respire in the uterus have made very few experiments: they have not even attended to the fact, that the fœtus in utero swims in a body of water; and that the lungs of a fœtus immersed in water always sink: nor have they given due consideration to the evident shortness of the breast, and the smallness of the lungs. Whether it can take in air through the vagina of the mother is very difficult to be determined; but we suspect it to be possible in a certain situation, that a well-grown fœtus, which is not too much compressed, may sometimes draw in air, while it is in the birth.

As the fœtus grows larger, so the uterus increases proportionally. The general figure of the uterus is oviform; the fundus answering to the largest extremity of the egg, and the cervix and os uteri to the small end: but the fundus is larger and more flat, or less pointed, in proportion to the lower extremity of the uterus, than one end of an egg is to the other; and the whole uterus seems more or less compressed, so as to be broader from right to left, than it is from the fore-part backwards. Besides these more constant deviations, the figure of the uterus differs from the regular oviform, from a variety of accidental causes, as it adapts itself to the neighbouring parts, to the attitude of the body, and to the position of the contained child. In order to conceive these varieties more easily, we must remember that in most cases the uterus is not so completely filled as to be upon the full stretch. Were it out of the body, and filled artificially, it would easily contain more than it actually does. Thus the uterus, like a bladder of water not quite full, is plastic, and moulds itself into various shapes from accidental circumstances.

As the surrounding parts resist the pressure or weight of the uterus unequally, according to their different natures, the uterus swells out in some places, while in others it is pressed inwards. Thence it is, that the brim of the bony pelvis has commonly the effect of a belt girding that part of the uterus, and the projections of the spine, and of the psoæ and iliac vessels, mould the outside of the uterus into corresponding cavities. That the different attitudes of the mother's body should produce alterations in the figure of the uterus, needs not a particular explanation or proof. The weight of the uterus itself, and of the adjacent viscera, being differently directed, must produce some change in its form corresponding to every change of posture, especially as the parts against which the uterus will rest its weight, in the different postures of the body, are of such different natures.

The same plastic state of the uterus makes it adapt its

figure to the circumstances of the child within, and vary as those change. We not only in dead bodies see the parts of the child making a variety of different projections on the outside of the uterus; but, in the living body, all the same variety is frequently manifest to the touch, in examining the outside of the abdomen. The round projecting ball made by the child's head or buttocks is commonly very perceptible, and in many instances smaller projecting parts are so distinctly felt through the containing parts of the abdomen, as to leave no room to doubt of their being knees or elbows.

To illustrate this fact, and to display the situation and connection of the womb, under the above-mentioned circumstances, Dr. Hunter has given a Front View of the Pregnant Uterus at its full time, with the containing parts turned back, so as to shew the external coat and vessels of the womb, and parts contiguous. These are represented in Plate II. of the GRAVID UTERUS, of which the following is an explanation:—AA, The fore-part of the chest, just below the breasts, where the trunk was cut through. BB, The two upper angles of the integuments, muscles, and peritonæum, turned back over the cartilaginous margin of the chest. CC, The two inferior angles, turned down over the groin, thigh, and anterior spine of the os ilium, on each side. D, The upper end of the longitudinal incision, at the pit of the stomach. E, The lower end of the same incision carried down to the symphysis of the ossa pubis. F, The umbilical or falciform ligament of the liver, which runs upwards on the inside of the abdominal muscles. GG, The epigastric artery and vein, projecting through the peritonæum. H, The small lobe of the liver, situated in the highest part of the epigastric region. I, The omentum, spread over the small intestines in the epigastric region. K, The lower and middle part of the omentum, which had been pushed up by the womb, and lay in numerous small folds pressed together. L, The omentum in the right side. M, The omentum in the left side, which came down before the Fallopian tube, &c. NN, Two turns of the small intestines. O, The womb, possessing all the umbilical and hypogastric regions: its surface is interspersed with a number of small vessels, the greatest part of which are veins; they were filled with blood only, and therefore gradually disappeared after the subject had been preserved some time: its situation is a little oblique, and towards the right side: the navel was a little higher than the part upon which the letter O is placed. The form of the womb is a little irregular, at some places projecting more than at others; this seemed partly owing to its being moulded upon the neighbouring bowels, particularly at its fundus, and partly to its contents; whence P, A swelling towards the left side of the womb, where the middle of the placenta adhered; and Q, A swelling on the right side, where the buttocks of the child lay, and where the child could be distinctly felt through its substance. RR, The round ligaments: the left is longer than the right, because of the oblique situation of the womb. SS, The Fallopian tubes: in the right side, little more than the beginning of the tube is seen, the rest running down behind the womb.

The small or lower end of the uterus is placed in the cavity of the pelvis. This generally contains the greater part of the child's head, and fills up the cavity of the pelvis so completely, as to press the vesica urinaria against the symphysis pubis, and the rectum against the hollow of the sacrum. The os uteri is directed against the coccyx, or the lower part of the sacrum. The body and fundus of the uterus, which for the most part contains all the rest of the child and the placenta, is so placed in the anterior part of the abdomen, from the brim of the pelvis upwards to the epigastric region, as to be under and before all the other bowels in immediate contact with the parietes abdominis, occupying the whole space from one hip-bone to the other, and a proportionable space from these bones upwards as far as the epigastric region. When the uterus rises up from the cavity of the pelvis into the hypogastric

hypogastric and umbilical regions of the abdomen by its increasing bulk, it is no wonder that it should instantly mount up before the small intestines. Their attachment to the loins by the mesentery, would seem to render this necessary; but there is another cause which co-operates towards this effect, and which almost as certainly prevents the epiploon from falling down before the uterus, though that membrane is naturally so loose, that we might conceive it to be spread out indifferently either before or behind the body of the uterus. Yet in fact this fatty membrane is commonly found pushed up by the uterus, and crowded all round the fundus uteri, with the small intestines in the epigastric and adjacent parts of the hypochondriac regions. The cause of all this would appear to be the specific lightness of those parts in comparison of that of the uterus. The intestines contain some air, and the epiploon a good deal of oil, which gives them lightness, and buoys them up above the uterus.

Whoever has any tolerable notion of the shape of the abdomen, and situation of the cavity of the pelvis, must understand that the axis of the uterus is very far from the perpendicular line, its lower end being turned backwards, and its upper end in proportion turned forwards. This obliquity changes with the attitude of body, and from many other causes. When erect, the weight of the uterus presses the fore-part of the abdomen into a greater roundness, and then the axis of the uterus approaches nearest to the transverse or horizontal line; and, in a recumbent posture, the contrary happens from a similar cause. In the case of a first pregnancy, the uterus stretches itself higher up in the epigastric region, and its axis comes nearer to the longitudinal or vertical direction, because the parietes of the abdomen do not easily give way, and do not swell forwards in any great degree; but in a woman who has had many children there is a more loose and pendulous abdomen, and thence the uterus does not shoot upwards, but rather forwards, and takes more of the transverse situation. This oblique direction of the uterus, approaching to the transverse, is more remarkable in very short women; because in them the chest is so near the pelvis that the uterus is stopped in its ascent, and forced to shoot forwards. The same thing happens, and for a like reason, when the pelvis is very narrow. For in this case the uterus must be higher, as no part of it can be lodged in the cavity of the pelvis. In a very short and crooked woman, with a very narrow pelvis, upon whom Dr. Hunter saw the Cæsarian section performed, the fundus uteri was turned not only forwards, but even a little downwards. As she lay upon the table, the navel and hypogastrium could not be seen; the navel being situated on what might have been called the posterior and inferior part of the abdominal tumour. And to expose that part of the abdomen to the surgeon, it was necessary with two assisting hands to lift up the fundus uteri, or the most prominent part of the abdomen; without which the hypogastric region would have been inaccessible. Indeed, it was an appearance which, without having seen, it was almost impossible to have conceived.

The obliquity of the uterus towards the right or left side is not commonly, indeed cannot be, very considerable. A small degree of lateral obliquity is very common; and it is natural to suppose that in a reclined posture, the middle projection of the lumbar vertebræ will throw a little more than one half of the uterus into the lateral cavity between the spine and one hip-bone. In fact, we know that in all the last months of the utero-gestation the abdomen is often more full on one side than on the other. Women say in such a case, that the child lies one side; and they judge rightly. Where the child lies, the bulk must both be more considerable and more permanent; but where there is only uterus, placenta, and water, the swelling will be softer, and project less. When the child lies more in one side than in the other, the limb of that side is weaker, more benumbed, and more liable to cramps and ædematous swellings. That an awkward position of the

child will occasion spasms in the limb, experience testifies with the clearest evidence. Many women feel that the one depends upon the other; and, from particular motions of the child, can certainly prognosticate ease or pain till it shall alter its situation again.

It is a common observation, that the ligaments and tubes of the pregnant uterus are attached lower upon the side of the uterus than they were before pregnancy. If the reason of this has not been so generally known, it is nevertheless evident. The peritoneal coat of the uterus makes the broad ligament on each side, much in the same manner as the analogous membrane of the intestinal tube makes the mesentery. When a woman is not pregnant, this ligament is of considerable breadth, the spermatic vessels pass between its two laminae, the round ligament runs downwards, and outwards, on its anterior surface, and the tube runs in loose serpentine turns upon its upper edge. But, in proportion as the circumference of the uterus grows larger, the broad ligaments grow narrower, their posterior lamella covering the posterior surface, and their anterior lamella covering the anterior surface of the uterus itself. As a proof of what has been said, we observe that the round ligaments do not now run down on the fore-part of the broad ligaments, but upon the fore-part of the body of the uterus itself; a proof that the peritonæum, which covers the uterus at this part, is the very membrane which before pregnancy made the anterior lamella of the broad ligament. Farther, in proportion as the fundus uteri rises upwards, and increases in size, the upper part of the broad ligament is so stretched, that it clings close to the side of the uterus, so that in reality the broad ligament disappears, no more of it remaining than its very root; viz. its upper and outer corner, where the group of spermatic vessels pass over the iliacs immediately to the side of the uterus. In this state, though the small end of the tube opens into the same part of the uterus as before impregnation, yet the tube has a very different direction; instead of running outwards in the horizontal direction, it runs downwards, clinging to the side of the uterus. And behind the fimbriae lies the ovarium, for the same reason, clinging close to the side of the uterus. The fimbriae and ovarium are commonly placed upon the iliac vessels, or fleshy brim of the pelvis, behind the group of spermatic vessels.

The round ligaments run almost perpendicularly downwards from the fundus uteri to their passage through the muscles; they are considerably enlarged in thickness, and are so vascular, that when injected, they seem to be little more than a bundle of arteries and veins. Their arteries are all convoluted. Both their arteries and veins are branches principally of the spermatics, and both evidently anastomose with their respective external vessels in the groin, or upper part of the labia. Even in this enlarged state of the round ligaments, it is very difficult to say how they terminate in the groin; they appear to be insensibly lost.

The ovaria seem to have undergone no remarkable change, except that one which contains the corpus luteum; which for the most part can be distinguished by a rounded fullness, and frequently a considerable prominence, sensible both to the sight and touch, upon the middle of which there is a small pointed cavity or indentation like a cicatrix. Upon slitting the ovarium at this part, the corpus luteum appears a round body, of a very distinct nature from the rest of the ovarium. Sometimes it is oblong or oval, but more generally round. Its centre is white, with some degree of transparency; the rest of its substance has a yellowish cast, is very vascular, tender, and friable, like glandular flesh. Its larger vessels cling round its circumference, and thence send their smaller branches inwards through their substance. A few of these larger vessels are situated at the cicatrix or indentation on the outer surface of the ovarium; and are there so little covered, as to give that part the appearance of being bloody when seen at a little distance. When there is only one child, there is only one corpus luteum; and two in case

of twins. Dr. Hunter, who had frequent opportunities of examining the ovaria with care in several cases of twins, always found two corpora lutea. In some of these cases there were two distinct corpora lutea in one ovarium; in others, there was a distinct corpus luteum in each ovarium. In a variety of different cases, it has been found that the sex of the foetus has no relation to the corpus luteum being in the right or left ovarium.

Those who say that the uterus grows thicker in the same proportion that its bulk is increased, have probably been deceived by examining the uterus of a woman who died some hours or days after delivery. In that contracted state the uterus is often found even two inches thick; but in all those Dr. Hunter examined, in the natural distended state, though there was some difference, the thickness of the uterus was but a little more considerable than before impregnation. When not injected, its more common thickness is from one to two thirds of an inch; when its vessels, and particularly its veins, are pretty well filled with wax, its thickness is thereby considerably increased, more especially where the placenta is fixed, on account of the number and size of the vessels at that part. For this reason only, perhaps, the uterus is thickest at that part, and for this reason too it is commonly thicker towards the fundus than the cervix. In respect of thickness, a good deal of variety has been observed, and such inequalities in the same uterus, that, even where the placenta did not adhere, the uterus has been almost twice as thick at one part as at another. We have always observed in opening the uterus, that its thickness is more considerable than one could have imagined it to be by feeling it externally, where there is a fluctuation of the water. Its substance is so soft, that the fluctuation then felt is like that of water in a thin bladder.

To shew the elevated position of the womb in advanced pregnancy, and its situation with respect to the ligaments, tubes, intestines, and whole mass of the abdominal viscera, Dr. Hunter has furnished an elegant Dissection of the Parts, which we have given in Plate III. of the GRAVID UTERUS, and of which the following is an explanation. AA, The thighs cut through. B, The back bone cut through above the diaphragm. C, Part of the eighth rib. DD, The integuments and muscles at the back-part of the chest. E, The inferior flap of the abdominal muscles, &c. F, Part of the mons veneris, turned aside with the abdominal muscles. G, The respective part of the left side. H, The margin of the chest covered by the peritoneum and muscles, which are turned over it. I, The ensiform cartilage. KK, The lower ribs and other containing parts, cut down longitudinally. L, The posterior and lower part of the right cavity of the chest. M, The trunk of the descending aorta. N, The œsophagus. O, The upper convex surface of the diaphragm. P, That part of the centrum tendinosum of the diaphragm which is in the right side. Q, The trunk of the lower cava tied, close to the upper surface of the diaphragm. RR, The cut edge of the pleura. SS, The cut edge of the peritoneum. T, The inside of the transversus muscle covered with the peritoneum. U, The great or right lobe of the liver. V, The small lobe of the liver. W, The falciform ligament, or remains of the umbilical vein, cut off as it enters the fissure of the liver. X, The colon passing up from the caecum to the liver. YY, The colon with its appendiculae adiposæ running towards the left side. ZZ, The beginning or root of the omentum. aaaa, The small intestines brought to view by cutting off the omentum a little below the edge of the liver. b, The womb; upon its surface we can trace, though obscurely, its veins. c, The round ligament running down to its passage into the groin. d, The Fallopian tube running backwards on the inside of the os ilium. e, The fimbriated end of the tube, lying behind the side of the womb. f, The prominent corner of the womb, where the buttocks or loins of the child were distinctly felt before the part was opened.

Of the VESSELS of the GRAVID UTERUS.

There is no circumstance in which the gravid uterus differs more from the unimpregnated state, than in the size and termination of its vessels. The arteries, both spermatic and hypogastric, are very much enlarged. The hypogastric is commonly considerably larger than the spermatic, and we very often find them of unequal sizes in the different sides. They form a large trunk of communication all along the side of the uterus; and from this the branches are sent across the body of the uterus, both before and behind. The cervix uteri has branches only from the hypogastrics, and the fundus only from the spermatics; or, in other words, the hypogastric artery gives a number of branches to the cervix, besides sending up the great anastomosing branch, and the spermatic artery supplies the tube and fundus uteri before it gives down the anastomosing branch on the lateral parts of the uterus. All through the substance of the uterus there are infinite numbers of anastomosing arteries, large and small, so that the whole arterial system makes a general net-work, and the arteries are convoluted, or serpentine, in their course. Hardly any of the larger arteries are seen for any length of way upon the outside of the uterus. As they branch from the sides, where they first approach the uterus, they disappear by plunging deeper and deeper into its substance.

The veins of the uterus would appear to be still more enlarged in proportion than the arteries. The spermatic and hypogastric veins in general follow the course of the arteries, and like them, anastomose on the side of the uterus. From thence they ramify through the substance of the uterus, running deeper and deeper as they go on, and without following precisely the course of the arterial branches. They form a plexus of the largest and most frequent communications which we know of among the vessels of the human body. And this they have in common with the arteries that their larger branches go to, or rather come from, that part of the uterus to which the placenta adheres; so that when the venous system of the uterus is well injected, it is evident that that part is the chief source of the returning blood. Here too, both the large and small veins are continued from the placenta to the uterus, and are always necessarily broken upon the separation of these two parts. The veins are without valves, and are therefore easily injected. In injecting them, we observe that at first they become turgid, and project on the outer surface of the uterus; but in proportion as we throw a greater quantity of wax into these vessels, they grow more flat and obscure; because the uterus itself becomes more filled and tense, which has the effect of compressing the veins that run in its substance.

Mr. Cruikshank is the first, in this school of anatomy, who observed the lymphatics in the gravid uterus; he also injected them with mercury, and traced them with great success in several subjects. They are more numerous, and many of them larger, than could have been imagined; from which it is manifest, that a copious absorption is carried on in the uterus towards the mother. The lymphatics pervade its substance universally; its peritoneal coat appears, like that of a calf's spleen, to be interwoven with a crowded plexus of these vessels; and where they get to the sides of the uterus, when filled with mercury, some of them are even larger than a goose-quill. Some are remarkably varicose, or enlarged at particular places. They pass from the sides of the uterus, many with the spermatic vessels, but the greater number and the larger with the hypogastrics. Of these last, some pass into the glands on the side of the vagina; others meet with no glands till they have reached the side of the pelvis, where they run into the glands of the iliac plexus, or shoot backwards into the glands of the sacral plexus; from both of which they pass into the lumbar plexus, where they are lost among the absorbents of the lower extremities, and the external parts of generation.

Besides the lymphatic vessels of the uterus, there are others belonging to the ovary and Fallopian tubes, which follow the course of the spermatic arteries and veins. They anastomose with the lymphatics of the uterus, and terminate in glands which are placed upon the sides of the lumbar vertebrae, near the origin of these blood-vessels. Here they become mixed with the lymphatics of the lumbar plexus, and enter along with them into the lower end of the thoracic duct. The spermatic lymphatics enlarge during pregnancy in the same manner as the blood-vessels; and for this reason they are then both most readily seen and injected. The reason why the blood-vessels, lymphatics, and nerves, of the ovary and Fallopian tubes, have their origin in the loins, is the same with that of the origin of similar vessels and nerves in the male. The ovary and Fallopian tubes are not placed in the cavity of the pelvis in the early foetal state, but upon the psoe muscles, some little way under the kidneys. It is natural, therefore, that their vessels and nerves should arise near the vessels and nerves of these organs.

All the uterine nerves come from the intercostals, and pass in the form of plexuses with the blood-vessels, as in the other abdominal viscera; so that there is a spermatic and hypogastric plexus of each side attending the vessels of the same name. They are principally the branches of two large cords of the intercostals, which run down before and on each side of the aorta in the abdomen, much in the same manner as the trunks of the intercostals run down upon the sides of, and behind, that artery. On the left side this large cord comes down from the semilunar ganglion, partly as a continuation of the anterior cord of the intercostal from that part where it is forming the semilunar ganglion, and partly as a plexus of nervous filaments coming down more forwards from the ganglion itself. This cord passes down before the beginning of the renal artery, all along the side of the aorta. In its way it receives branches from the intercostal, and gives off branches, so that it has the appearance of a plexus, though the principal cord can always be distinguished. It gives off the renal plexus, which is situated upon the side of the uppermost vertebra lumborum, and passes to the sinus of the kidney, behind the renal vein; but both before, and behind, and above, and below, the renal artery. Opposite to the third vertebra lumborum, the cord gives off two large branches, and some small filaments of nerves, which run down with and before the spermatic artery. This spermatic plexus may be distinctly traced, with the artery, into the ovary and adjacent parts, at the upper part of the broad ligament. Immediately below the origin of the spermatic plexus, opposite to the same third vertebra lumborum, two large branches come from the trunk of the intercostal nerve, in the common direction of these communicating branches; viz. forwards, downwards, and inwards, which join the great cord, and make it larger from this junction downwards. On the right side the cord comes from the semilunar ganglion, close to the root of the superior mesenteric plexus and artery, giving a few branches only to the renal plexus, and runs down on the right of the aorta, as the other on the left. And on the right side the renal plexus, which comes chiefly from the semilunar ganglion, as it passes towards the kidney, behind the vena cava and renal vein, sends down the spermatic plexus behind the beginning of the renal, which soon joins and passes with the spermatic vessels of this side.

The two cords, right and left, may be said to constitute a lumbar plexus all along the aorta, which makes the basis of the plexuses which accompany the branches of that artery; or they may be considered as the anterior cords of the intercostals in the abdomen. At the upper part of the fourth vertebra lumborum, the right cord gives down a considerable branch with the iliac artery, which, branching, forms a kind of sheath-like plexus upon the artery in its way to the groin. At the bifurcation of the aorta, the right and left cord unite upon the fore-part of the aorta, and make a plexus from that part directly downwards as

far as the lower part of the fifth vertebra lumborum, and then finally divide into what we may call the right and left hypogastric nerve. On the right side a large branch comes from the trunk of the intercostal, on the side of the fourth vertebra lumborum, which passing downwards, and inwards, behind the right iliac artery, joins the plexus of the two united cords before the last vertebra lumborum.

The hypogastric nerve passes round the side of the pelvis, between the peritonaeum and the hypogastric vessels, and upon the inside of the ureter. At the middle of the side of the pelvis, where the hypogastric vessels divide, the nerve splits into a double range of branches; viz. posterior and anterior. The posterior range goes to the side of the rectum, some branches passing to the back-part, and others to the fore-part, of the gut; and the first and uppermost of those branches are manifestly reflected upwards upon the gut, directing their course towards the colon. The anterior range of branches is the largest, and may be considered as the continuation of the trunk of the hypogastric nerve, in the form of a plexus. Where the hypogastric vessels are passing to the side of the uterus and vagina, this nerve, situated behind them, spreads out in branches like the portio dura of the seventh pair, or like the sticks of a fan, with many communications which are sent to the whole side of the uterus and vagina. The uppermost branches pass upwards, in the duplicature of the broad ligament, towards the fundus uteri. The branches, as they go to lower parts of the organ, pass less obliquely, then horizontally, and the lowest of all run downwards on the side of the vagina. The greatest crowd or number of these branches go to the os tincæ, and the adjacent parts of the uterus and vagina.

The substance of the uterus is rendered remarkably soft and loose in its texture by pregnancy; so that, when an incision is made into it, the wound can easily be made to open wide; or if a narrow piece of the uterus be cut quite out through and through, it is so loose and flexible, that it can be readily drawn out to at least double its natural thickness. This laxity appears to depend on two causes, viz. the great quantity of large vessels in its composition, and the loose connection between the fasciculi of its fibres. It would seem probable that utero-gestation enlarges the cellular connecting membrane, as well as the vessels of the uterus. When we speak of the muscular fibres, it is difficult to treat the subject with precision. We neither know their external appearance, nor their internal composition. They only manifest themselves to our senses, when numbers of them are collected into bundles, and make what we commonly call muscular fasciculi. In living bodies they manifest themselves by motion in the part, which we suppose is produced by a contraction or accretion of the fibres themselves; but that change in the nature of a muscular fibre, which is the cause of its contraction, is not certainly known. This contraction in some parts is voluntary, in others involuntary, and in some it is both. In some parts it is quick, and in others very slow. The motion which is actually observed in the uterus of living women, is involuntary and slow. It is commonly believed to be muscular motion, and the fibres peculiar to the substance of the uterus are believed to be muscles. In the quadruped, the cat particularly, and the rabbit, the muscular action, or the peristaltic motion of the uterus, is as evidently seen as that of the intestines, when the animal is opened immediately after death. In many parts, particularly of the internal surface of the uterus, these fibres have the same striking fasciculated appearance which we observe in common muscles; yet they are of a paler colour, and appear to be of a harder texture. When we know more of the nature of muscular fibres, we shall perhaps be able to account for this variety. Dr. Hunter took considerable pains to trace the arrangement of the uterine fasciculi; but, except upon its inner surface, he observed nothing but irregularity and confusion. On the inner surface itself he observed some variety, and always, where the placenta adheres, a good deal of irregularity.

In a woman who died seven days after delivery, he gave up the uterus entirely to this pursuit, and examined the fibres very carefully. He stretched it gradually in warm water, then inverted it, to have a full view of its inner surface. The remains of the decidua had been melted down, and passed off with the lochia, so that the fasciculated stratum of muscular fibres appeared to be bare, and to make the internal surface of the uterus. In a great number of places, but particularly where the placenta had been fixed, the fasciculi left oval spaces between them for the passage of arteries and veins, somewhat like those separations in the tendinous fibres of the abdomen and loins, where vessels pass out to the cellular membrane and integuments. The cervix uteri, where the penniform rugæ are situated, had not such regular nor so large fasciculi as the rest of the uterus. In the body of the uterus the fibres were regularly circular. The fundus was made up of two concentric circular plains of fibres, at the very centre of which was the orifice of the Fallopian tube. The better to conceive this arrangement of the internal muscular fibres, we may suppose each corner of the fundus uteri, where the tube is inserted, to be stretched or drawn out, so as to make two horns, or a bifid fundus, as in the quadruped; then, if we understand the inner fibres to be circular in every part of the uterus, we understand clearly how they will be circular in the human uterus upon its body, and likewise circular and concentric at each corner of the fundus.

When this internal stratum was removed, the fasciculated appearance and regular direction of the fibres was less and less apparent, in proportion as it was dissected outwards; which seemed in a great measure to be owing to the infinite number of the branches and communications of the large veins. The outer stratum in general was firmer and less vascular; that is, had fewer large vessels, and therefore was more dense than the middle and inner stratum. But the lateral parts of the uterus, where both the spermatic and hypogastric vessels first come to it, and anastomose upon its outside, are excepted in this general observation.

Dr. Hunter had afterwards the most favourable occasion that could be desired, for examining the fibres upon the inside of the uterus. It was the uterus of a woman who died at the end of the ninth month, without being in labour, and without having any flooding or discharge of waters. When he had examined and taken out all the contents, he attended particularly to the internal surface of the uterus. He found it every where covered with a thin stratum of the decidua, through which the muscular fibres appeared, but with some degree of obscurity.

The mouth of the uterus differs considerably in the different times of utero-gestation. For the greatest part of the nine months, that is, till the cervix uteri be fully distended, there is a projection of both the anterior and posterior lip of the os tincæ; and in some women this continues till the very time of labour. But in most women, when they are at their full time, or very near it, the os uteri is flat, and makes only a small rugous hole, often not readily discoverable by the touch on the lower or posterior part of the rounded lower edge of the uterus. The border of this orifice, and the internal surface of the uterus, for an inch or more all around, is full of little irregular cavities. These contain a tough gluten, which shoots across, and plugs up the inner part of the orifice. This gluten is commonly squeezed out from all the lacunæ, by the dilatation of the os uteri in the beginning and progress of the labour; and so, losing its hold, it falls out. In the dead body, when the part is kept some days in water, the gluten swells out more and more from all these cavities, and then separates entirely. Then the innumerable lacunæ which contained it, being empty, are very visible. And if the gluten has been thus carefully taken away, and be floated in water, its external surface is seen beautifully ornamented with all the processes which were drawn out of the innumerable lacunæ.

To illustrate the foregoing observations on the Pelvis, and Vessels of the Pregnant Womb, we have annexed Plate IV. of the GRAVID UTERUS, which represents a most elegant dissection performed by Dr. Hunter, and of which the following is a description. AA, The thighs cut through. BB, The lower angles or flaps of the abdominal muscles and peritoneum turned aside. CC, A front view of the womb, with the external covering dissected off, to shew the veins, arteries, &c. DD, The os pubis of each side cut through, above the foramen magnum ischii. EE, The small branch of the ischium which joins the os pubis cut through. F, The perineum. GG, The labia pudendi: the upper part of those, the nymphæ and the extremity of the clitoris are cut off. H, A large caruncula myrtiformis. I, The vagina: at the lower part of this passage, the deeper black part of this surface, in this figure, represents the cavity of the vagina leading backwards as well as upwards; and where this letter, I, stands, is seen the upper or anterior part of the vagina which is united to the bladder and urethra, and which is pressed downwards by the viscera that lie over it. At the upper point of this dark oval orifice, the tuberosity of the urethra is seen, with the orifice of the meatus urinarius. K, The body of the clitoris cut through; in the middle of which two small arteries are seen almost contiguous, viz. one in each corpus cavernosum. LL, The crura and erectores clitoridis. These lie more horizontally than in the natural state; the ossa pubis, &c. which suspend them, being removed; and they are stretched or lengthened, from the bones of the pelvis being drawn a little asunder that the contents might be better seen.

CONTENTS of the PREGNANT UTERUS.

The pregnant uterus may be said to contain the secundines, liquor amnii, and the foetus. The secundines make the lining of the uterus, and the immediate covering of the child; they form the chain of connection and communication between the bodies of the mother and child, and carry on that wonderful influence upon which the life and health of the child depend. There is an obvious division of them, into the navel-string, the placenta, and the membranes. A very singular peculiarity in the secundines is, that there is not any appearance of fat in them, let the mother or child be ever so adipose, at any period of utero-gestation, neither in the sound or natural, nor in the morbid, state of parts. What, upon a careless examination, appears to be fat upon the inner surface of the placenta in many cases, is an accumulation of a substance somewhat like a tough jelly, with an opaque and yellowish cast; and what often appears like slender ramifications of fat upon the outer surface, in reality is not fat, but ossifications in that part of the decidua.

The navel string and placenta have been in part already described. The foetus is connected to the placenta by the navel-string; which may be defined, a long vascular rope, composed of two arteries and a vein, covered with coats derived from the membranes, and distended with a quantity of viscid gelatinous substance, to which the bulk of the cord is chiefly owing. The cord always arises from the centre of the child's belly, but its point of insertion in the cake is variable. If the placenta adhere to the fundus, or is fixed over the mouth of the uterus, it is then of a round form, and the cord arises from its middle; but, if the placenta adhere elsewhere, the cord is inserted nearer its edge. Its shape is seldom quite cylindrical; and its vessels are sometimes twisted or coiled, sometimes formed into longitudinal sulci. Its diameter is commonly about the thickness of an ordinary finger, and its length sufficient to admit the birth of the child with safety, though the placenta should adhere at the fundus uteri. In length and thickness, however, it is liable to considerable variation. The extremity next the foetus is generally strongest; and somewhat weaker and more slender next the placenta, according to its place of insertion; which, though commonly not far from the centre, is sometimes very near the edge.

This suggests an important advice to practitioners, to be cautious of pulling the rope to extract the placenta when they feel the sensation of its splitting as it were into two divisions, which will proportionally weaken its resistance, and render it liable to be ruptured with a very slight degree of force in pulling.

The placenta, cake, or after-birth, is a thick, soft, vascular, mass, connected to the uterus on one side, and to the umbilical cord on the other. It differs in shape and size; it is thickest at the centre, and gradually becomes thinner towards the edges, where the membranes go off all round, making a complete bag or involucre to surround the waters, funis, and child. Its substance is chiefly vascular, and probably in some degree glandular. The ramifications of the vessels are very minute, which are unravelled by maceration, and, when injected, exhibit a most beautiful appearance, resembling the bushy tops of a tree. It has an external convex, and an internal concave, surface. The former is divided into a number of small lobes and fissures, by means of which its adhesion to the uterus is more firmly secured. This lobulated appearance is most remarkable when the cake has been rashly separated from the uterus; for the membrana decidua, or connecting membrane between it and the uterus, being then torn, the most violent and alarming hemorrhages frequently ensue. The internal concave surface of the placenta is in contact with the chorion, and that with the amnios. From its internal substance arise innumerable ramifications of veins and arteries, which inosculate and anastomose with one another; and at last the different branches unite, and form the funis umbilicalis. The after-birth may adhere to every part of the internal surface of the uterus, as at the posterior and anterior, superior and lateral, parts; and sometimes, though more rarely, part of the cake extends over the orificium uteri; from whence, when the orifice begins to dilate, the most frightful and dangerous floodings arise. But the most common place of attachment of the cake is from the superior part of the cervix to the fundus. Twins, triplets, &c. have their placenta, sometimes separate, and sometimes adhering together. When the placenta adhere, they have generally the chorion in common; but each foetus has its distinct amnios. They are commonly joined together, either by an intervening membrane, or by the surfaces being contiguous to one another; and sometimes the vessels of the one cake anastomose with those of the other. The human placenta, according to Dr. Hunter, and others who believe that the child is nourished by a secreted liquor, is composed of two distinct systems of parts, a spongy or cellular, and a vascular substance; the spongy or cellular part, formed by the decidua, being derived from the mother, the more internal vascular part belonging entirely to the foetus; but, according to those who are of opinion that a real circulation is carried on between the mother and the child, the placenta is chiefly composed of vessels which are connected by the common cellular substance.

The membranes consist, externally, of two layers of the spongy chorion, called *decidua*, and *decidua reflexa*; internally, of the true chorion, and the amnios. They form a pretty strong bag, commencing at the edge of the cake, going round the whole circumference, and lining the internal surface of the womb. When separated from the uterus, this membranous bag is slender and yielding, and its texture is readily destroyed by the impulse of the contained fluid, the pressure of the child, or of the finger in touching; but in its natural state, while it lines the womb, and is in close contact with its surface, the membranous bag is tough and strong, so as to give a considerable degree of resistance. It is also strengthened in proportion to the different layers of which it is composed, whose structure we shall proceed to explain more particularly.

1. The *membrana decidua*, or that lamella of the spongy false chorion which is in immediate contact with the uterus, is originally very thick and spongy, and exceedingly vascular, particularly where it approaches the placenta.

At first, there is a small intervening space between it and the ovum, which is filled with a quantity of gelatinous substance. It gradually becomes more and more attenuated by stretching, and approaches nearer to the decidua reflexa; and about the fifth month the two layers come in contact, and adhere so as to become apparently one membrane.

2. The *decidua reflexa*, in its structure and appearance, is similar to the former, being rough, fleshy, and vascular, on its external surface. In advanced gestation, it adheres intimately to the former membrane, and is with difficulty separated from it. The decidua reflexa becomes thicker and more vascular as it approaches the placenta, and is then blended with its substance, constituting the cellular or maternal part of the cake, as it is termed by Dr. Hunter. The other or more internal part belongs to the foetus, and is styled the *fatal* part of the placenta. The double decidua is opaque in comparison of the other membrane; the blood-vessels are derived from the uterus, and can be readily traced into it. Dr. Hunter supposes that the double decidua lines the uterus nearly in the same manner as the peritonæum does the cavity of the abdomen, and that the ovum is inclosed within its duplicature.

3. The *true chorion*, or that connected with the amnios, is the firmest, smoothest, and most transparent, of all the membranes, except the amnios; and, when separated from it, has a considerable degree of transparency. It adheres closely to the internal surface of the cake, which it covers immediately under the amnios, and gives also a coat to the umbilical cord. It is connected to the amnios by means of a gelatinous substance, and is easily separated from it.

4. The *amnios*, or internal membrane, forms the external coat of the umbilical cord. This lateral lamella of the membranous bag is the most thin, attenuated, and transparent, of the whole; and its vessels are so delicate, that they can hardly be discovered: their diameters are so small as to be incapable, in their natural state, of admitting globules of red blood. It is, however, firmer and stronger than the chorion, and gives the greatest resistance in the breaking of the membranes. The small bag, called *vesicula umbilicalis*, formerly described, and only conspicuous in the early months from its situation, is placed between the amnios and chorion, near the attachment of the cord; and, from the colour of its contents, has been mistaken for the urachus: but there is no allantois in the human subject. The allantois in quadrupeds is an oblong membranous sac, or pouch, placed between the chorion and amnios. This membrane communicates with the urachus, which in brutes is open, and transmits the urine from the bladder to the allantois.

5. The *waters* are contained within the amnios, and are called the *liquor amnii*. They are purest, clearest, and most limpid, in the first months; acquiring a colour, and becoming somewhat ropy, towards the latter end. They vary in different subjects, both in consistence and quantity; and, after a certain period, they proportionally diminish as the woman advances in her pregnancy. This liquor does not, in any respect, resemble the white of an egg; it is generally saltish, and therefore unfit for the nutrition of the child: some of it may perhaps be absorbed by the foetus, but the child is chiefly nourished by the navel-string. Water is sometimes collected between the chorion and amnios, or between the lamellæ of the chorion. This is called the *false water*. It is generally in much smaller quantity than the true water; and, without detriment to the woman, may flow at any time of pregnancy.

The foetus is commodiously adapted to the cavity of the uterus, and describes an oblong or oval figure; its several parts being collected together in such a manner as to occupy the least possible space. The spine is rounded, the head reclines, and the knees are drawn up to the belly, while the heels are drawn backwards towards the breech, and the hands and arms are folded upwards and downwards. The head of the child is generally downwards. This does not proceed, as was commonly alleged, from the funis

funis not being exactly in the middle of the child's body, for it is not suspended by the funis: the reason is, because the superior parts are much larger, and heavier in proportion, than the inferior. When other parts present, it seems owing to the motion of the child altering its figure when the waters are much diminished in quantity, or to circumvolutions of the cord: when the position is once altered, it becomes confined or locked in the uterus, and cannot easily resume its original posture. As the figure of the fœtus is oval, and the head naturally falls to the most depending part of the uterus, the vertex generally points to the os tincæ, with the ears diagonally in the pelvis. The fœtus is mechanically disposed to assume this position from its peculiar figure and construction, particularly by the bulk of the head and articulation with the neck, by the action of its muscles, and by the shape and construction of the cavity in which it is contained.

When a child is newly born, and left unconfined, however it may fling its limbs in starts, yet for the most part, when quiet, it gathers itself up into the oval form, as it lay in the womb. Were it not for art, this natural habit would be preserved, and man would take rest, like the quadruped, with all his limbs folded up.

The size and weight of a child's body at birth is generally over-rated, inasmuch that we are often told of children weighing from fifteen to twenty pounds. So far is this from being true, that Dr. Hunter declares, he never knew an instance of a child that weighed twelve pounds, and the greatest number are but little above *half* that weight. Dr. Macaulay was at great pains to ascertain the

ordinary bulk of new-born children, by weighing several thousands that were born in the British lying-in hospital; the result was, that the smallest weighed a little above four pounds, the largest eleven pounds two ounces, but the greatest number weighed from five to eight pounds, *avoirdupois*.

To shew the general position of the child in the womb at or about its full time, Dr. Hunter has favoured us with an elegant dissection, which we have represented in Plate V. of the GRAVID UTERUS. Indeed the four former of these plates represent dissections of the same subject, an unfortunate female, who expired suddenly at nearly the end of the ninth month of her pregnancy. The arteries and veins, and most of the different vessels, were injected with wax, and are now in Dr. Hunter's collection. These engravings demonstrate the different appearances of the gravid uterus, in the same order that its different membranes were dissected off; the last of which being removed, exhibits, as in Plate V. a view of the child, of its full size, just before birth. The navel-string is cut, tied, and turned to the left side over the edge of the womb. At the fundus the investing membranes are likewise turned over the edge of the womb, that they might be more apparent. On opening the uterus, the body of the child was found covered with a white greasy mucus, which is commonly seen on children at their birth. This is represented at the upper part of its back, where it was intersected with lines, from the wrinkles and motion of the child's body. Every part is delineated just as it was found; not so much as one joint of a finger having been moved to shew any part more distinctly, or to give a more picturesque effect.

COMPARATIVE ANATOMY.

THE principal advantages of Comparative Anatomy are the following: First, it furnishes us with a sufficient knowledge of the different parts of animals, to prevent our being imposed upon by such authors as have delineated and described several parts from brutes as belonging to the human body. Secondly, it helps us to understand several passages in the ancient medical writers, who have taken many of their descriptions from brutes, and reasoned from them: their reasonings have often been misapplied, and consequently wrong explained, by the moderns. The third and great use we reap from this science, is the light it casts on several functions in the human œconomy, about which there have been so many disputes among anatomists. These differences of opinion, by exhibiting the structure of the same parts in different animals, and by comparing the several organs employed in performing the same action, which in the human body is brought about by one more complex, will be in a great measure done away.

All quadrupeds have a covering of hair, wool, &c. to defend them from the injuries of the weather; which varies in thickness according to the season of the year, and difference of the climate. Thus in Russia and the northern countries the furs are very thick and warm; while the little Spanish lap-dogs, and Barbary cows, have little or no hair at all. The *cutis* and *cuticula* in quadrupeds are disposed much in the same way as the human, but they are more elastic. Immediately under this there is a very thin cutaneous muscular substance, called *panniculus carnosus*, which is common to all quadrupeds, the porcine kind excepted; this principally covers the trunk, serving to shrivel the skin, in order to drive off insects, their tails and heads not being sufficient for this purpose, while their extremities are employed in their support and progression.

It has probably been from observing some muscles of the human body, such as the *platysma myoides*, *cremaster*, and *frontales*, and the collapsed tunica cellulosa of the emaciated subjects, to resemble this thin muscle, that some of the older anatomists reckoned such a *panniculus* among the common integuments of the human body. Most of the quadrupeds want clavicles, whereby their anterior

extremities fall upon their chest, so as to make their thorax proportionally narrower than the human. This small distance of their anterior extremities is very necessary for their uniform progression. Apes indeed, and squirrels, have clavicles, to allow them a more full use of their extremities in climbing; but they walk ill on all fours.

ANATOMY of a DOG.

We may first observe of this animal, as indeed of most quadrupeds, that its legs are much shorter in proportion to its trunk than in man, the length of whose steps depends entirely on the length of his inferior extremities: however, to balance this, the trunk of the animal is proportionally longer and smaller, and his spine more flexible, by which he is able at each step to bring his posterior extremities nearer to his anterior. His common integuments are much like those of other quadrupeds; only they allow little or no passage for sweat; but, when he is over-heated, the noxious and superfluous matter finds an exit by the salivary glands; for he lolls out his tongue, and flavers plentifully. We are not, however, to suppose, that because a dog does not sweat, he has no insensible perspiration. That a dog perspires is evident, because one of these animals can trace another by the scent of his footsteps; which could not happen, if a large quantity of perspirable matter was not constantly going off. We may also observe, that the *rabies canina* is a disease peculiar to dogs, foxes, wolves, and others of that genus; for though the bite of other mad animals, such as cats, or hogs, and even poultry, will produce the disease, no fair instance has ever been brought of any of these animals being originally seized with this malady.

The pyramidal muscles are wanting in the dog; to supply which, the rectus is inserted fleshy into the os pubis. The *omentum* reaches down to the os pubis; which, considering the posture of the animal, we shall find to be a wise provision, since its use is to separate an oily liquor for lubricating the guts, and facilitating their peristaltic motion. So, in our erect posture, the natural gravity of the oil will determine it downward; but, in the horizontal position

sition of these creatures, if all the intestines were not covered, there would be no favourable derivation of the fluid to the guts lying in the posterior part of the abdomen, which is the highest; and besides, had the omentum reached much farther down in us, it would not only have supplied too great a quantity of oil to the lower part of the abdomen, but we should have been in continual danger of herniæ; and even at present the omentum frequently passes down with some of the other viscera, and forms part of these tumours. To these, however, the dog is not subject, as his viscera do not press so much on the rings of the abdominal muscles, and besides are prevented from passing through by a pendulous flap of fat. The inferior and anterior lamella of the omentum is fixed to the spleen, fundus of the stomach, pylorus, liver, &c. in the same way as the human; but the superior, having no colon to pass over, goes directly to the back-bone. This serves to explain the formation of the small omentum in the human body; which is nothing but the large omentum, having lost its fat, passing over the stomach and colon, where it re-assumes its pinguedo, so proceeds, and is firmly attached to the liver, spine, &c.

This animal's stomach, though resembling the human in its shape, is somewhat differently situated. It lies more longitudinal, as indeed all the other viscera do, to accommodate themselves to the shape of the cavity in which they are contained; that is, its inferior orifice is much farther down with respect to the superior than the human: by this means the gross food has an easier passage into the duodenum. Again, the fundus of the human stomach, when distended, stands almost directly forwards, which is occasioned by the little omentum tying it so close down to the back-bone, &c. at its two orifices; but, it not being fixed in that manner in the dog, the fundus remains always posterior: this also answers very well the shape of the different cavities, the distance between the cardia and fundus being greater than that between the two sides. It seems to be much larger in proportion to the bulk of the animal than the human, that it might contain a greater quantity of food at once; which was very necessary, since this animal cannot at any time get its sustenance as men do. The turbilion is not so large, nor is there any coarction forming the *antrum Vilesi*, as in the stomach of man. It is considerably thicker and more muscular than ours, for breaking the cohesion of their food, which they swallow without sufficient chewing. Hence it is evident the force of the stomach is not so great as some anatomists would have it, nor its contraction so violent; otherwise that of dogs would be undoubtedly wounded by the sharp bones, &c. which they frequently swallow; for the contraction is still greater than in the human stomach, which is much thinner. The rugæ of the tunica villosa are neither so large, nor situated transversely, as in the human, but go from one orifice to the other: the reason of which difference is, perhaps, that they might be in less danger of being hurt by the hard substances this creature frequently feeds on; and for the same reason there is not the like coarction at their pylorus.

The intestines of this animal are proportionally much shorter than ours; for the food which these creatures mostly use, soon dissolves, and then putrefies; on which account there was no occasion for a long tract of intestines; the food being required to be quickly thrown out of the body. The same is to be observed of all the carnivorous animals. The muscular coat of the intestines is also thicker and stronger than the human, to protrude the contents quickly and accurately. The valvulæ conniventes are less numerous, and in a longitudinal direction; and the whole tract of the alimentary canal is covered with a slime, which lubricates the intestines, saves them from the acrimony of the excrementitious part, and facilitates its passage.

The duodenum differs considerably in its situation from the human. For in man it first mounts from the pylorus upwards, backwards, and to the right side; then passes down by the gall-bladder; and, going over the right kid-

ney and superior part of the psoas muscles, makes a curvature upwards; and passes over the back-bone and vena cava inferior, to the left hypochondrium, where it gets through the omentum, mesentery, and mesocolon, to commence jejunum, being firmly tied down all the way, the biliary and pancreatic ducts entering at its most depending part. Whereas in the dog, the duodenum is fixed at the pylorus to the concave surface of the liver, and hangs loose and pendulous with the mesentery backwards into the cavity of the abdomen; then turning up again, is fixed to the back-bone, where it ends in the jejunum; the bile and pancreatic juice are poured into it at the most depending part. Therefore the same intention seems to have been had in view in the formation of this part in both, viz. the giving the chyle, after the liquors of the liver and pancreas are poured into it, a disadvantageous course, that so it might be the more intimately blended with the humours before its entry into the jejunum, where the lacteals are very numerous. And thus, by reason of their different posture, the same design (though by a very different order of the parts) is brought about in both.

The other small guts are much the same with ours, only shorter. The great guts are also shorter and less capacious than in the human body; and we take it for a general rule, that all animals that live on vegetable food have not only their small guts considerably longer, but also their great guts more capacious, than such creatures as feed on other animals. Hence man, from this form of his intestines, and that of the teeth, seems to have been originally designed for feeding on vegetables chiefly; and still the most of his food, and all his drink, is of that class. The reason of this difference seems to be, that as animal food is not only much more easily reduced into chyle, but also more prone to putrefaction, too long a remora of the juices might occasion the worst consequences. So it was necessary that their receptacles should not be too capacious; but, on the contrary, being short and narrow, might conduce to the seasonable discharge of their contents. Whereas, vegetable food being more difficultly dissolved and converted into an animal nature, there was a necessity for such creatures as fed on it to be provided with a long intestinal canal, that this food in its passage might be considerably retarded, and have time to change its indoles into one more agreeable to our nature.

The *appendix vermiformis* justly enough deserves the name of an *intestinum cæcum* in this subject, though in the human body it does not; and it has probably been from the largeness of this part, in this and some other animals, that the oldest anatomists came to reckon that small appendix in man one of the great guts. On its internal surface we observe a great number of mucous glands. As all these throw out slime, their principal office would seem to be the procuring a sufficient quantity of that matter for the purposes above-mentioned. Still, however, there seems to be some unknown use for this organ in other animals; for the *appendicula vermiformis* in them is either of great size or of great length. In a rat, it is rather larger than the stomach; in others, as swine, and some of the animals which live on vegetables, it has long convolutions, so that the food must be lodged in it for a long time. Thus, probably, some change takes place in the food, which requires a considerable time to effectuate, and, though unknown to us, may answer very useful purposes to the animal.

The colon, in the dog, has no longitudinal ligaments; and consequently this gut is not purged up in different bags or cells as the human: nor does this intestine make any circular turn round the abdomen; but passes directly across it to the top of the os sacrum, where it gets the name of *rectum*.

The mesentery is considerably longer than in the human body; that, in his horizontal situation, the intestines may rest securely on the soft cushion of the abdominal muscles. The fat is here disposed in the same way, and for the same reason, as in the omentum. The interstices between the

fat are filled with a fine membrane. Instead of a great number of glandulæ vague to be found in the human mesentery, we find the glands few in number, and those are closely connected together; or there is only one large gland to be observed in the middle of the mesentery of a dog, which from its imagined resemblance to the pancreas and the name of its discoverers, is called *pancreas Asellii*; but the resemblance, if there is any, depends chiefly on the connection, the structure being entirely different. The reason why this in man is as it were subdivided into many smaller ones, may possibly be, that as the guts of a human body are proportionally much longer than those of this creature, it would have been inconvenient to have gathered all the *lacteals primi generis* into one place; whereas, by collecting a few of these vessels into a neighbouring gland, the same effect is procured much more easily. Whether the food in this animal needs less preparation in its passage through these glands, is a matter very much unknown to us; though it is certain that some changes really take place.

The *pancreas* in man lies across the abdomen, tied down by the peritonæum; but, the capacity of this creature's abdomen not allowing of that situation, it is disposed more longitudinally, being tied to the duodenum, which it accompanies for some way. Its duct enters the duodenum about an inch and a half below the ductus communis.

The *spleen* of this animal differs very much from ours both in figure and situation. It is much more oblong and thin, and lies more according to the length of the abdomen, like the pancreas. Though the spleen of this creature is not firmly tied to the diaphragm (which was necessary in our erect posture to hinder it from falling downwards), yet by the animal's prone position, its posterior parts being rather higher than the anterior, it comes to be always contiguous to this muscle, and is as effectually subjected to an alternate pressure from its action as the human spleen is.

The human *liver* has no fissures or divisions, unless we reckon that small one between the two *pylæ*, where the large vessels enter: whereas in a dog, and all other creatures that have a large flexion in their spine, as lions, leopards, cats, &c. the liver and lungs are divided into a great many lobes by deep sections, reaching the large blood-vessels, which in great motions of the back-bone may easily lap over one another; and are thus in much less danger of being torn or bruised, than if they were formed of one entire piece, as we really see it in horses, cows, and such creatures as have their back-bone stiff and immoveable. There is no *ligamentum latum* connecting the liver to the diaphragm, which in our situation was necessary to keep the viscus in its place: whereas, in this creature, it naturally gravitates forwards, and by the horizontal position of the animal is in no danger of pressing against the vena cava; the preventing of which is one use generally assigned to this ligament in man. Had the liver of the dog been thus connected to the diaphragm, the respiration must necessarily have suffered; for this muscle is here moveable at the centre as well as at the sides. But in man the liver is fixed to the diaphragm, mostly at its tendinous part; that is, where the pericardium is fixed to it on the other side; so that it is in no danger of impeding the respiration, being suspended by the mediastinum and bones of the thorax. In consequence of this viscus being divided into so many lobes, it follows, that the hepatic ducts cannot possibly join into one common trunk till they are quite out of the substance of the liver; because a branch comes out from every lobe of the liver; all of which, by their union, form the hepatic duct: whence we are led to conclude, that the hepato-cystic ducts, mentioned by former authors, do not exist. The gall-bladder itself is wanting in several animals, such as the deer, the horse, the ass, &c. but in place of it, in such animals, the hepatic duct, at its beginning, is widened into a reservoir of considerable size, which may answer the same purpose in them that the gall-bladder does in others.

The *kidneys* in this animal are situated much in the same way as in the human subject; but have no fat on their inferior surface, where they face the abdomen, and are of a more globular form than the human. The reason of these differences will easily appear, if we compare their situation and posture with those in a man, who walks erect. They are placed in this subject in the inferior part of the body, so are not subject to the pressure of the viscera, which seems to be the principal cause of the fatness of those organs in us, and perhaps may likewise be the cause of our being more subject to the stone than other animals. Hence there is no need of any cellular substance to ward off this pressure where there would necessarily be fat collected; but the superior part of their kidneys is somewhat covered with fat, lest they should suffer any compression from the action of the ribs and spine.

In the internal structure there is still a more considerable difference: for the *papillæ* do not here send out single the several *tubuli uriniferi*; but, being all united, they hang down in form of a loose pendulous flap in the middle of the pelvis, and form a kind of septum medium; so that a dog has a pelvis formed within the substance of the kidney. The only thing that is properly analogous to a pelvis in man, is that sac or dilatation of the ureters formed at the union of the *ductus uriniferi*. The external part of the kidney of a dog somewhat resembles one of the lobes of the kidney of a human foetus: but in a human adult the appearance is very different; because, in man, from the continual pressure of the surrounding viscera, the lobes, which in the foetus are quite distinct and separated, concrete, but the original cortical substance is still preserved in the internal parts of the kidney. The reason of these particularities may probably be, that the liquors of this animal, as of all those of the carnivorous kind, being much more acrid than those of such as live on vegetable food, its urine must incline much to an alkalescency, as indeed the smell and taste of that liquor in dogs, cats, leopards, &c. evidently shew, being fetid and pungent, and therefore not convenient to be long retained in the body. For this end it was proper, that the secretory organs should have as little impediment as possible by pressure, &c. in the performing their functions; and for that design the mechanism of their kidneys seems to be excellently adapted.

The *glandulæ* or *capsulæ atrabiliaræ* are thicker and rounder than the human, for the same reason as the kidneys; and the *ureters* are more muscular than the human, because of the unfavourable passage the urine has through them; they enter the bladder near its fundus. The bladder differs considerably from the human; and first in its form, which is pretty much pyramidal or pyriform. This shape of the dog's bladder is likewise common to all quadrupeds, except the ape and those of an erect posture. In men it is by no means pyriform, but has a large sac at its posterior and inferior part: this form depends entirely on the urine gravitating in our erect posture to its bottom, which it will endeavour to protrude; but, as it cannot yield before, being contiguous to the os pubis, it will naturally stretch out where there is the least resistance, that is, at the posterior and lateral parts; and, were it not for this sac, we could not so readily come at the bladder to extract the stone either by the lesser or lateral operation of lithotomy. Most anatomists have delineated this wrong; so much, that none have justly painted it, excepting Cowper in his *Myotomia*, and Mr. Butty. It has certainly been from observing it in brutes and young children, that they have been led into this mistake.

As to its *connection*, it is fastened to the abdominal muscles by a process of the peritonæum, and that membrane is extended quite over it; whereas in us its superior and posterior parts are only covered by it: hence in man alone the high operation of lithotomy can be performed without hazard of opening the cavity of the abdomen. Had the peritonæum been spread over the bladder in its whole extent, the weight of the viscera in our erect posture would have

have fo borne upon it, that they would not have allowed any confiderable quantity of urine to be collected there; but we muft have been obliged to difcharge its contents too frequently to be confiftent with the functions of focial life; whereas, by means of the peritonæum, the urine is now collected in fufficient quantity, the vifcera not gravitating this way. We may take it for a general rule, that thofe creatures that feed upon animal food have their bladder more mufcular and confiderably stronger, and lefs capacious, than thofe that live on vegetables, fuch as horfes, cows, fwine, &c. whofe bladder of urine is perfectly membranous, and very large. This is wifely adapted to the nature of their food: for, in thefe firft, as all their juices are more acrid, fo in a particular manner their urine becomes exalted; which, as its remora might be of very ill confequence, muft neceffarily be quickly expelled. This is chiefly effected by its ftimulating this vifcus more strongly to contract, and fo to difcharge its contents, tho' the irritation does not altogether depend upon the ftretching, but likewise arifes from the quality of the liquor.

Their *fpermatic veffels* are within the peritonæum, which is fpread over them, and from which they have a membrane like a mefentery; fo that they hang loofe and pendulous in the abdomen; whereas, in us, they are contained in the cellular part of the peritonæum, which is tenfely ftretched over them. At their paffage out of the lower belly, there appears a plain perforation, or holes; hence the adult quadruped, in this refpect, refembles the human fœtus. And from obferving this in quadrupeds, has arifen the falfe notion of *hernia* or *rupture* among authors. This opening, which leads down to the tefticle, is of no difadvantage to them, but evidently would have been to us; for, from the weight of our vifcera continually gravitating upon thefe holes, we muft have perpetually laboured under enterocæles, which they are in no hazard of, as in them this paffage is at the higheft part of their belly, and, in their horizontal pofture, the vifcera cannot bear upon it.

The *ferotum* is fhorter and not fo pendulous as the human in all the dog kind that want the *veficulæ feminales*, that the feed at each copulation might the fooner be brought from the teftes, thus in fome meafure fupplying the place of the *veficulæ feminales*; for the courfe of the feed through the *vafa deferentia* is thus fhortened, by placing the fecerning veffels nearer the excretory organs. The want of *veficulæ feminales* at the fame time explains the reafon why this creature is fo tedious in copulation. The ftructure of the *tefticles* is much the fame with the human, as are likewise the *corpus pyramidale*, *varicofofum*, or *pampiniforme*, and the *epididymis* or excretory vefsel of the tefticle. The *vafa deferentia* enter the abdomen where the blood-veffels come out; and, paffing along the upper part of the bladder, are inferted a little below the bulbous part of the urethra.

The *præputium* has two mufcles fixed to it; one that arifes from the fphincter ani, and is inferted all along the *penis*; and this is called *retractor præputii*. But the other, whofe office is directly contrary to this, is cutaneous; and feems to take its origin from the mufcles of the abdomen, or rather to be a production of their tunica carnofa. The *corpora cavernofa* rife much in the fame way as the human: but thefe foon terminate; and the reft is fupplied by a triangular bone, in the inferior part of which there is a groove excavated for lodging the urethra. There are upon the penis two protuberant bulbous flefhy fubftances, refembling the glans penis in man, at the back of which are two veins, which, by the *erectores penis* and other parts, are compressed in the time of coition; and, the circulation being ftopped, the blood diftends the large cavernous bodies. After the penis is thus fwelled, the vagina, by its contraction and fwelling of its corpus cavernofum, which is confiderably greater than in other animals, gripes it clofely; and fo the male is kept in action fome time contrary to his will, till an opportunity be given for bringing a quantity of feed fufficient to impregnate the female: and

thus, by that *orgafmus veneris* of the female organs, the want of the *veficulæ feminales* is in fome meafure fupplied. But as it would be a very uneasy pofture for the dog to fupport himfelf foely upon his hinder feet, and for the bitch to fupport the weight of the dog for fo long a time; therefore, as foon as the bulbous bodies are fufficiently filled, he gets off and turns averfe to her. Had then the penis been pliable as in other animals, the urethra muft of neceffity have been compressed by this twifting, and confequently the courfe of the feed intercepted; but this is wifely provided againft by the urethra's being formed in the hollow of the bone. After the emiffion of the feed, the parts turn flaccid, the circulation is reftored, and the bulbous parts can eafily be extracted. The *prof-tata* feems here divided into two, which are proportionally larger than the human, and afford a greater quantity of that liquid. The *uterus* of the multiparous animals is little elfe but a continuation of their vagina, only feparated from it by a fmall ring or valve. From the uterus two long canals mount upon the loins, in which the fœtuses are lodged: thefe are divided into different facs, which are ftrongly constricted between each fœtus; yet thefe contractions give way in the time of birth. From thefe go out the *tubæ Fallopianæ*, fo that the ovaria come to lodge near the kidneys.

We ought next to examine the ftructure of the thorax and its contents. But firft it may not be amifs to remark of the *diaphragm* in its natural fituation, that it is in general more loofe and free than the human; which is owing to its connection with the neighbouring parts in a different manner from ours. The human diaphragm is connected to the pericardium; which again, by the intervention of the mediastinum, is tied to the fternum, spine, &c. but here there is fome diftance between the diaphragm and pericardium. We obferve further, that its middle part is much more moveable, and the tendinous parts not fo large. And indeed it was neceffary their diaphragm fhould be fomewhat loofe, they making more ufe of it in difficult refpiration than man. This we may obferve by the ftrong heaving of the flanks of an horfe or dog when out of breath; which corresponds to the rifing of the ribs in us.

The difpofition and fituation of the *mammæ* vary as they bear one or more young. Thofe of the uniparous kind have them placed between the posterior extremities, which in them is the higheft part of their bodies, whereby their young get at them without the inconvenience of kneeling. Nevertheless, when the creatures are of no great fize, and their breaft large, as in fheep, the young ones are obliged to take this pofture. In multiparous animals, they muft have a great number of nipples, that their feveral young ones may have room at the fame time, and thefe are difpofed over both thorax and abdomen; and the creatures generally lie down when the young are to be fuckled, that they may give them the moft favourable fituation. From this it does not appear to be from any particular fitnefs of the veffels at certain places for giving a proper nourifhment to the child, that the breasts are fo placed in women as we find them, but really from that fituation being the moft convenient both for mother and infant.

The *fternum* is very narrow, and confifts of a great number of fmall bones, moveable every way; which always happens in creatures that have a great mobility in their spine. The *mediastinum* is pretty broad. The pericardium is not here contiguous to the diaphragm, but there is an inch of diftance between them, in which place the fmall lobe of the lungs lodges; and by this means the liver, &c. in this animal, though continually preffing upon the diaphragm, yet cannot difturb the heart's motion.

The *heart* is fited with its point almoft directly downwards, according to the creature's pofture, and is but very little inclined to the left fide. Its point is much fharpier, and its fhape more conoidal, than the human. Here the names of *right* and *left* ventricles are proper enough, tho' not fo in the human; which ought rather to be called *anterior* and *posterior*, or *superior* and *inferior*. The animal has

the *vena cava* of a considerable length within the thorax, having near the whole length of the heart to run over ere it gets at the *sinus Lowerianus dexter*. In men it enters the pericardium as soon as it pierces the diaphragm, which is firmly attached to it, and immediately gets into the *sinus Lowerianus*; which sinus, in the human subject, by the oblique situation of the heart, is almost contiguous to the diaphragm: and by this we discover, that several authors have taken their delineations of the human heart from brutes; which is easily detected by the shape and situation of the heart, and the long *vena cava*, within the thorax. This situation of the heart of the dog agrees best with the shape of its thorax, which is lower than the abdomen.

The egress of the large blood-vessels from the heart is somewhat different from the human; for here the right subclavian comes off first; and as a large trunk runs some way upwards before it gives off the left carotid, and splits into the carotid and subclavian of the right side, then the left subclavian is sent off. So that, neither here, properly speaking, is there an *aorta ascendens* more than in the human; but this name has probably been imposed upon it from observing this in a cow, where indeed there is an ascending and descending aorta. From this specialty of the distribution of the vessels of the right side, which happens, though not in so great a degree, in the human subject, we may perhaps in some measure account for the general greater strength, readiness, or facility of motion, which is observable in the right arm. We believe, upon measuring the sides of the vessels, the surface of the united trunk of the right subclavian and carotid is less than that of the left subclavian and carotid, as they are separated. If so, the resistance to the blood must be less in that common trunk than in the left subclavian and carotid. But, if the resistance be smaller, the absolute force with which the blood is sent from the heart being equal, there must necessarily be a greater quantity of blood sent through them in a given time; and, as the strength of the muscles is, *ceteris paribus*, as the quantity of blood sent into them in a given time, those of the right arm will be stronger than those of the left. Now children, being conscious of this superior strength, use the right upon all occasions; and thus from use comes that great difference which is so observable. But, if by any accident the right arm is kept from action for some time, the other from being used gets the better; and those people are left-handed. For it is not to be imagined, that the small odds in the original formation of the vessels should be sufficient to resist the effect of use and habit, (instances of the contrary occur every day;) it is enough for our present argument, that, where no means are used to oppose it, the odds are sufficient to determine the choice in favour of the right. Now, because it is natural to begin with the leg corresponding to the hand we have most power of, this is what gives also superiority to the right leg. This difference is not peculiar to man, but is still more observable in those creatures in whom the same mechanism obtains in a greater degree. Observe a dog at a trot, how he bears forward with his right side; or look at him when scraping up any thing, and we shall presently see that he uses his right much oftener than his left foot. Something analogous to this may be observed in horses; who are never considered to gallop well, unless the right leg be presented first. It has been the opinion of some anatomists, that left-handed people, as well as those distinguished by the name of *ambidexter*, (who use both hands promiscuously,) have the two carotid and subclavian arteries coming off in four distinct trunks from the arch of the aorta; but no appearance of this kind has ever been observed in such bodies as have been examined for this purpose; though indeed these have been but few, and more experience might throw greater light on the subject.

The *thymus* of the dog is proportionally much larger than ours; whereas the *glandula thyroidea* is much less, and is divided into two distinct parts, or there are two separate glands: which is not the case in man. The reason

of this difference is unknown, as is likewise the use of the gland itself. It is generally remarked, that these two glands supply the place of each other; that is, in such animals as have a large *thymus*, the *glandula thyroidea* is smaller, and *vice versa*. Hence we are naturally led to ascribe the same use to both, viz. the separation of a thin lymph for diluting the chyle in the thoracic duct before it be poured into the blood; then, if we consider the different formation of the thorax in both, we shall readily account for the variety in the bulk of these two glands. Respiration being chiefly performed in man by the widening of the chest, the lungs at every inspiration must press upon the *thymus*, and consequently diminish it: but the diaphragm, yielding more in the dog's inspiration, this gland is not so much pressed by the lungs, and so will be larger; and hence the *glandula thyroidea* will be proportionally less. Again, from the posture of this creature, we shall see that it was much more convenient for a dog to have the most part of the diluting lymph supplied by the *thymus*, since, the neck being frequently in a descending posture, the lymph of the thyroid gland would have a very disadvantageous course to get to the thoracic duct: whereas in the human body, the *thymus* is really below the lacteal canal, where it makes its curvature before it opens into the subclavian; and consequently there is a necessity of a considerable share of the diluting liquor being furnished by the thyroid gland, which is situated much higher; so that its lymph has the advantage of a perpendicular descent.

We may here observe, that the *thoracic duct* in a dog has no curvature before it enters the subclavian vein, the horizontal position of this animal allowing a favourable course to the chyle, so as not to need that turn to force its passage into the blood. It may likewise be observed, that such animals as walk horizontally, have the valves of the thoracic duct fewer in number than others. The horse has only a single pair; while, on the contrary, the ape resembles man in having several valves. Thus the lymph is forwarded in its passage, and the weight of it diminished.

The *lungs* of the dog are divided into more numerous lobes, and deeper, than they are in man, for the same reason as the liver. The left side of the thorax in this animal bears a greater proportion to the right than in man; the one being nearly as three to two, the other as four to three. In quadrupeds, as well as in man, the lungs are closely applied to the containing parts; although this has been denied by some authors.

We consider it as a general rule, that all quadrupeds, as having occasion to gather their food from the ground, are provided with longer necks than man: but as a long neck not only gives the advantage of too long a lever to the weight of the head, but also, when the animal is gathering his food, makes the brain in danger of being oppressed with too great a quantity of blood, by the liquor in these arteries having the advantage of a descent, while that in the veins must remount a considerable way contrary to its own gravity; it was therefore necessary that a part of the length of the neck should be supplied by the length of the jaws. Thus we see horses, cows, &c. who have no occasion for opening their mouths very wide, yet have long jaws. Bull-dogs indeed, and such animals as have occasion for very strong jaws, must of necessity have them short; because, the longer they are, the resistance to be overcome acts with a longer lever. Another exception to this general rule is, such animals are furnished with something analogous to hands to convey their food to their mouths, as cats, apes, &c. The teeth of the dog plainly shew it to be of the carnivorous kind; for there are none of them made for grinding the food, but only for tearing and dividing it. It has six remarkable sharp teeth before, and two very long tusks behind; both of which the ruminating animals want. These are evidently calculated for laying very firm hold of substances, and tearing them to pieces; and the vast strength of the muscles inserted into the lower jaw assists greatly in this action; while the molars

ares have sharp cutting edges, calculated for cutting flesh, and breaking the hardest bones.

The tongue, in consequence of the length of the jaws, is much longer than ours; and, as this creature feeds with his head in a depending posture, the bolus would always be in danger of falling out of the mouth, were it not for several prominences or papillæ placed mostly at the root of the tongue, and crooked backwards in such a manner, as to allow any thing to pass easily down to the jaws, but to hinder its return. By the papillæ also the surface of the tongue is increased, and a stronger impression is made on the sensation of taste. In some animals who feed on living creatures, these tenter-hooks are still more conspicuous; as in several large fishes, where they are almost as large as their teeth in the fore-part of their mouth, and nearly as firm and strong. When we open the mouth of a dog, we see the amygdalæ very prominent in the posterior part of it; so that it would appear at first view, that these were inconveniently placed, as being continually exposed to injuries from the hard substances this animal swallows: but, upon a more narrow scrutiny, we find this inconvenience provided against by two membranous capsulæ, into which the amygdalæ, when pressed, can escape, and remove themselves from such injuries. The *velum pendulum palati* is in this creature considerably longer than in man, to prevent the food from getting into his nose; which would happen more frequently than with us, because of its situation while feeding.

In the dog, as well as in other quadrupeds, there is no *uvula*; but then the *epiglottis*, when pressed down, covers the whole rima entirely, and naturally continues so: there is therefore a ligament, or rather muscle, that comes from the os hyoides and root of the tongue, that is inserted into that part of epiglottis where it is articulated with the cricoid cartilage, which serves to raise it from the rima, tho' not so strongly but that it may with a small force be clapped down again. It may be asked, however, Why the uvula is wanting here, and not in man? This seems to be, that quadrupeds, who swallow their food in an horizontal situation, have no occasion for an uvula, though it is necessary in man on account of his erect situation.

In the upper part of the pharynx, behind the cricoid cartilage, there is a considerable gland to be found, which serves not only for the separation of a mucous liquor to lubricate the bolus as it passes this way, but also to supply the place of a valve, to hinder the food from regurgitating into the mouth, which it would be apt to do by reason of the descending situation of the creature's head. In man, this muscle of the epiglottis is wanting, its place being supplied by the elasticity of the cartilage. The *œsophagus* is formed nearly in the same way as the human. Authors indeed generally allege, that quadrupeds have their gullet composed of a double row of spiral fibres decussating one another; but this is peculiar to ruminating animals, who have occasion for such a decussation of fibres. The action of these may easily be observed in a cow chewing her cud.

The canine nose is generally longer than that of man, and its external passage is much narrower. The internal structure is also better adapted for an acute smelling, having a larger convoluted surface on which the *membrana scheideriana* is spread; and this is to be observed in most quadrupeds, who have the ossa spongiosa commonly large, and these too divided into a great number of excessively fine thin lamellæ. The sensibility seems to be increased in proportion to the surface; and this will also be found to take place in all the other senses. The elephant, which has a head large in proportion to its body, has the greatest part of it taken up with the cavity of the nose and frontal sinuses; which last extend almost over their whole head, and leave but a small cavity for their brains. A very nice sense of smelling was not so absolutely necessary for man, who has judgment and experience to direct him in the choice of his food; whereas brutes, who have only their senses, must of necessity have these acute; some having

one sense in greater perfection than others, according to their different way of life. We not only conclude, *a priori*, from the large expanded *membrana scheideriana*, that their sense of smelling is very acute, but we find it so by cows and horses distinguishing so readily between noxious and wholesome herbs, which they do principally by this sense.

The external ear in different quadrupeds is differently framed, but always calculated to the creature's manner of life. In shape it commonly resembles the oblique section of a cone from near the apex to the basis. Hares, and such other animals as are daily exposed to insults from beasts of prey, have large ears directed backwards, their eyes warning them of any danger before; rapacious animals, on the other hand, have their ears placed directly forwards, as we see in the lion, cat, &c. The slow hounds, and other animals that are designed to hear most distinctly the sounds coming from below, have their ears hanging downwards; or their ears are flexible, because they move their head for the most part with greater difficulty than man. Man again, who must equally hear sounds coming from all quarters, but especially such as are sent from about his own height, has his external ear placed in a vertical manner, somewhat turned forward. In short, wherever we see a specialty in the make of this organ in any creature, we shall, with very little reflection, discover this form to be more convenient for that creature than another. The animal also has the power of directing the cone of the ear to the sonorous body without moving the head. There are some differences to be observed in the structure of the internal ear in different animals; but we know so very little of the use of the particular parts of that organ in the human subject, that it is altogether impossible to give reasons for these variations in other creatures.

All quadrupeds have at the internal canthus of the eye a strong firm membrane with a cartilaginous edge, which may be made to cover some part of their eye; and this is greater or less in different animals as their eyes are more or less exposed to dangers in searching after their food. This *membrana nictitans*, as it is called, is not very large in the dog. Cows and horses have it so large as to cover one half of the eye like a curtain, and at the same time it is transparent enough to allow abundance of the rays of light to pass through it. Fishes have a cuticle always over their eyes, as they are ever in danger of that inconstant element, the water. In this then we may also observe a sort of gradation. Quadrupeds have also a seventh muscle belonging to the eye, called *suspensorius*. It surrounds almost the whole optic nerve, and is fixed into the sclerotic coat as the others are. Its use is to sustain the weight of the globe of the eye, and prevent the optic nerve from being too much stretched, without obliging the four straight muscles to be in a continual contraction, which would be inconvenient; at the same time this muscle may be brought to assist any of the other four, by causing one particular portion of it to act at a time.

The next thing to be remarked is the figure of the *pupil*, which is different in different animals, but always exactly accommodated to the creature's way of life, as well as to the different species of objects that are viewed. Man has it circular, for obvious reasons; an ox has it oval, with the longest diameter placed transversely, to take in a larger view of his food; cats, again, have theirs likewise oval, but the longest diameter placed perpendicularly; they can either exclude a bright light altogether, or admit only as much as is necessary. The pupil of different animals varies in wideness, according as the internal organs of vision are more or less acute. Thus cats and owls, who seek their prey in the night, or in dark places, (and consequently must have their eyes so formed as that a few rays of light may make a lively impression on the retina,) have their pupils in the day-time contracted into a very narrow space, as a great number of rays would oppress their nice organs; while in the night, or where the light is faint, they open the pupil, and very fully admit the rays.

In the same way, when the retina is inflamed, a great number of rays of light would occasion a painful sensation; therefore the pupil is contracted: on the contrary, in dying people, or in a beginning amaurosis, it is generally dilated, as the eyes on such occasions are very difficultly affected, and as it were insensible.

The posterior part of the choroid coat, which is called *tapetum*, is of different colours in different creatures. For oxen, feeding mostly on grass, have this membrane of a green colour, that it may reflect upon the retina all the rays of light which come from objects of that colour, while other rays are absorbed: thus the animal sees its food better than it does other objects. Cats and owls have their tapetum of a whitish colour; and for the same reasons have the pupil very dilatable, and their organs of vision acute. And we shall find, that all animals see more or less distinctly in the dark, according as their tapetum approaches nearer to a white or black colour. Thus dogs, who have it of a greyish colour, distinguish objects better in the night than man, whose tapetum is dark brown, and who sees worst in the dark of any creature. The difference then of the colour of the tapetum, as indeed the fabric of any other part in different creatures, always depends on some particular advantage accruing to the animal in its peculiar manner of life from this singularity.

The brain is proportionally much smaller in all quadrupeds than the human; but, as in man, it is divided into cerebrum and cerebellum, and these two parts bear nearly the same proportion to one another as in us. There was no occasion for so great a quantity of brain in those animals as in man: since in them all its energy is employed in their progression, while man has a great waste of spirits in the exercise of his reason and intellectual faculties. And, besides this, a great bulky brain would be inconvenient to these creatures, inasmuch as it would add considerably to the weight of the head; which, having the advantage of a long lever to act with, would require a much greater force to support it than it now does; for the heads of the greatest part of quadrupeds are not near so heavy as they would at first sight seem to be, from the sinus frontales being produced a great way upwards to enlarge the organs of smelling. The pits in the anterior part of their skulls are much more conspicuous than in the human cranium; which may be occasioned by the depending posture of these creatures heads while they gather their food; the brain at this time gravitating much on the bones while they are as yet soft, will gradually make impressions upon them at these places where it rises into eminences. This is prevented in man mostly by his erect posture. The second process of the *dura mater*, or *tentorium cerebelli superexpansum*, is considerably thicker and stronger in most quadrupeds than in man; especially in such of them as are very swift of foot, as hares and rabbits, and that most when they are old. This membrane is generally ossified, or we find the place of it supplied by a bone, that it may the more effectually keep off the superincumbent vein from the cerebellum in their rapid motions, which otherwise would be of bad consequence.

The olfactory nerves are very large, and justly deserve the name of *processus mamillares*. They are hollow, and consist of a medullary and cineritious substance, and at first sight appear to be the anterior ventricles of the brain produced; but in man they are small, and without any discernible cavity. The reason of this is sufficiently evident, if we consider how this animal's head is situated; for the lymph continually gravitating upon the inferior part of the ventricles, may thus elongate and produce them; but from this very inferior part the olfactory nerves rise, and are sent immediately through the os ethmoides into the nose. Hence the ancients, thinking they were continued hollow into the nose, believed they were the emunctories of the brain. In the brain of sheep, which, by its firm texture, is the best subject of any for searching into the structure of this part, we evidently see, that the name of the *sigmoid cavity* was very properly applied by the ancients

to the lateral ventricles of the brain; which are really of a greater extent than they are ordinarily painted by the anatomists, reaching farther backwards, and forwards again under the substance of the brain. The cortical and medullary parts, as well as the corpus callosum, are similar to those parts in man.

The *nates* and *testes* deserve this name much better here than in the human body, with respect to each other. They are larger in the quadruped; and hence we perceive that there is no great reason for ascribing the different operations to any particular size or shape of these parts. They are here also of different colours: the nates being of the colour of the cortical, and the testes of the medullary, substance of the brain; whereas in man they are both of one colour. The reason of these differences, and others of the like nature, we shall not pretend to determine; for we have hitherto such an imperfect knowledge of the brain itself, that we are entirely ignorant of the various uses of its different parts. We may in general conclude, that the varying in one animal from what it is in another, is fitted to the creature's particular way of living.

The *rete mirabile Galeni*, situated on each side of the *fella turcica*, about which there has been so much dispute, is very remarkable in most quadrupeds. This plexus of vessels is nothing else than a continuation of the internal carotid arteries, which, entering the skull, divide into a vast number of minute branches running along the side of the *fella turcica*, and, uniting afterwards, are spent on the brain in the common way. Galen seems with justice to suppose, that this plexus of vessels serves for checking the impetuosity of the blood destined for the brain. The structure of the brain differing but very little in all quadrupeds, it will be needless to examine it in any other.

ANATOMY of a COW.

The next species of quadrupeds we propose to consider, is the ruminant kind, of which we have an example in the cow; and accordingly shall take the fœtus of the animal *in utero*, that we may first remark some things that are peculiar to it in that state, and afterwards proceed to examine its viscera as a ruminant animal.

The form of a cow's *uterus* differs from the human, in having two large cornua. This is common to it with other brutes; for a bitch has two long *cornua uteri*. But these again differ (as being multiparous and uniparous) in this, that in the bitch's cornua the fœtuses are contained; whereas here there is only part of the secundines, being mostly the allantois with the included liquor. The muscular fibres of the uterus are more easily discovered; its internal surface has a great number of spongy, oblong, protuberant, glandular bodies, fixed to it. These are composed of vessels of the uterus terminating here. In an impregnated uterus, we can easily press out of them a chylous mucilaginous liquor; they are composed of a great many processes or digituli, and deep caverns, answering to as many caverns and processes of the placenta. Their resemblance has occasioned the name of *papilla* to be given them; and hence it was that Hippocrates was induced to believe that the fœtus sucked *in utero*. The papillæ are found in all the different stages of life, in the various stages of pregnancy, and likewise in the unimpregnated state. It is not easy to determine whether the uterus grows thicker or thinner in the time of gestation. The membranes, it is plain, (by the stretching of the parts,) must be made thinner; but then it is as evident, that the vessels are at that time enlarged, upon which principally the thickness of any part depends; so there seems to be as much gained the one way as is lost the other.

The *os uteri* is entirely shut up by a glutinous mucilaginous substance, that is common to the females of all creatures when with young; by this the external air is excluded, which would soon make the liquors corrupt; it also prevents the inflammation of the membranes and the hazard of abortion. By this means also the lips of the womb are kept from growing together, which they would otherwise

otherwise certainly do at this time. There are mucous glands placed here to fecern this gluten, which on the breaking of the membranes with the contained waters make a sapo that lubricates and washes the parts, and makes them easily yield. The first of the proper involucri of the fœtus is the chorion.

The *chorion* is a strong firm membrane, on whose external surface are dispersed a great many red fleshy bodies of the same number, size, and structure, with the papillæ, with which they are mutually indented. They have been called *cotyledones*, from *κοτυλη*, "cavity." This is greatly disputed by some authors as a name very improper; but we think without reason, since the surface that is connected to the papillæ is concave, though when separated it appears rather convex. To shun all dispute, they may be called properly enough *placentulæ*, since they serve the same use as the placenta in women. The separation of these from the papillæ without any laceration, and our not being able to inject coloured liquors from the vessels of the glands of the uterus into the placentulæ, seem to prove beyond a reply, that there can be here no anastomoses between the vessels: on their coats run a great number of vessels that are sent to the several placentulæ, on the external side next to the uterus; whereas in creatures that have but one placenta, as in the human subject, cats, dogs, &c. the adhesion is somewhat firmer. The placenta are likewise joined to the papillæ in the cornua uteri.

The *allantois* is a fine transparent membrane contiguous to the former. It is not a general involucrium of the fœtus in the mother, for it covers only a small part of the amnios. It is mostly lodged in the cornua uteri. In mares, bitches, and cats, it furrounds the amnios, being every where interposed between it and the chorion. In sheep and goats it is the same as in the cow; and in swine and rabbits it covers still less of the amnios. This sac is probably formed by the dilatation of the urachus, which is connected at its other end to the fundus of the bladder, through which it receives its contents; and a great quantity of urine is commonly found in it. The membrane is doubled at the extremity of the canal, to hinder the return of the urine back into the bladder. Its vessels are so excessively fine and few, that we cannot force an injected liquor farther than the beginning of this coat. This membrane is so far analogous to the cuticula, as not to be liable to corruption, or easily irritated by acrid liquors.

The third proper integument of the fœtus is the *amnios*. It is thinner and firmer than the chorion; it has numerous ramifications of the umbilical vessels spread upon it, the lateral branches of which separate a liquor into its cavity. This is the proper liquor of the amnios; which at first is in a small quantity, afterwards increases for some months, then again decreases; and, in a cow near her time, the quantity of this liquor is not above a pound. This membrane does not enter the cornua uteri in this creature, being confined to the body of the uterus; whereas the *allantois* occupies chiefly its cornua. There are two *venæ umbilicales*, and but one in the human subject; because the extreme branches coming from the several placentulæ could not unite so soon as they would have done had they come all from one cake as in the human. There is a small round fleshy body that swims in the urine of cows, mares, &c. which is the *hippomane* of the ancients. Several idle opinions have been entertained as to its use; but that seems to be still unknown, or how it is generated or nourished, for it has no connection with the fœtus or placenta.

The umbilical vein joins the *vena portarum* in the *capsula Glissoniana*, without sending off any branches as it does in the human subject. This vein soon after birth turns to a ligament; yet there are some instances where it has remained pervious for several years after birth, and occasioned an hæmorrhage. We may next observe the duct called *canalis venosus*, going straight from the capsula Glissoniana to the *vena cava*; this turns also afterwards to a ligament. The umbilical arteries rise at acute angles

from the internal iliacs, whatever some may say to the contrary; these also become impervious.

The pulmonary artery coming from the right ventricle of the heart divides into two: the largest, called *canalis arteriosus*, opens into the descending aorta; the other divides into two, to serve the lungs on each side. The *foramen ovale* is placed in the partition between the right and left auricles. At the edge of the hole is fixed a membrane, which when much stretched will cover it all over; but more easily yields to a force that acts from the right auricle to the left, than from the left to the right. After what has been said, we may easily understand how the circulation is performed in a fœtus. The blood, being brought from the placenta of the mother, is thrown into the capsula Glissoniana, where it is intimately blended with the blood in the *vena portarum*: then part of this blood goes directly into the *vena cava* by the *ductus venosus*; the rest passes through the liver. First, then, the whole is sent from the *vena cava* into the right auricle, from whence part of it is sent by the *foramen ovale* into the left auricle; the rest passes into the right ventricle, then into the pulmonary artery; then the greatest share it receives is sent immediately into the descending aorta by the *canalis arteriosus*, and the remainder circulates through the lungs, and is sent back by the pulmonary veins into the left auricle; which, with the blood brought there by the *foramen ovale*, is sent into the left ventricle, from whence it is driven by the aorta through the body. The great design of this mechanism is, that the whole mass of blood might not pass through the collapsed lungs of the fœtus; but that part of it might pass through the *foramen ovale* and *canalis arteriosus*, without circulating at all through the lungs.

This was the opinion that universally prevailed till the end of the last century, when it was violently opposed by Mr. Mery, who is very singular in several of his opinions. He will not allow that the *foramen ovale* transmits blood from the right to the left auricle, but on the contrary from the left to the right; and that for no other reason, but because he observed the pulmonary artery in a fœtus larger than the aorta. Mr. Winslow endeavours to reconcile these two opinions, by saying the blood may pass either way, and that it is here as it were blended. His reason is, that, on putting the heart in water, the *foramen ovale* transmits it any way. Mr. Rohault, professor of anatomy at Turin, and formerly one of Mery's scholars, strongly defends his master, and criticises Mr. Winslow. What he principally builds on, is the appearance this *foramen* has in some dried preparations; but this Mr. Winslow will not allow as proof. After all, the common opinion seems the most rational.

We now come to consider the cow as a ruminant animal. There are no *dentes incisores* in the upper jaw; but the gums are somewhat hard, and the tongue rough. This roughness is occasioned by long sharp-pointed papillæ with which the whole substance of it is covered. These papillæ are turned towards the throat; so that by their means the food, having once got into the mouth, is not easily pulled back. The animals therefore supply the defect of teeth by wrapping their tongue round a tuft of grass; and so, pressing it against the upper jaw, keep it stretched, and cut it with the teeth of the under jaw; then, without chewing, throw it down into the *œsophagus*, which in these creatures consists of a double row of spiral fibres decussating one another. All animals which ruminate must have more stomachs than one; some have two, some three; our present subject has no less than four. The food is carried directly down into the first, which lies upon the left side, and is the largest of all; it is called *γαστήρ*, *ventriculus*, and *χοιλία*, by way of eminence. It is what is called by the general name of *paunch* by the vulgar. There are no rugæ upon its internal surface; but instead of these there are a vast number of small blunt-pointed processes, by which the whole has a general roughness, and the surface is extended

to several times the size of the paunch itself. The food, by the force of its muscular coat, and the liquors poured in here, is sufficiently macerated; after which it is forced up hence by the œsophagus into the mouth, and there it is made very small by mastication; this is what is properly called *chewing the cud*, or *rumination*; for which purpose the *dentes molares* are exceedingly well fitted: for, instead of being covered with a thin crust, the enamel on them consists of perpendicular plates, between which the bone is bare, and constantly wearing faster than the enamel, so that the tooth remains good to extreme old age; and by means of these teeth the rumination is carried on for a long time without any danger of spoiling them. After rumination, the food is sent down by the gullet into the second stomach; for the œsophagus opens indifferently into both. It ends exactly where the two stomachs meet; and there is a smooth gutter with rising edges which leads into the second stomach, from thence to the third, and also to the fourth; however, the cow has a power to direct it into which it will. Some tell us, that the drink goes to the second; but that might be easily determined by making them drink before slaughter. The second stomach, which is the anterior and smaller, is called *κεντροφαλός*, *reticulum*, *honey-comb*, the *bonnet*, or *king's-hood*. It consists of a great number of cells on its internal surface, of a regular pentagonal figure, like to a honey-comb. Here the food is farther macerated; from which it is protruded into the third, called *εξυγός*, or *omasum*, *vulgo* the *manyplies*, because the internal surface rises up into a great many plicæ or folds, and *stratum super stratum*, according to the length of this stomach. There are numberless glandular grains like millet-seeds dispersed on its plicæ, from which some authors call the stomach the *millet*. From this it passes into the fourth, whose names are *νυστρον*, *abomasum*, *caille*, or the *red*, which is the name it commonly has because of its colour. This much resembles the human stomach, or that of a dog; only the inner folds or plicæ are longer and looser; and it may also be observed, that in all animals there is only one digestive stomach, and that has the same coagulating power in the fœtus as the fourth stomach in this animal; whence this might not improperly be called the only true stomach. *Caille* signifies *curdled*; and hence the French have given that as a name to this fourth stomach, because any milk that is taken down by young calves is there curdled. It is this fourth stomach, with the milk curdled in it, that is commonly taken for making runnet; but, after the bile and pancreatic juice enter, this coagulation is not to be found, which shews the use of these liquors. There are other creatures which use the same food, that have not such a mechanism in their digestive organs. Horses, asses, &c. have but one stomach, where grass is macerated, and a liquor for their nourishment extracted, and the remainder sent out by the anus very little altered. From this different structure of the stomach in these creatures, a ruminant animal will be served with one-third less food than another of equal bulk: graziers are sufficiently acquainted with this. The reason is, that ruminating animals have many and strong digestive organs; all their food is fully prepared, and almost wholly converted into chyle: but a horse's stomach is not fitted for this; so that he requires a much greater quantity of food to extract the same nourishment.

The *duodenum* is formed here much the same way as in a dog, and the general intention kept in view with regard to the mixture of the bile and pancreatic lymph. The great guts here hardly deserve that name, their diameter differing very little from that of the small ones; but, to compensate this, they are much longer proportionally than a dog's, being convoluted as the small guts are. The cæcum is very large and long. The digestion of the cow, as well as some other animals, is accompanied with a peculiar kind of action called *rumination*; the intention of which seems to be, that the food may be sufficiently comminuted, and thus more fully acted upon by the stomach: for it is not observed that a calf ruminates as long as it is

fed only upon milk, though the action takes place as soon as it begins to eat solid food; but it is to be observed, that, as long as a calf feeds only upon milk, the food descends immediately into the fourth stomach (which, as has been already mentioned, seems only capable of performing the operation of digestion), without stopping in any of the first three. The rumination does not take place till after the animal has eaten a considerable quantity; after which she lies down, if she can do it conveniently, and begins to chew; though the operation will take place in a standing posture, if she cannot lie down. In this action a ball is observed to rise from the stomach with great velocity, almost as if shot from a musket. This ball the animal chews very accurately, and then swallows it again, and so on alternately, till all the food she has first eaten has undergone this operation. This is easily explained from the structure of the œsophagus, which has one set of fibres calculated for bringing up the grass, and another for taking it down again. By means of rumination, the cow extracts a much larger proportion of nourishment from her food than those animals which do not ruminate; and hence she is contented with much worse fare, and smaller quantities of it, than a horse; hence also the dung of cows, being much more exhausted of its fine parts than horse-dung, proves much inferior to it as a manure.

The *spleen* differs not much either in figure or situation from that of a dog's: but it is a little more firmly fixed to the diaphragm, there not being here so much danger of this viscous being hurt in the flexions of the spine. The *liver* is not split into so many lobes in this creature as either in a man or dog; which depends on the small motion this creature enjoys in its spine, which made such a division needless. Their *vesica urinaria* is of a pyramidal shape. It is very large, and more membranaceous; for, the urine of these creatures not being so acrid as that of carnivorous animals, there was no such occasion for expelling it so soon.

The male is provided with a loose pendulous *scrotum*, and consequently with *vesiculæ seminales*. The female organs differ from those of a bitch mostly as to the form of the cornua uteri, which are here contorted in form of a snail. In this, and in all uniparous animals, they contain only part of the secundines; but in bitches, and other multiparous animals, they run straight up in the abdomen, and contain the fœtus themselves.

The situation of the *heart* is much the same with that of a dog, only its point is rather sharper: in us, the heart beating continually against the ribs, and both ventricles going equally far down to the constitution of the apex, it is very obtuse; but here the apex is made up only of the left ventricle, so is more acute. The *aorta* in the cow is justly divided into *ascending* and *descending*, though this division is ill-founded either in a dog or man; and it has certainly been from this subject that the older anatomists took their descriptions when they made this division; for here the aorta divides into two, the ascending and descending.

ANATOMY of FOWLS.

Fowls have a particular covering of feathers different from all other creatures, but exactly well suited to their manner of life; for it not only protects them from the injuries of the weather, but serves them in their progression through that thin aerial element in which they are for the most part employed; and, as some fowls live much in the water, their feathers being continually besmeared with an oily liquor keeps the water from soaking into their skins, and prevents the bad effects which it would infallibly otherwise produce. Fowls have the strongest muscles of their whole body inserted into their wings; whence we may observe, that it is altogether impossible for man to buoy himself up into the air like birds, even though he had proper machines in place of wings, unless he were likewise provided with muscles strong enough for moving them, which he has not. In the next place, their wings are not placed in the middle of their bodies, but a good deal further for-

wards; whence it would at first view appear, that their heads would be erect, and their posterior parts most depending when raised in the air: but by stretching out their heads, which act upon the lever of a long neck, they alter their centre of gravity considerably; and also by filling the sacs or bladders in the inside of their abdomen with air, and expanding their tail, they come to make the posterior part of their bodies considerably higher; and thus they fly with their bodies nearly in an horizontal situation. Hence we find, that if their necks are kept from being stretched out, or their tails cut away, they become incapable of flying any considerable distance. The largeness of the wings in different fowls varies according to the occasions of the creature. Thus birds of prey, who must fly a considerable way to provide their food, have large strong wings; whereas domestic birds, who find their nourishment almost every where, have very short and but small wings.

Carnivorous animals are provided with strong crooked claws for catching their prey: water-fowls use them for swimming; and, principally for this purpose, have a strong firm membrane interposed between the toes. There is a beautiful mechanism to be observed in the toes of fowls, which is of considerable use to them. For their toes are naturally drawn together, or bent, when the foot is bent: this is owing to the shortness of the tendons that pass over them, which is analogous to our heel: and that the toes are set in the circumference of a circle, as our fingers are: hence, when the foot is bent, the tendons must consequently be much stretched; and, since they are inserted into the toes, must of necessity bend them when the foot is bent; and, when the foot is extended, the flexors of the toes are again relaxed, and the toes therefore expanded. This is also of great use to different kinds of fowls; thus the hawk, descending with his legs and feet extended, spreads his talons over his prey; and, the weight of his body bending his feet, the toes are contracted, and the prey is seized by the talons. This is also of great use to water-fowls; for, had there been no such contrivance as this, they must have lost as much way when they pulled their legs in as they had gained by the former stroke; but, as the parts are now framed, whenever the creature draws in its foot, the toes are at the same time bent and contracted into less space, so that the resistance made against the water is not near so great as before; on the contrary, when they stretch their foot, their toes are extended, the membrane between them expanded, and consequently a greater resistance made to the water. Again, such fowls as live mostly in the air, or have occasion to sustain themselves on branches of trees in windy weather, and even in the night-time when asleep, while all their muscles are supposed to be in a state of relaxation; such have no more to do but lean down the weight of their bodies, and their toes continue bent without any muscles being in action; and whenever they would disentangle themselves, they raise up their bodies, by which their foot, and consequently their toes, are extended.

The rostrum, bill, or beak, of fowls, is composed of two mandibulae, and, as in quadrupeds, the upper one has no motion, but what it possesses in common with the head. But parrots are an exception to this rule; for they can move the upper mandible at pleasure: this is exceedingly convenient, as it enables them to lay hold of whatever comes in their way. Carnivorous fowls have their beaks long, sharp, and crooked; domestic fowls, such as the hen kind, &c. have strong short beaks, commodiously fitted to dig up and break their food; the water-fowls, again, have long, or very broad scoop-like beaks, which is most convenient for them. The sternum of fowls is much larger proportionally than the human, and has a ridge rising in its middle for the more commodious origin of the muscles that move the wings. It is also less moveable than ours; for, had it been very moveable, a great deal of the force employed for moving the wings would at every contraction of the muscles have been lost, or else some other muscles must have come in play to keep the sternum firm; but

this additional weight would have been inconvenient for their progression.

ANATOMY of a COCK.

Though this kind of birds lives upon food somewhat similar to that of man, yet, as they have no teeth to separate or break down this food, we should expect to find something to compensate the want of teeth, something remarkable in the organs of digestion: we shall therefore begin with these parts. The *oesophagus* of the cock runs down its neck, somewhat inclined to the right side; and terminates in a large membranous sac, which is the *ingluvies* or crop, where the food is macerated and dissolved by a liquor separated by the glands, which are easily observed every where on the internal surface of this bag. The effect of this maceration may be very well observed in pigeons, who are sometimes in danger of being suffocated by the pease, &c. they feed upon, swelling to such an immense bulk in their *ingluvies*, that they can neither get upwards nor downwards. If it be a favourite fowl, it might be preserved by opening the sac, taking out the pease, and sewing up the wound. The food, getting out of this sac, goes down by the remaining part of the *oesophagus* into the *ventriculus succenturiatus*, or *infundibulum Peyerii*, which seems to be a continuation of the gullet: it has several glands, for separating a liquor to dilute the food still more before it comes into the true stomach or gizzard, *ventriculus callosus*. The gizzard consists of two very strong muscles, covered externally with a tendinous aponeurosis, and lined on the inside by a very thick firm membrane, which we evidently discover to be a production of the cuticula. This might have been proved in some measure *à priori*, from observing, that this membrane, which in chicks is only a thin slight pellicle, by degrees turns thicker and stronger the more attrition it suffers: but there is no other animal substance, so far as we know, which grows more hard and thick by being subjected to attrition, except the cuticula. Hence may be drawn some kind of proof of what has been affirmed concerning the tunica villosa of the stomach and intestines in the human body, viz. that it was in part a continuation of the epidermis; nay, all the hollow parts of the body, even arteries, veins, &c. seem to be lined with a production of this membrane, or one analogous to it. The use of the internal coat of the stomach of fowls, is to defend the more tender parts of that viscus from the hard grains and little stones these creatures swallow. The use of the gizzard is to compensate for the want of teeth; and it is well fitted for this purpose from the great strength it possesses.

The digestion of these animals is performed merely by attrition, as is evinced by many experiments; and it is further assisted by the hard bodies they swallow. We see them daily take down considerable numbers of the most solid little rugged flints they find; and these can serve for no other purpose than to help the trituration of their aliments. After these pebbles, by becoming smooth, are unfit for this office, they are thrown up by the mouth. Hence fowls that are long confined, though ever so well fed, turn lean for want of these stones to help their digestion. But this was put beyond all dispute by Mr. Tauvry, who gave a piece of metal to an ostrich, convex on one side, and concave on the other, but carved on both; and, opening the creature's body some time after, it was found, that the carving on the convex side was all obliterated, while the engraved character remained the same as before, on the concave side, which was not subjected to the stomach's pressure: this circumstance could not have happened had digestion been performed by a menstruum, or any other way whatsoever; but may be easily solved by allowing a simple mechanical pressure to take place. We are, however, by no means to conclude from this, as some have too rashly done, that in the human body digestion is performed by simple attrition; otherwise we may, with equal strength of reason, by as good arguments drawn from what is observed in fishes, prove that the aliments are dissolved

solved in our stomachs by the action of a menstruum. But this method of reasoning is very faulty; nor can it ever bring us to the true solution of any philosophical or medical problem. It is very plain, since the structure of the parts of the human stomach are so very different from that of this creature, that it is foolish and unreasonable to imagine both of them capable of producing the same effects. At each end of the stomach, there are as it were two particular faces of a different texture from the rest of the stomach, not consisting of strong muscular fibres; they seem to be receptacles for the stones, (especially at the end which is farthest from the orifice,) while the digested aliment is protruded into the intestines.

The *duodenum* begins near the same place at which the *œsophagus* enters; yet notwithstanding the vicinity of these two tubes, the aliments are in no danger of getting out before they are perfectly digested, by reason of a protuberance, or *septum medium*, between the orifices; and in those creatures who have such a strong muscular stomach, it is a matter of great indifference whether the entry of the *œsophagus* or *pylorus* be highest, provided that the entry from the *œsophagus* does not allow the food to regurgitate, since the force of the stomach can easily protrude it towards the *duodenum*. This gut is mostly in the right side, and hangs pendulous in their abdomen, having its two extremities fixed to the liver. The *ductus choledochus* enters near its termination, where it mounts up again to be fixed to the liver; and left, by the contraction of the intestines, the bile should pass over without being intimately blended with the chyle, that duct enters downwards, contrary to the course of the food, and contrary to what is observed in any of the animals we have yet mentioned. But still the general intention is kept in view, in allowing these juices the fairest chance of being intimately blended with the food.

The *small guts* are proportionally longer than those of carnivorous birds, for the general cause already assigned. At the end of the ilium they have two large *intestina caca*, one on each side, four or five inches long, coming off from the side of the rectum, and ascending; and we find them containing part of the food: these serve as reservoirs to the fæces; which, after some remora, there regurgitate into what soon becomes the rectum; which, together with the excretories of urine and organs of generation, empties itself into the common cloaca. The small intestines are connected by a long loose mesentery, which has little or no fat accompanying the blood-vessels, there being no hazard of the blood's being stopped. The *pancreas* in the cock lies between the two folds of the *duodenum*, and sends two or three ducts into this gut near the biliary duct. Their *spleen* is of a round globular figure, situated between the liver and stomach; and between these and the backbone it enjoys the same properties as in other animals, viz. large blood-vessels, &c. All its blood is sent into the *vena portarum*, and has a perpetual confluxation. It has no excretory, as far as we know. Their *liver* is divided into two equal lobes by a pellucid membrane, running according to the length of their body. The shape of their *gall-bladder* is not much different from that of quadrupeds; but it is thought to be longer in proportion to the size of the animal, and is farther removed from the liver. The principal difference to be remarked in the *heart*, is the want of the *valvule tricuspidæ*, and their place being supplied by one fleshy flap. The *lungs* are not loose within the cavity of the thorax, but fixed to the bone all the way; neither are they divided into lobes, as in those animals that have a large motion in their spine. They are two red spongy bodies, covered with a membrane that is pervious, and which communicates with the large vesicles or air bags that are dispersed over their whole abdomen; which vesicles serve two very considerable uses. The one is to render their bodies specifically light, when they have a mind to ascend and buoy themselves up when flying, by distending their lungs with air, and also straiten their *trachea arteria*, and so retain the air. Secondly, they supply the

place of a muscular *diaphragm* and strong abdominal muscles; producing the same effects on the several contained viscera as the muscles would have done, without the inconvenience of their additional weight; and conducting as much to the exclusion of the egg and fæces.

When we examine the upper end of the *trachea*, we observe a *rima glottidis* with muscular sides, which may act in preventing the food or drink from passing into the lungs; for there is no *epiglottis*, as in man and quadrupeds. The *trachea arteria*, near where it divides, is very much contracted; and their voice is principally owing to this contraction. If you listen attentively to a cock crowing, you will be sensible that the noise does not proceed from the throat, but deeper; nay, this very pipe, when taken out of the body, and cut off a little after its division, and blown into, will make a squeaking noise, something like the voice of these creatures. On each side, a little higher than this contraction, there is a muscle arising from their sternum, which dilates the *trachea*. The cartilages, of which the pipe is composed in this animal, go quite round it; whereas in men and quadrupeds they are discontinued for about one-fourth on the back-part, and the intermediate space is filled up by a membrane. In place of a muscular *diaphragm*, this creature has nothing but a thin membrane connected to the pericardium, which separates the thorax and abdomen. But besides this, the whole abdomen and thorax are divided by a longitudinal membrane or *mediastinum* connected to the lungs, pericardium, liver, stomach, and to the fat lying over the stomach and guts, which is analogous to an *omentum*, and supplies its place.

The *lymphatic system* in birds consists, as in man, of lacteal and lymphatic vessels, with the thoracic duct. The lacteals indeed, in the strictest sense, are the lymphatics of the intestines; and, like the other lymphatics, carry only a transparent lymph; and, instead of one thoracic duct, there are two, which go to the jugular veins. In these circumstances, it would seem that birds differ from the human subject, so far at least as we may judge from the dissection of a *goose*, the common subject of this inquiry, and from which the following description is taken. The lacteals run from the intestines upon the mesenteric vessels: those of the *duodenum* pass by the side of the pancreas; afterwards they get up the *cæliac artery*, of which the superior mesenteric is a branch. Here they are joined by the lymphatics of the liver, and then they form a plexus which furrounds the *cæliac artery*. Here also they receive a lymphatic from the gizzard, and soon after another from the lower part of the *œsophagus*. At the root of the *cæliac artery* they are joined by the lymphatics from the *glandulæ renales*, and near the same part by the lacteals from the other small intestines, which vessels accompany the lower mesenteric artery; but, before they join those from the *duodenum*, they receive from the rectum a lymphatic, which runs from the blood-vessels of that gut. Into this lymphatic some small vessels from the kidneys seem to enter at the root of the *cæliac artery*. The lymphatics of the lower extremities probably join those from the intestines. At the root of the *cæliac artery* and contiguous part of the *aorta*, a net-work is formed by the vessels above described. From this net-work arise two thoracic ducts, of which one lies on each side of the spine, and runs obliquely over the lungs to the jugular vein, into the inside of which it terminates, nearly opposite to the angle formed by the jugular and subclavian vein. The thoracic duct of the left side is joined by a large lymphatic, which runs upon the *œsophagus*. The thoracic ducts are joined by the lymphatics of the neck, and probably by those of the wings, where they open into the jugular veins. The lymphatics of the neck generally consist of two large branches on each side of the neck, accompanying the blood-vessels; and these two branches join near the lower part of the neck, and form a trunk which runs close to the jugular vein, and opens into a lymphatic gland; from the opposite side of this gland a lymphatic comes out, which ends in the jugular vein. On the left side, the

whole of this lymphatic joins the thoracic duct of the same side: but, on the right side, part of it goes into the inside of the jugular vein a little above the angle; whilst another joins the thoracic duct, and with that duct forms a common trunk, which opens into the inside of the jugular vein, a little below the angle which that vein makes with the subclavian. This system in birds differs most from that of quadrupeds, in the chyle being transparent and colourless, and in there being no visible lymphatic glands, neither in the course of the lacteals, nor in that of the lymphatics of the abdomen, nor near the thoracic ducts.

The *kidneys* lie in the hollow excavated in the side of the back-bone, from which there is sent out a bluish-coloured canal running along by the side of the *vas deferens*, and terminating directly into the common cloaca. This is the *ureter*, which opens by a peculiar aperture of its own, and not at the penis. Fowls having no *vesica urinaria*, some authors thought that they never passed any urine, but that it went to the nourishment of the feathers: but this is false; for that whitish substance covering their greenish faeces, and which turns afterwards chalky, is their urine.

The *testicles* are situated one on each side of the back-bone; and are proportionally very large in proportion to the creature's bulk. From these run out the *vasa feminifera*; at first straight, but, after they recede farther from the body of the testicle, they acquire an undulated or convoluted form, as the epididymis in man. These convolutions partly supply the want of *vesiculæ seminales*: they terminate in the penis, of which the cock has two, one on each side of the common cloaca, pointing directly outwards. They open at a distance from each other, and are very small and short; whence they have escaped the notice of anatomists, who have often denied their existence. In birds there is no prostate gland. This is what is chiefly remarkable in the organs of that male.

The *racemus vitellorum*, being analogous to the ovaria in the human subject, are attached by a proper membrane to the back-bone. This is very fine and thin, and continued down to the uterus. Its orifice is averse with respect to the ovaria; yet notwithstanding, by the force of the *orgasmus venereus*, it turns round and grasps the *vitellus*, which in its passage through this duct called the *infundibulum*, receives a thick gelatinous liquor secreted by certain glands. This, with what it receives in the uterus, composes the white of the egg. By this tube then it is carried into the uterus. The shell is lined with a membrane: and in the large end there is a bag full of air, from which there is no outlet.

The *uterus* is a large bag, placed at the end of the *infundibulum*, full of wrinkles on its inside; here the egg is completed, receiving its last involucre, and is at last pushed out at an opening on the side of the common cloaca. From the testes in the male being so very large in proportion to the body of the animal, there must necessarily be a great quantity of semen secreted; hence the cock is salacious, and becomes capable of impregnating many females. The want of the *vesiculæ seminales* is in some measure supplied by the convolutions of the *vasa deferentia*, and by the small distance between the fecerding and excretory organs. The two *penees* contribute also very much to their short coition; at which time the opening of the uterus into the cloaca is very much dilated, that the effect of the semen on the vitelli may be greater. A hen will of herself indeed lay eggs; but these are not impregnated, and yet they appear entirely complete.

We come now to consider the nutrition of the foetuses of oviparous animals, and shall give a short history of an egg, and of the changes brought on by incubation. The shell of an egg becomes more brittle by being exposed to a dry heat. It is lined every where with a very thin, but somewhat tough, membrane; which, dividing at or very near to the obtuse end of the egg, forms a small bag, where air only is contained. In a new-laid egg, this folliculus appears very little, but becomes larger when the egg is kept.

The albumen, or white of an egg, is contained in concentric membranes, but is not all of the same consistence; for the exterior part of it is thin, and diffuses itself almost like water when the membranes are broken; whereas its anterior part is more viscous. The white of an egg can make its way through the shell, as appears from its wasting by keeping, especially if exposed to gentle heat.

The globular vitellus, or yolk, would seem to be no other than a liquor inclosed in a membrane; because, whenever the membrane is broke, it runs all out; and is specifically heavier than the white. The chalazæ are two white spongy bodies, rising very small from the opposite sides of the membrane of the yolk, but gradually become larger as they are stretched out from it in an oblique direction with regard to the two ends of the egg. If we compare the chalazæ to the extremities of an axis passing through the spherical vitellus, this sphere will be composed of two unequal portions, its axis not passing through its centre; consequently, since it is heavier than the white, its smaller portion must always be uppermost in all positions of the egg.

The yellowish-white round spot, called *cicatricula*, is placed in the middle of the smaller portion of the yolk; and therefore always appears on the superior part of the vitellus. The *cicatricula* seems to be composed of several circles of different colours; and, in a fecundated egg, contains the embryo or chick. Eggs, whose obtuse ends are all rubbed over with linseed-oil, or such other substances as block up small pores, are as fit for bringing forth chickens, when incubated by a hen, as other eggs are. After incubation, the *folliculus aris* is gradually extended; till, near the time of the exclusion of the chick, it occupies more than a third of the cavity of the shell. The extended folliculus does not collapse, upon being exposed to the pressure of the atmosphere, after incubated eggs are opened. By incubation the albumen becomes thinner and more turbid, especially on its upper part near the air-bag, where it is also first consumed: and it is afterwards diminished towards the sharp end of the egg, till at last nothing of it is left except a white cretaceous substance at the lower part of the shell.

As the part of the white nearest to the *cicatricula* is wasted, its membrane and the *cicatricula* still approach nearer, till they become contiguous. This membrane of the albumen is what is commonly called the *chorion*. Some time before the albumen is quite consumed, what remains of it is placed at the lower part of the egg; and therefore the yolk is interposed between it and the membrane which immediately contains the foetus. The white of a fecundated egg is as sweet and free from corruption, during all the time of incubation, as it is in a new-laid egg. I tasted, smelled, and swallowed, says Dr. Monro, the whites of eggs during all the states of incubation, both when they were raw and boiled, and constantly found them sweet; and therefore cannot imagine how Bellini could affirm it to have a heavy abominably ungrateful taste, a stinking smell, and not only to occasion, when swallowed, a troublesome sensation in the stomach and guts, but to prove purgative. He must unluckily have examined none but subventaneous eggs: which is further confirmed by his description of the small particles in the colligated albumen, that reflect light so strongly as the eye cannot bear it. Very soon after incubation, the volume of the yolk appears increased; and, by its rising then nearer to the upper part of the egg, we may conclude that its specific weight decreases. The yolk becomes pale and more fluid for some time, especially on the side next to the chick, where its bulk also soonest increases; but afterwards the membranes of the yolk turn firmer and stronger, and the liquor in them is less in quantity, and becomes more viscous. As the chick increases, the yolk is depressed in the middle; and is soon brought into a form something like to a horse-shoe, in the middle of which the chick is lodged. The yolk remains fresh and uncorrupted all the time of incubation, and is always coagulable.

Not long before the exclusion of the chick, the whole yolk is taken into its abdomen. The whole albumen and vitellus are not consumed by the chick: for some part of the humours of the egg escapes through the shell, and is not supplied by any thing from without; as evidently appears by an egg's becoming so much specifically lighter as to swim in water after incubation, though it sunk in it when recent.

The chalazæ remain long without being considerably changed, unless that they are brought nearer to each other by the crescent form of the yolk; at last they degenerate into a dry chalky substance. The cicatricula very soon is enlarged by incubation; and, being buoyed up on the top of the yolk to the superior part of the egg, it is placed very near to the air-bag; and, when both increase, they become contiguous. The cicatricula is called *amnios*, when it becomes large, and contains the *colliquamentum* or liquor in which the chick is immersed. The quantity of the *colliquamentum* gradually increases till the fifteenth or sixteenth day of incubation; on the eighteenth, it is all consumed; and, in the three following days, scarcely any moisture can be observed on the internal surface of the *amnios*. The liquor of the *amnios* is more clear and transparent than the colligated white; its taste is more salt, and it has no observable smell. Its consistence is at first a little viscous, then it becomes more fluid, and afterwards turns a little ropy again. We can say nothing of the particular times when it does or does not coagulate by heat: for it is in so small quantity during the greater part of the time of incubation, that one can scarcely gather as much in a spoon as is fit to make any experiment with: and when all the egg is boiled hard, it adheres so closely to the white, that it is hardly possible to distinguish the one from the other. Malpighius, speaking of the egg between the fourteenth and nineteenth day, says, "That this thin diaphanous liquor of the *amnios* was sometimes forced, by boiling, into a white starchy substance;" which Dr. Monro's trials also confirmed.

The allantois and its contained urine are to be seen in an egg, as well as in the secundines of viviparous animals. Though the heart is among the first parts of the chick that can be distinguished, yet the umbilical vessels are seen much about the same time that the heart is observed. The umbilical vessels gradually disperse their branches upon the *amnios*, upon the vitellus, and upon the membranes of the albumen: the extremities of the much greater number, being immersed into the white, are extended proportionally as it is colligated. Near the end of incubation, the umbilical vessels begin to shrivel and decrease, till at the exclusion they are very small.

The embryo is seen in an egg at first in the form of a small worm: then its carina or spine, with the large prominences, that afterwards shew themselves to be the brain and eyes, appear; the other bowels seem hanging from the spine; the chasm of the mouth discovers itself; the extremities sprout out; the viscera are gradually covered with the integuments; and at last the beak, nails, and feathers, are seen; after which all the parts become stronger and firmer, the proportional bulk of the head decreasing. After all the parts of the chick are formed, it is always found lying on the side, with its neck greatly bent forward, the head being covered with the upper wing, and the beak placed between the thighs. When the shell is opened after the chick is large and strong, it may be seen to bounce and spurn, sometimes opening its mouth wide, especially if it is stirred or pricked. The mouth, œsophagus, and ingluvies, are always found moist; but never contain any quantity of liquor that can be collected or will run out in drops. The bulbous glandular part of the œsophagus immediately above the stomach, or what Peyer calls the *infundibulum*, and the stomach, are full of a liquor, in the youngest chick we can dissect, and continue full the whole time of incubation; neither *infundibulum* nor stomach having yet the tendinous firmness they have in adults; nor can we observe the dry pellicle which is so easily sepa-

rated from these parts in hens. This liquor of the stomach is at first thin and more watery; afterwards it becomes curdy; and at last resembles a greyish white mucus, unless that some part of it frequently is coloured yellow or green by a mixture of bile. It always coagulates, by boiling, into a firm yellowish white substance. A little time before the exclusion, the chick may frequently be heard making the same piping sound that hatched chickens make. In three eggs, which were opened in this state, the beak of the chick had perforated the membrane of the folliculus æris. The shell at the obtuse end of the egg frequently appears cracked some time before the exclusion of the chick. The chick is sometimes observed to perforate the shell with its beak; but in those Dr. Monro saw tumbling out of the shell, it was broke off irregularly, at the place where the membrane of the folliculus æris was joined to it. After the exclusion the yolk is gradually wasted, being conveyed into the small guts by a small duct, its membranes gradually contract themselves, and the duct becomes shorter. On the tenth day after exclusion, the vitellus was no larger than a small pin's head, and the duct was scarcely one-twentieth part of an inch long.

From this history of the egg, we shall endeavour to deduce the manner in which the colligated white is taken in by the chick. Authors generally seem to agree, that the oviparous foetus, while very young, receives its nourishment by the navel; but several of the best reputation have been of opinion, that afterwards it is conveyed by the month. Let us examine the arguments they have used in proof of this, and then subjoin some negative reasons which they have not noticed.

Bellini has described the cicatricula, or *sacculus amnii*, with the chalazæ first formed in the back of the hen; to which, according to him, the vitellus is afterwards joined, and the white is acquired as they pass down the oviduct. He says, the chalazæ are composed of numerous canals, which open into the *amnios*, and send out their roots into the cavity of the yolk, and into the white. It is easy to conceive what consequences may be drawn from this description, by those who assert the nourishment to be carried by the mouth, viz. That here are direct passages into the cavity where the chick is, which can take up the liquors no other way than by the mouth. We deny, however, that the *sacculus amnii* is formed before the vitellus; on the contrary, the vitellus is evidently to be seen before the cicatricula or chalazæ can be discerned. We also deny the chalazæ (if they are canals) to have the least communication with the *amnios*, at any time, or in any state of the egg, otherwise than as they are both adhering to the membrane of the vitellus; upon which, or within which, no particular fibres, no canals, are stretched to the cicatricula. Every one has it in his power to examine these facts. If then the facts are denied, the consequences cannot be admitted.

Since there are no canals passing through the yolk, that open into the *sacculus colliquamenti*, and the cicatricula comes to be placed on the upper part of the yolk, and contiguous to the air-bag, it is evident, that the *liquor amnii* must be furnished by the chick, which being covered with feathers, having no mammæ, bladder of urine, or large salivary glands, can only supply it by the branches of the umbilical vessels spread on the *amnios*. Harvey affirms, that a liquor is found in the mouth and ingluvies of the chick, which he concludes to be the *colliquamentum* or liquor amnii, from their resemblance; from the quantity of the contents of the stomach; from the chick's being seen to open its mouth; and from the necessity creatures are in of swallowing, or of forcing back by vomiting, whatever is introduced to the root of their tongue. As to the resemblance, we do not see how the comparison can be made, since the liquor in the mouth and crop is in such a small quantity. But, suppose that a sufficient quantity was collected, the two liquors agreeing in their several properties would not of itself be a sufficient proof of their being the same; and if, for argument's sake, the liquor in the crop

was granted to be in a very large quantity, and to agree in every property with that in the amnios, it would certainly appear in the same form for some time in the stomach; whereas it is always found very different there in the larger fœtus; and Harvey confesses as much in this place: therefore it may be concluded, that it does not go down into the stomach. If ever any thing like fœces has been seen in the crop of chickens, as has been alleged by some, it might be no more than the yellow or green-coloured substance brought up from the stomach.

Though creatures that respire are under a necessity of either swallowing, or forcing back by vomiting, whatever is introduced beyond their fauces, it cannot be thence concluded that a fœtus is under the same necessity; for, as it does not exercise respiration, it will suffer no inconvenience by a liquor lodging near to the glottis; whereas creatures that breathe cannot allow any substance to remain there without danger of the glottis being stopped, or of such substances falling down the trachea, either of which would be of bad consequence; which the animal prevents, by forcing such substances out of such a dangerous situation. But, to enforce the negative of the colliquamentum passing by the mouth, observe, that there are only three days in which this passage can most probably be supposed to happen, which are from the fifteenth to the eighteenth day of incubation: for before the fifteenth, the quantity of the liquor amnii is encreasing, which is no great sign of its being swallowed; and after the eighteenth, this liquor is not to be seen. If, then, the liquor amnii were all swallowed between the fifteenth and eighteenth days, the stomach ought to be fuller at this time, and its contents should be thinner, more pellucid, &c. like to the colliquamentum; which, however, does not happen. Besides, if we suppose the power of digestion so strong as to expel this liquor as fast as it is taken down in these three days, it would certainly follow, that this powerful digestion continuing in the three succeeding days, while there is no liquor to be swallowed, the stomach ought to be quite emptied; which every one who opens the stomachs of chickens at this time will see it is not. And, lastly, as a more direct proof still against Harvey, Dr. Monro broke the shells of several incubated eggs, while the colliquamentum was in large quantity; and, before the amnios was opened, he saw the chickens open their mouths very wide several times, but could not observe the quantity of the liquor in which they lay at all lessened. He afterwards carefully dissected the chickens, and found no other than the common small quantity in the crops, and the ordinary curdy mucus in the stomach; which seems to be a demonstration that they do not swallow. After such convincing proofs, we shall only desire the reader to compare the posture of a chick, and of a hen while she swallows liquors, that they may see the posture of the chick's neck to be most unfavourable to the supposition of deglutition being performed; and then shall conclude with a very short history of incubation, assigning the most probable reasons of the several appearances.

By the heat of the hen, assisted possibly by the action of the air contained in the folliculus aeris, the albumen becomes thinner, especially where it is most exposed to these forces; and the vitellus in the same manner becomes specifically lighter, and therefore readily rises in the white. And as, by being divided into two unequal portions by its axis the chalazæ, it presents the smaller portion to the incubating heat at first; so the change in consequence of incubation being soonest and most produced here, and the cicatricula being enlarged at the same time, the smaller portion of the yolk becomes much lighter; and therefore is buoyed up to the superior part of the egg; whereby the folliculus aeris and the membranes of the cicatricula become contiguous when they enlarge, and the vitellus can never be in hazard of compressing the tender embryo; and the umbilical vessels are situated so as to have their extremities immersed in the liquors that first undergo the proper change, for being imbibed by their orifices. The

incubation continuing, the white is still more and more colliquated, and the umbilical vessels are proportionally extended, the veins to absorb it, and the arteries to throw out any particles that are unfit for the chick till they are farther prepared. When the white in the upper part of the egg is exhausted, its membranes become contiguous to the amnios; and thereby, the membranes involving the fœtus, becomes sufficiently strong to resist the motions of the chick, when its ease or safety prompt it at any time to spurn. The powers of incubation above-mentioned, assisted by the pulsation and conquassatory motions of the numerous umbilical vessels spread on the yolk, dissolve that humour more, and render some part of it fine enough to be taken up by the small extremities of the umbilical vein, some of which penetrate its membrane: by which the liquor at last becomes thicker; and the membrane, being in part emptied, will more easily yield to the weight of the chick; and is pressed into the form of a horse-shoe, while the net-work of the vessels extended on this membrane renders it stronger and firmer. The folliculus aeris not only assists in colliquating the albumen, but, when the humours of the egg come to occupy a less space, by escaping through the shell, and by being changed into the solid substance of the chick, the folliculus enlarging, keeps the chick and humour steady, without danger of being disordered and broken by the motions of the egg. Branches of the umbilical vessels being distributed to the amnios, the arteries will pour out their liquors into its cavity in greater quantity than the veins can take them up, as long as the fœtus is weak: but, whenever the fœtus becomes stronger, and consequently the absorbent power of the veins increases, they will take up the fluid of the amnios faster than the arteries pour it in, and its quantity will be diminished till it is quite exhausted. This absorption will go on more speedily in proportion also to the umbilical vessels being less distended with albumen, whereby there is less resistance to the progressive motion of the absorbed liquors; which probably is the reason of the colliquamentum being all taken up between the fifteenth and eighteenth days. By the constant circulation and renewal of all these humours of the egg, they keep fresh and uncorrupted in a fecundated egg; but corrupt soon in a subventaneous one, or in such whose fœtus dies in the time of incubation. Wherever vessels are not sufficiently filled, they contract themselves; and therefore, the albumen being exhausted in the last days of incubation, the umbilical vessels gradually shrivel, which prevents the danger of an hæmorrhage when the chick is separated from its membranes. But, as the white is not sufficient at this time fully to supply the chick, the yolk is taken into its body; and, being there pressed, it is thrown gradually by the proper duct into the guts to supply that defect. The vessels and glands which open into the alimentary tube separate at least as much liquor as will moisten it; and the stomach, having no callous strong crust on its internal surface, will separate more than it can do in the adult; and in the mean time the glands of the infundibulum pour out a liquor that is always thicker as the chick increases, till it becomes a very thick white mucus: and therefore the contents of the stomach of the fœtus in the egg must have the appearance above described, and will be slowly passing off into the intestines. The shell at the obtuse end of the egg becoming more brittle, by being so long exposed to a dry heat, and the membranes losing their toughness when their moisture is exhausted, the chick very easily tears them, and breaks off that end of the shell, to make its way into the common atmosphere. The mother having no juices prepared within her body to give to the chick for food after it is hatched, and its organs for taking in and digesting aliment being for some time too weak to supply it sufficiently with nourishment, the vitellus is made to supply these deficiencies, till the chick is sufficiently confirmed and strong; after which it is no longer the subject of our present inquiry. We therefore proceed to finish our anatomical observations on the domestic fowls.

These creatures, as was observed of fowls in general, have no teeth. Some, indeed, have an appearance of teeth; but these are only small processes or serræ rising out from the mandible, without any socket, &c. which would have been needful, as they swallow their food entire. But their tongue is made somewhat firm, lest it should be hurt by the sharp points of the grain on which they feed. It is of a triangular figure, and pointed before; and, as by their depending posture their meat is in hazard of falling out of their mouths, to prevent this, there are several small pointed papillæ standing out upon their tongue and palate, with their points inclined backwards, allowing an easy passage to the food, but hindering it to return. We have here no velum palatinum, uvula, or epiglottis; and, in place of two large holes opening into the nose, there is only a long narrow rima furnished with strong muscles; and a similar rima supplies the place of a glottis. Fowls have a power of shutting both at pleasure; the nature of their food seems not only to exempt them from the hazard of its getting into the nose or trachea, but its sharp points would hurt an uvula or epiglottis. Hence we see with what difficulty they swallow dough or other sort of food that can be easily moulded into any form. When we examine the upper end of the trachea, we observe a rima glottidis with muscular sides, which may act in preventing the food or drink from passing into the lungs, for there is no epiglottis, as in man and quadrupeds.

Their *cranium* is more cellular and cavernous than ours. By this means their heads are light, yet strong enough to resist external injuries; for the enlarging of the diameter of bones contributes to their strength. By this cavernous *cranium* the organ of smelling is supposed to be considerably enlarged; and farther, finging birds, as is observed by Mr. Ray and Mr. Derham, have the cavernous structure of the brain still more observable: and we are told that the cavity of the tympanum communicates with the cells. Their brain is covered with the common membranes, but its external surface is not formed into so many gyæ or convolutions as ours. Its anterior part is quite solid, of a cineritious colour, and so far resembles the *corpora striata* as to give rise to the olfactory nerves. The whole of it appears to us as imperfect, and we can scarcely determine whether there be any thing analogous to a third or fourth ventricle; neither the *corpus callosum*, *fornix*, *nates*, or *testes*, &c. can be observed here; which parts therefore cannot be imagined as absolutely necessary for the functions of life, since we find these creatures perform them sufficiently well. Their organ of smelling is very large, and well provided with nerves; hence they have this sensation very acute. Ravens and other birds of prey give a sure proof of this, by their being able to find out their prey, though concealed from their sight, and at a considerable distance. Those birds that grope for their food in the waters, mud, &c. have large nerves, which run quite to the end of their bills, by which they find out and distinguish their food.

The anterior part of their eyes, instead of having the sclerotic coat contained, so as to make nearly a sphere as in us, turns all of a sudden flat; so that here the sclerotic makes but half a sphere; and the cornea rises up afterwards, being a portion of a very small and distinct sphere: so that in these creatures there is a much greater difference between the sclerotic and cornea than in us. Hence their eyes do not jut out as in man and quadrupeds. As most of these creatures are continually employed in hedges and thickets, that their eyes might be secured from these injuries, as well as from too much light when flying in the face of the sun, there is therefore a very elegant mechanism in their eyes. A membrane rises from the internal canthus, which at pleasure, like a curtain, can be made to cover the whole eye; and this, by means of a proper muscle that rises from the sclerotic coat, and, passing round the optic nerves, runs through the *musculus oculi attolens* and palpebra, to be inserted into the edge of this membrane. Whenever this muscle ceases to act, the membrane by its

own elasticity again discovers the eye. This covering is neither pellucid nor opaque, both which would have been equally inconvenient; but, being somewhat transparent, allows as many rays to enter as to make any object just visible, and is sufficient to direct them in their progression. By means of this membrane it is that the eagle is said to look at the sun. Quadrupeds also have a small *membrana nictitans*.

Besides, all fowls have another particularity, the use of which appears not so well understood; and that is, a longish black triangular purse, rising from the bottom of their eye just at the entry of the optic nerve, and stretched out into their vitreous humour, and perhaps it gives some threads to the crystalline. To this the French (who were the first that took notice of it in their dissections before the Royal Academy) gave the name of *bourse noire*. It may possibly serve to suffocate some of the rays of light, that they may see objects more distinctly without hurting their eyes. It has a connection with the vitreous, and seems to be joined also to the crystalline humours. If we suppose it to have a power of contraction, (which may be as well allowed as that of the iris,) it may so alter the position of the vitreous and crystalline humours, that the rays from any body may not fall perpendicularly upon the crystalline; and this seems to be necessary in them, since they cannot change the figure of the anterior part of their eye so much as we do: and, as this animal is exposed often to too great a number of rays of light, so they have no tapetum, but have the bottom of their eye wholly black on the retina; and in consequence of this, fowls see very ill in the dark.

They have no external ear; but in its place a tuft of very fine feathers covering the *meatus auditorius*, which easily allows the waves of sound to pass them, and likewise prevents dust or any insect from getting in. An external ear would have been inconvenient in their passage through thickets, and in flying, &c. A liquor is separated in the external part of the ear, or *meatus auditorius*, to lubricate the passage, and farther prevent the entrance of any insects, &c. The *membrana tympani* is convex externally; and no muscles are fixed to the bones of their ear, which are rather of a cartilaginous consistence: any tremulous motions impressed on the air are communicated in these creatures merely by the spring and elasticity of these bones; so, probably, the membrane is not so stretched as in the human ear by muscles. The semicircular canals are very distinct, and easily prepared.

We shall next consider carnivorous birds, commonly called *birds of prey*; and for an example shall take a *stannet* or small hawk. The principal difference to be observed in them, is in their chylopoietic viscera, which may be accounted for from their different way of life. Immediately under their clavicles, we observe the *oesophagus* expanded into their *ingluvies*, which is proportionally less than in the granivorous kind, since their food does not swell so much by maceration: and for the same reason, there is a less quantity of *menstruum* to be found there. They have also a *ventriculus succenturiatus*, plentifully stored with glands, situated immediately above their stomach, which is much more thin and musculo-membranous than in the granivorous kind; and this difference, which is almost the only one we find between the two different species of fowls, is easily accounted for from the nature of their food, which acquires less attrition, being easier of digestion than that of the other kind; nevertheless, it seems requisite it should be stronger than the human, to compensate the want of abdominal muscles, which are here very thin. The same mechanism obtains in this creature's duodenum, that we have hitherto observed. As being a carnivorous animal, its guts are proportionally shorter than those of the granivorous species, for the reason first given, viz. its food being more liable to corrupt, is therefore not proper to be long detained in the body; and for that reason it has no intestina cæca, of which the other fowls

fowls have a pair. The difference in their wings, beaks, and claws, are obvious; and have been already in some measure observed.

ANATOMY of AMPHIBIOUS and AQUEOUS ANIMALS.

Aqueous animals are generally divided into such as have lungs, and such as want them. The first species differ so inconsiderably from an ox or any other quadruped, that a few observations may be sufficient to give an idea of their internal structure; for this purpose, we shall first examine that species which most resembles man in the internal structure, the *tortoise*. The covering of this animal is composed of a shell so remarkably hard and firm in its texture, that a loaded waggon may go over it without hurting the shell or the animal within it. In the young, this shell grows harder in proportion as its contents expand; and this creature never changes its shell as some others do: hence it was necessary for it to be composed of different pieces; and these are more or less distinct in different animals. Its feet are small and weak, and are exceedingly slow in motion. It has neither tongue nor teeth; to make up for which, its lips are so hard as to be able to break almost the hardest bodies. The alimentary canal very much resembles that of the other class. The principal difference is in the circulation of the blood. The heart has two distinct auricles, without any communication; and under these, there is the appearance of two ventricles similar in shape to those of the former class: but they may be considered as one cavity; for the ventricle sends out not only the pulmonary artery, but likewise the aorta; for there is a passage in the septum by which the ventricles communicate freely, and the blood passes from the left into the right one. From the aorta the blood returns into the right auricle, while that from the pulmonary artery returns to the left auricle, from which it is sent to the left ventricle, &c. so that only a part of the blood is sent to the lungs, the rest going immediately into the aorta; hence the animal is not under the necessity of breathing so often as otherwise it would be.

From the base of the right ventricle goes out the pulmonary artery and aorta. The pulmonary artery is spent upon the lungs. The aorta may be said to be three in number; for the aorta sinistra ascends through the pericardium in company with the pulmonary artery; and afterwards turns down, and sends off a considerable branch, which splits into two; one of which joins the right aorta, while the other is distributed upon the liver, stomach, intestines, &c. What remains of this aorta runs to the kidneys and posterior extremities of that side. An aorta descends, &c. after piercing the pericardium, runs down and communicates with the branch already mentioned, is distributed upon the right kidney and inferior extremity, and also upon the bladder and parts of generation. An aorta ascends, after getting out of the pericardium, supplies the fore-legs, neck, and head. The blood of the superior part of the body returns to the right auricle by two jugular veins, which unite after perforating the pericardium. From the inferior part, it returns to the same auricle by two large veins: one on the right side receives the blood from the right lobe of the liver; the other on the left side receives the blood from the left lobe, and also a trunk which corresponds with the inferior vena cava in other animals. The pulmonary vessels run in the left auricle in the common way.

The absorbent system in the turtle, like that in the former class, consists of lacteals and lymphatics, with their common trunks the thoracic ducts; but differs from it in having no obvious lymphatic glands on any parts of its body, nor plexus formed at the termination in the red veins. The *lacteals* accompany the blood-vessels upon the mesentery, and form frequent net-works across these vessels: near the root of the mesentery a plexus is formed, which communicates with the lymphatics coming from the kidneys and parts near the anus. At the root of the mesentery on the left side of the spine, the lymphatics of

the spleen join the lacteals; and immediately above this a plexus is formed, which lies upon the right aorta. From this plexus a large branch arises, which passes behind the right aorta to the left side, and gets before the left aorta, where it assists in forming a very large receptaculum, which lies upon that artery.

From this receptaculum arise the thoracic ducts. From its right side goes one trunk, which is joined by that large branch that came from the plexus to the left side of the right aorta, and then passes over the spine. This trunk is the thoracic duct of the right side; for, having got to the right side of the spine, it runs upwards on the inside of the right aorta, towards the right subclavian vein; and, when it has advanced a little above the lungs, it divides into branches, which near the same place are joined by a large branch, that comes up on the outside of the aorta. From this part upwards, those vessels divide and subdivide, and are afterwards joined by the lymphatics of the neck, which likewise form branches before they join those from below. So that between the thoracic duct and the lymphatics of the same side of the neck, a very intricate net-work is formed; from which a branch goes into the angle between the jugular vein and the lower part or trunk of the subclavian. This branch lies therefore on the inside of the jugular vein, whilst another gets to the outside of it, and seems to terminate in it, a little above the angle between that vein and the subclavian.

Into the above-mentioned receptaculum the lymphatics of the stomach and duodenum likewise enter. Those of the duodenum run by the side of the pancreas, and probably receive lymphatics from it, and a part of those of the liver. The lymphatics of the stomach and duodenum have very numerous anastomoses, and form a beautiful net-work on the artery, which they accompany. From this receptaculum likewise (besides the trunk already mentioned, which goes to the right side) two other trunks, nearly equal in size, arise; one of which runs upon the left side, and the other upon the right side, of the left aorta, till they come within two or three inches of the left subclavian vein; where they join behind the aorta, and form a number of branches which are afterwards joined by the lymphatics of the left side of the neck; so that a plexus is here formed as well as upon the right side. From this plexus a branch issues, which opens into the angle between the jugular and subclavian vein.

The circulation in serpents and crocodiles is similar to that of the turtle; but we find only one ventricle. The blood goes from the right auricle to the ventricle which sends out the pulmonary artery and aorta; the blood from the pulmonary artery returns to the left auricle, that from the aorta going to the right auricle, and both the auricles opening into the ventricle.

The frog and lizard differ from the former animals, in having only one auricle and ventricle: and besides, the ventricle sends out a single artery, which afterwards splits into two parts; one to supply the lungs, the other runs to all the rest of the body: from the lungs and from the other parts the blood returns into the auricle.

ANATOMY of FISHES.

With respect to Fishes we may first observe, that they have a very strong thick *cuticle*, covered with a great number of scales, laid one on another like tiles on houses. This among other arguments is supposed to prove the human epidermis to be of a squamous structure; but the scales resemble the hairs, wool, feathers, &c. of the creatures that live in air; and below these we observe the proper *cuticula* and *cutis*. The generality of fishes, particularly those shaped like the cod, haddock, &c. have a line running on each side. These lines open externally by a number of ducts, which throw out a mucous or slimy substance, that keeps the skin soft and clammy, and seems to serve the same purpose with the mucous glands or ducts which are placed within many of our internal organs. In the next place, these creatures have neither superior nor inferior

inferior extremities, as quadrupeds and fowls; for their progression is performed in a different way from either of those species of animals: for this purpose they are provided with machines, properly consisting of a great number of elastic beams, connected to one another by firm membranes, and with a tail of the same texture; their spine is very moveable towards the posterior part, and the strongest muscles of their bodies are inserted there. Their tails are so framed as to contract to a narrow space when drawn together to either side, and to expand again when drawn to a straight line with their bodies; so, by the assistance of this broad tail, and the fins on their sides, they make their progression much in the same way as a boat with oars on its sides and rudder at its stern. The perpendicular fins situated on the superior part of their body keep them in *aquilibrium*, hindering the belly from turning uppermost; which it would readily do, because of the air-bag in the abdomen rendering their belly specifically lighter than their back; but, by the resistance these fins meet with when inclined to either side, they are always kept with their backs uppermost. It may next be observed, that these creatures have nothing that can be called a *neck*, since they seek their food in an horizontal way, and can move their bodies either upwards or downwards, as they have occasion, by the contraction or dilatation of the air-bag; a long neck, as it would hinder their progression, would be very disadvantageous in the element they live in.

The *abdomen* is covered on the inferior part with a black-coloured thin membrane resembling our peritoneum. It is divided from the thorax by a thin membranous partition, which has no muscular appearance; so that we have now seen two different sorts of animals that have no muscular diaphragm. These creatures are not provided with *teeth* proper for breaking their aliment into small morsels, as the food they use is generally small fishes, or other animals that need no trituration in the mouth, but spontaneously and gradually dissolve into a liquid chyle. Their teeth therefore serve to grasp their prey, and hinder the food they have once caught from escaping again. For the same purpose, the internal cartilaginous basis of the branchiæ, and the two round bodies situated in the posterior part of the jaws, have a great number of tenter-hooks fixed into them, in such a manner as that any thing can easily get down, but is hindered from getting back. The water that is necessarily taken along with their food in too great quantities to be received into their jaws in deglutition, passes between the interstices of the branchiæ and the flap that covers them.

The *oesophagus* in these creatures is very short, and scarcely distinguished from their stomach; and the food lies almost equally in both. The stomach is of an oblong figure. There are commonly found small fishes still retaining their natural form in the stomach of large ones; but, when touched, they melt down into a jelly. From this, and the great quantity of liquors poured into their stomachs; we may conclude, that digestion is solely brought about in them by the dissolving power of a menstruum, and that no trituration happens here. The *guts* of these animals are very short, making only three turns; the last of which ends in the common cloaca for the feces, urine, and semen, situated about the middle of the inferior part of their bodies.

To that substance which we call *pancreas*, some give the name of *intestinula cæca*. It consists of a great number of small threads, like so many little worms, which all terminate at last in two larger canals, that open into the first gut, and pour into it a viscous liquor much about the place where the biliary ducts enter. That kind of pancreas formed of *intestinula cæca* is peculiar to a certain kind of fishes; for the cartilaginous, broad, and flat, kind, as the skate, sole, flounder, &c. have a pancreas resembling that of the former class of animals. Their intestines are connected to the back-bone by a membrane analogous to a mesentery. Their *liver* is very large, of a whitish colour, and lies almost wholly in the left side, and contains a great

deal of fat or oil. The *gall-bladder* is situated a considerable way from their liver; and sends out a canal, the cystic duct, which joins with the hepatic duct just at the entry into the gut. Some fibres are stretched from the liver to the gall-bladder; but nobody has hitherto discovered any cavity in these cords: so in this animal it should seem impossible that the bile can be carried into the gall-bladder in the ordinary way; and consequently it must either be secreted on the sides of that sac, or regurgitate into it from the canalis choledochus. Here we may make the same remark as upon the biliary ducts of fowls, viz. that hepato-cystic ducts exist in the one as well as the other. This, for example, is very obvious in the salmon, where large and distinct ducts run from the biliary ducts of the liver, and open into the gall-bladder.

The *spleen* is placed near the back-bone, and at a place where it is subject to an alternate pressure from the contraction and dilatation of the air-bag, which is situated near it. Since, in all the different animals we have dissected, we find the spleen attached to some part that may give it a concussion; as in the human subject and quadrupeds, it is contiguous to the diaphragm; in fowls, it is placed between the back-bone, the liver, and the stomach; in fishes, it lies on the faccus aerius; and since we find it so well served with blood-vessels, and all its blood returning into the liver, we must not conclude the spleen to be an *inutile pondus*, only to serve as a balance to the animal *pro æquilibrio*, but particularly designed for preparing the blood for the liver.

The only *organs of generation* in this animal, are two bags situated in the abdomen uniting near the podex. These in the male are filled with a whitish firm substance called the *milt*; and in the female with an infinite number of little ova clustered together, of a reddish yellow colour, called the *roe*. Both these at spawning-time we find very much distended; whereas at any other time the male organ can scarcely be distinguished from the female; nor is there any proper instrument in the male for throwing the seed into the organ of the female, as in other creatures. We shall not take upon us to determine the way whereby the female sperm is impregnated; but we find that the spawn of frogs consists of small specks wrapped up in a whitish glutinous liquor; these specks are the rudiments of the young frogs, which are nourished in that liquor till they are able to go in search of their food. Spallanzani has found, that the eggs of frogs, toads, and water-newts, are not fecundated in the body of the female; that the male emits his semen upon the spawn while it is flowing from the female; and that the foetus pre-exists in the body of the female. But whether impregnation takes place in the same manner in fishes, he has not yet been able to determine, though he seems to think it probable; for, in the same way, the ova of fishes are thrown out and deposited in the sand, the male being for the most part ready to impregnate them, and they are hatched by the heat of the sun. It is curious enough to remark with what care they seek for a proper place to deposit their ova, by swimming to the shallow, where they can better enjoy the sun's rays, and shun the jaws of other large fishes. The river-fishes, again, spawn in some creek free from the hazard of the impetuous stream. But whether this mixture be brought about in fishes by a simple application of the genitals to each other, or if both of them throw out their liquors at the same time in one place, and thus bring about the desired mixture, it is not easy to determine; the latter, we think, seems most probable. These creatures are so shy, that we cannot easily observe their manner of copulation, and we are consequently but little acquainted with their natural history. Frogs, it is very evident, do not copulate; at least no farther than to allow both sexes an opportunity of throwing their sperm. Early in the spring the male is found for several days in close contact upon the back of the female, with his fore-legs round her body in such a manner that makes it very difficult to separate them; but there is no penetration. At this time
the

the female lays her spawn in some place that is most secure, while the male emits his sperm upon the female spawn.

After raising up the black peritonæum in fishes, there comes in view an oblong white membranous bag, in which there is nothing contained but a quantity of elastic air. This is the *swimming-bladder*; it lies close to the back-bone, and has a strong muscular coat, whereby it can contract itself. By contracting this bag, and condensing the air within it, fish can make their bodies specifically heavier than water, and so readily fall to the bottom; whereas, the muscular fibres ceasing to act, the air is again dilated, and they become specifically lighter than water, and so swim above. According to the different degrees of contraction and dilatation of this bladder, they can keep higher or lower in the water at pleasure. Hence flounders, soles, raia or skate, and such other fishes as want this sac, are found always groveling at the bottom of the water: it is owing to this that dead fish (unless this membrane has been previously broken) are found swimming on the surface with their bellies uppermost; for the back-bone cannot yield, and the distended sac is protruded into the abdomen, and the back is consequently heaviest at its upper part, according to their posture. There is here placed a glandular substance, containing a quantity of red blood; and it is very probable that the air contained in the swimming-bladder is derived from this substance. From the anterior part of the bag go out two *processes* or *appendices*, which, according to the gentlemen of the French academy, terminate in their fauces. In a variety of other fishes we find communications with some parts of the alimentary canal, particularly the œsophagus and stomach. The salmon has an opening from the fore-end of the air-bag into the œsophagus, which is surrounded by a kind of muscular fibres. The herring has a funnel-like passage leading from the bottom of the stomach into the air-bag; but it is not determined whether the air enters the air-bag by this opening, or comes out by it: the latter, however, seems to be the more probable opinion, as the glandular body is found in all fishes, whereas there are several without this passage of communication. At the superior part of this bag there are other red-coloured bodies of a glandular nature, which are connected with the kidneys. From them the *ureters* go down to their insertion in the *vesica urinaria*, which lies in the lower part of the abdomen; and the urethra is there produced, which terminates in the podex. These last-mentioned parts have not hitherto been observed in some species of fish; whence authors too hastily denied them in all. These creatures have a *membranous diaphragm*, that forms a sac in which the heart is contained. It is very tense, and almost perpendicular to the vertebræ.

The *heart* is of a triangular form, with its base downwards and its apex uppermost; which situation it has because of the *branchiæ*. The heart has but one auricle, one ventricle, and one great artery. The size of the auricle and that of the ventricle are much the same; the artery sends out numerous branches to the branchiæ or gills. And, what is rather curious, this artery, instead of supporting all parts as in the frog, is distributed entirely upon the gills, every branch terminating there, and becoming so extremely small as at last to escape the naked eye. The *branchiæ* lie in two large slits at each side of the head, and seem to be all that bears any analogy to lungs. Their form is semicircular; they have a vast number of red fibrillæ standing out on each side of them like a fringe, and very much resemble the vane of a feather. These branchiæ are perpetually subject to an alternate motion and pressure from the water; and we may here remark, that we have not found any red blood but in places subject to this alternate pressure. This observation will help us in explaining the action of the lungs upon the blood. Over these gills there is a large flap, allowing a communication externally; by which the water they are obliged to take into their mouths with their food finds an exit without passing into their stomach; it is owing to these flaps coming so far

down, that the heart is said commonly to be situated in their heads. The blood is collected again from the gills by a vast number of small veins, somewhat in the same manner as in our pulmonary vein; but, instead of going back to the heart a second time, they immediately unite and form an aorta descendens without the intervention of an auricle and ventricle. Hence a young anatomist may be puzzled to find out the power by which the blood is propelled from the gills to the different parts of the body; but the difficulty will be considerably lessened when we consider the manner in which the blood is carried through the liver from the intestines in man and quadrupeds. The aorta in fishes sends off branches which supply all the parts of the body excepting the gills. From the extremity of those branches the blood returns to the heart somewhat in the same manner as in the former class of animals; only there are two inferior venæ cavæ, whereas the former has but one.

In the *absorbent system* in fishes, we shall take the haddock as a general example: for the other fishes, particularly those of the same shape, will be found in general to agree with it. On the middle of the belly of a haddock, immediately below the outer skin, a lymphatic vessel runs upwards from the anus, and receives branches from the parietes of the belly, and from the fin below the anus; near the head this lymphatic passes between the two pectoral fins; and, having got above them, it receives their lymphatics. It then goes under the symphysis of the two bones which form the thorax, where it opens into a network of very large lymphatics, which lie close to the pericardium, and almost entirely surrounds the heart. This net-work, besides that part of it behind the heart, has a large lymphatic on each side, which receives lymphatics from the kidney, runs upon the bone of the thorax backwards, and, when it has got as far as the middle of that bone, it sends off a large branch from its inside to join the thoracic duct. After detaching this branch, it is joined by the lymphatics of the thoracic fins, and soon after by a lymphatic which runs upon the side of the fish. It is formed of branches, which give it a beautiful penniform appearance.

The lacteals run on each side of the mesenteric arteries, anastomosing frequently across those vessels. The receptaculum into which they enter is very large, in proportion to them; and consists at its lower part of two branches, of which one lies between the duodenum and stomach, and runs a little way upon the pancreas, receiving the lymphatics of the liver, pancreas, those of the lower part of the stomach, and the lacteals from the greatest part of the small intestines. The other branch of the receptaculum receives the lymphatics from the rest of the alimentary canal. The receptaculum formed by these two branches lies on the right side of the upper part of the stomach, and is joined by some lymphatics in that part, and also by some from the sound and gall-bladder, which in this fish adheres to the receptaculum. This thoracic duct takes its rise from the receptaculum, and lies on the right side of the œsophagus, receiving lymphatics from that part; and, running up about half an inch, it divides into two ducts, one of which passes over the œsophagus to the left side, and the other goes straight upon the right side, passes by the upper part of the kidney, from which it receives some small branches, and soon afterwards is joined by a branch from the large lymphatic that lies above the bone of the thorax; near this part it likewise sends off a branch to join the duct of the opposite side; and then, a little higher, is joined by those large lymphatics from the upper part of the gills, and from the fauces.

The thoracic duct, after being joined by these vessels communicates with the net-work near the orbit, where its lymph is mixed with that of the lymphatics from the posterior part of the gills, and from the superior fins, belly, &c. and then, from this net-work, a vessel goes into the jugular vein just below the orbit. This last vessel, which may be called the termination of the whole system, is very small in proportion to the net-work from which it rises;

and indeed the lymphatics of the part are so large, as to exceed by far the size of the sanguiferous vessels. The thoracic duct, having passed under the œsophagus from the right, runs on the inside of the vena cava of the left side, receives a branch from its fellow of the opposite side, and joins the large lymphatics which lie on the left side of the pericardium, and a part of those which lie behind the heart; and afterwards makes, together with the lymphatics from the gills, upper fins, and side, of the fish, a network, from which a vessel passes into the jugular vein of this side. In a word, the lymphatics of the left side agree exactly with those of the right side above described. Another part of the system is deeper seated, lying between the roots of the spinal processes of the back-bone. This part consists of a large trunk that begins from the lower part of the fish, and, as it ascends, receives branches from the dorsal fins and adjacent parts of the body. It goes up near the head, and sends a branch to each thoracic duct, near its origin.

The brain, in fishes is formed nearly in the same way as that of fowls; only we may observe, that the posterior lobes bear a greater proportion to the anterior. Their organ of *smelling* is large; and they have a power of contracting and dilating the entry into their nose as they have occasion. It seems to be mostly by their acute smell that they discover their food; for their tongue seems not to have been designed for a very nice sensation, being of a firm cartilaginous substance; and common experience evinces, that their sight is not of so much use to them as their smell in searching for their nourishment. If you throw a fresh worm into the water, a fish will distinguish it at a considerable distance; and that this is not done by the eye, is plain from observing, that after the same worm has been a considerable time in the water, and lost its odour, no fishes will come near it: but if you take out the bait, and make several little incisions into it, so as to let out more of the odoriferous effluvia, it will have the same effect as formerly. Now it is certain, had the creatures discovered this bait with their eyes, they would have come equally to it in both cases. In consequence of their smell being the principal means of discovering their food, we may frequently observe their allowing themselves to be carried down with the stream, that they may ascend again leisurely against the current of the water; thus the odoriferous particles, swimming in that medium, being applied more forcibly to their smelling organs, produce a stronger sensation.

The *optic nerves* in these animals are not confounded with one another in their middle progress between their origin and the orbit, but the one passes over the other without any communication; so that the nerve that comes from the left side of the brain goes distinctly to the right eye, and *vice versa*. Indeed it would seem not to be necessary for the optic nerves of fishes to have the same kind of connection with each other as those of man have; for their eyes are not placed in the fore-part, but in the sides, of their head, and of consequence, they cannot so conveniently look at any object with both eyes at the same time. The *lens crystallina* is here a complete sphere, and more dense than in terrestrial animals, that the rays of light coming from the water might be sufficiently refracted.

As fishes are continually exposed to injuries in the uncertain element they live in, and as they are in perpetual danger of becoming a prey to the larger ones, it was necessary that their eyes should never be shut; and, as the cornea is sufficiently washed by the element they live in, they are not provided with palpebræ; but then, as in the current the eye must be exposed to several injuries, there was a necessity that it should be sufficiently defended; which in effect it is by a firm pellucid membrane, that seems to be a continuation of the cuticula, being stretched over here. The epidermis is very proper for this purpose, as being insensible, and destitute of vessels, and consequently not liable to obstructions, or, by that means, of becoming opaque. In the eye of the skate tribe, there is

a digitated curtain which hangs over the pupil, and may shut out the light when the animal rests, and it is similar to the tunica adna of other animals.

Although it was formerly much doubted whether fishes possessed a sense of hearing, yet there can be little doubt of it now; since it is found that they have a complete organ of hearing as well as other animals; and likewise, as the water in which they live is proved to be a good medium for the propagation of sound. Fishes, particularly those of the skate kind, have a bag at some distance behind the eyes; which contains a fluid and a soft cretaceous substance, and supplies the place of vestibule and cochlea. There is a nerve distributed upon it, similar to the portio mollis in man. They have semicircular canals, which are filled with a fluid, and communicate with the bag: they have likewise a meatus externus, which leads to the internal ear. The cod fish, and others of the same shape, have an organ of hearing somewhat similar to the former; but, instead of a soft substance contained in the bag, there is a hard cretaceous stone. In this kind of fish no meatus externus has been yet observed.

ANATOMY of INSECTS.

With respect to insects and worms, they are so exceedingly numerous, that it would be endless to examine all the different kinds, nor would it serve any useful purpose in this enquiry. We shall therefore be content with making a few general observations, and these chiefly on the structure of their body. Insects differ from the former classes, by their bodies being covered with a hard crust or scale, by their having feelers or antennæ arising from their head, and many of them breathing the air through lateral pores. As to the shape of their bodies, though it somewhat differs from that of birds, being in general not so sharp before, to cut, and make way through, the air, yet it is well adapted to their manner of life. The base of their bodies is not formed of bone, as in many other animals, but the hard external covering serves them for skin and bone at the same time. Their feelers, beside the use of cleaning their eyes, are a guard to them in their walk or flight. Their legs and wings are well fitted for their intended service; but the latter vary so much in different insects, that from them naturalists have given names to the several orders of the class. As, first, the *Coleoptera*, or beetle tribe, which have a crustaceous elytra or shell, that shuts together, and forms a longitudinal future down their back. *Hemiptera*: as in cicada, cockroach, bug, &c. which have the upper wings half crustaceous, and half membranaceous; not divided by a longitudinal future, but incumbent on each other. *Lepidoptera*: as the butterfly, have four wings covered with fine scales in the form of powder. *Neuroptera*: as the dragon-fly, spring-fly, &c. have four membranaceous transparent naked wings, generally reticulated. *Hymenoptera*: as wasps, bees, &c. have four membranaceous wings, and a tail furnished with a sting. *Diptera*: as the common house-fly, have only two wings. *Aptera*: as the lobster, crab, scorpion, spider, &c. have no wings.

The structure of the *eye* in many insects is a most curious piece of mechanism. The outer part is remarkably hard, to guard against injuries; and has commonly a reticular appearance, or the whole may be considered as an assemblage of smaller eyes; but whether they see objects multiplied before them, has not yet been determined.

Linnaeus, and several others following him, deny the existence of a *brain* in these creatures. But it is certain, that at least a number of the larger kinds, as the lobster, crab, &c. have a soft substance similar to the brain, from which the optic and other nerves take their rise; besides, when this substance is irritated, the animal is thrown into convulsions: hence we should conclude, that insects have a brain as well as the former classes, although this is smaller in proportion to their bodies. Their ear has been lately discovered to be placed at the root of their antennæ or feelers, and can be distinctly seen in some of the larger kinds,

kinds, as the lobster. They have a *stomach*, and other organs of digestion; and it is curious, that in some, as the lobster, the teeth are found in the stomach. They have a *heart* and *blood-vessels*, and circulation is carried on in them somewhat as in the former class; but the blood is without red globules; or, as naturalists speak, is colourless. In the lobster, and others of the larger kind, when a piece of the shell is broken, the pulsation of the heart is seen distinctly, and that sometimes for several hours after it has been laid bare. The existence of *lungs* has been denied by some authors. But late experiments and observations shew, that no species want them, or at least something similar to them; and, in many insects, they are larger in proportion than in other animals; in most of them, they lie on or near the surface of their body; and send out lateral pores or tracheæ, by which, if the animal is besmeared with oil, it is instantly suffocated.

The same difference in sex exists in insects as in other animals, and they even appear more disposed to increase their species, many of them, when become perfect, seeming to be created for no other purpose but to propagate. Thus the silk-worm, when it arrives at its perfect or moth state, is incapable of eating, and can hardly fly; it endeavours only to propagate its species: after which the male immediately dies; as does the female as soon as she has deposited her eggs. Besides those of the male and female, a third sex exists in some insects which we call *neuter*. As these have not the distinguishing parts of either sex, they may be considered as eunuchs or infertile. We know of no instance of this kind in any other class of animals; and it is only found among those insects which form themselves into societies, as bees, wasps, and ants; and here these eunuchs are real slaves, as on them lies the whole business of the œconomy. No hermaphrodites as yet have been discovered among insects.

Many have imagined that the generality of insects were merely the production of putrefaction, because they have been observed to arise from putrefied substances: but a contrary opinion is now more generally adopted; and it is certain, that, if putrid bodies be shut up in a close vessel, no insects are ever generated unless their ova have been originally deposited there. They are oviparous animals, and lay their eggs in places most convenient for the nourishment of their young; some in water, others in flesh; some in fruit and leaves; while others make nests in the earth or in wood, and sometimes even in the hardest stone.

The eggs of all insects first become caterpillar or maggot. From which they are changed into chrysalis or aurelia, so named from their being inclosed in a case; and these dying, or seeming to die, the fly, or butterfly, or perfect state, succeeds; and during each of these changes their appearance differs wonderfully.

With respect to Worms, they have characters corresponding with those of the former tribe, but are distinguished from them by having no antennæ, and in being furnished with tentacula. Many of them, particularly those without shells, are remarkably tenacious of life, sometimes capable of being new-formed from a part which may have been separated. By much the greater number of them are destitute of head, ears, nose, eyes, and feet. Some of those in the first order, as the common round worms, have a vascular and nervous system, with the parts of generation, which can be distinctly seen. Some, as the cuttle-fish, form a kind of connection between fishes and worms, in possessing gills but wanting fins, &c. while others, as those of the lowest order, or zoophyta, join the properties of the animal and vegetable kingdom together. The class is divided into the following orders, viz. *Intestina*: as the earth-worm, leech, &c. which are the most simple animals, being perfectly naked, and without limbs of any kind. *Mollusca*: as the naked snail, sea-slug, cuttle-fish; which are likewise simple animals without any shell, but they are brachiated or furnished with a kind of limbs. *Testacea*: as the snail, oyster, &c. which have the same characters as the former order, but are covered with a shell, and include the greater part of what we commonly call shell-fish. *Lithophyta*: as corals, madrepores, &c. which are compound animals fixed upon a calcareous base, constructed by the creatures themselves. *Zoophyta*: as the sponge, polypus, &c. These are likewise compound animals, furnished with a kind of flowers, and having a vegetating root and stem.

Some of these creatures inhabit the earth, others live on the rest of the animal or on the vegetable kingdom, and many are found in the hardest stones; while an innumerable tribe of them live in the waters. In general, they are said to be of the hermaphrodite and oviparous kind; while the lowest class, as the polypi, in a great measure resemble the vegetable kingdom in their manner of growth; but for the propagation of these animals, as well as the others of this class, we refer the reader to the various particulars under their respective heads.

A N A

A N A

A'NATRON, *f*. The scum which swims upon molten glass in the furnace, which, when taken off, melts in the air, and then coagulates into common salt. It is likewise that salt which gathers upon the walls of vaults.

A'NAX, a son of Cœlus and Terra, from whom Miletus was formerly called Anactoria. This name was anciently given to several remarkable persons, it having been of the greatest honour.

ANAXA'GORAS, one of the most celebrated philosophers among the ancients. He was born at Clazomene in Ionia, about the 70th Olympiad. He was a disciple of Anaximenes; and he gave up his patrimony, to be more at leisure for the study of philosophy, giving lectures in that science at Athens. Being persecuted in this place, and at last banished from it, he opened a school at Lampacum, where he was greatly honoured during his life, and still more after his death, statues having been erected to his memory. It is said he made some predictions relative to the phenomena of nature, as earthquakes, &c. upon which he wrote some treatises. His principal tenets may be reduced to the following: All things were in the beginning confusedly mixed together, without order and without

motion. The principle of things is at the same time one and multiplex, which had the name of *homemeries*, or similar particles, deprived of life. But there is beside this, from all eternity, another principle, an infinite and incorporeal spirit, who gave motion to these particles; in virtue of which, such as are homogeneous united, and such as were heterogeneous separated according to their different kinds. All things being thus put in motion by the spirit, and every thing being united to such as are similar, those that had a circular motion produced heavenly bodies, the lighter particles ascending, while those that were heavier descended. The rocks of the earth, being drawn up by the whirling force of the air, took fire, and became stars, beneath which the sun and moon took their stations. It was said he also wrote upon the Quadrature of the Circle; the treatise upon which, Plutarch says, he composed during his imprisonment at Athens.

ANAXAR'CHUS, a philosopher of Abdera, highly esteemed by Alexander the Great. His end was peculiarly tragical: having the misfortune to fall into the hands of the enemy, they pounded him alive in a mortar.

ANAXA'RETE, in fabulous history, a nymph of the island

island of Cyprus, for whose unkindness her lover Iphigene hanged himself at her door; and, looking on this sad spectacle without emotion or pity, she was turned into a stone.

ANAXIMANDER, a very celebrated Greek philosopher, was born at Miletus in the 42d Olympiad; for, according to Apollodorus, he was sixty-four years of age in the second year of the 58th Olympiad. He was one of the first who publicly taught philosophy, and wrote upon philosophical subjects. He was the kinsman, companion, and disciple, of Thales. He wrote also upon the sphere and geometry, &c. And he carried his researches into nature very far, for the time in which he lived. It is said that he discovered the obliquity of the zodiac; that he first published a geographical table; that he invented the gnomon, and set up the first sundial in an open place at Lacedæmon. He taught, that infinity of things was the principal and universal element; that this infinite always preserved its unity, but that its parts underwent changes; that all things came from it; and that all were about to return to it. By this obscure and indeterminate principle he probably meant the chaos of other philosophers. He held that the worlds are infinite; that the stars are composed of air and fire, which are carried about in their spheres, and that these spheres are gods; and that the earth is placed in the midst of the universe, as in a common centre. Farther, that infinite worlds were the produce of infinity; and that corruption proceeded from separation.

ANAXIMENES, an eminent Greek philosopher, born at Miletus, the friend, scholar, and successor, of Anaximander. He diffused some degree of light upon the obscurity of his master's system. He made the first principle of things to consist in the air, which he considered as infinite or immense, and to which he ascribed a perpetual motion; that this air was the same as spirit or God, since the divine power resided in it, and agitated it. The stars were as fiery nails in the heavens; the sun a flat plate of fire; the earth an extended flat surface, &c.

ANAXIMENES, the son of Aristocles of Lampfacus, an orator, the disciple of Diogenes the Cynic, and of Zoilus the railer against Homer. He was preceptor to Alexander of Macedon, and followed him to the wars. Alexander being incensed against the people of Lampfacus, they sent this philosopher to intercede for them. Alexander, knowing the cause of his coming, swore that he would do the very reverse of whatever he desired of him. Anaximenes begged of him to destroy Lampfacus. Alexander, unwilling to break his oath, and not able to elude this stratagem, pardoned Lampfacus much against his will.

ANAZAR'BUS, or **ANAZAR'BA**, a town of Cilicia, on the river Pyramus, the birth-place of Dioscorides, and of the poet Oppian. It was sometimes called *Cæsarea*, in honour either of Augustus or of Tiberius. It was destroyed by a dreadful earthquake in the year 525, along with several other important cities: but they were all repaired at a vast expence by the emperor Justin; who was so much affected with their misfortune, that, putting off the diadem, &c. he appeared for several days in sackcloth.

ANBLATUM, *f.* in botany. See **LATHRÆA**.

AN'BERTKEND, in the eastern language, a celebrated book of the Brachmans, wherein the Indian philosophy and religion are contained. The word in its literal sense denotes the cistern wherein is the water of life. The Anbertkend is divided into fifty beths or discourses, each of which consists of ten chapters. It has been translated from the original Indian into Arabic, under the title of *Morat al Maani*, q. d. "the marrow of intelligence."

ANCE'US, the son of Neptune and Astypalæa, who went with the Argonauts, and succeeded Tiphis as pilot of the ship Argo. He reigned in Ionia, and was once told by a slave, whom he pressed with hard labour in his vineyard, that he never would taste of the produce of his vines. Anceus laughed at this prediction, caused a cup of it to be brought immediately, and told him he was a false prophet. Not yet, replied the slave, for many things fall out be-

tween the cup and the lip. Just then he was informed that a wild boar had entered his vineyard; upon which he threw down the cup, and ran to drive away the animal, but was slain in the attempt.

ANCARA'NO, a town of Italy, in the march of Ancona, situated in Lat. 42. 48. N. lon. 14. 54. E.

AN'CASTER, [*of an, and cafter, Sax. a castle,*] Is a town in Lincolnshire of great antiquity, which is taken by some to be the *Crococolana* of Antoninus. At the south end of it are the remains of a castle, encompassed by a ditch and rampart. The area against the east end of the church, where the castle once stood, is large; and on the highest ground of the area stand the ruins of a chapel, dedicated to St. Mary, adjoining which is an hermitage. The townlet is divided into two lordships: the east side, whereon stood the castle, is in the township of Wilsford; the west side is in the township of Ancaster, whereon stands the church, which was built by the Romans; it is a neat building, with a lofty spire, dedicated to St. Martin, and is a vicarage. The town consists chiefly of one street, leading from north to south. On the west side of the town is a road, which was formerly designed for the use of such as travelled after the gates were shut. To the south of the castle is a fine running spring, called Lady's Well; it was never known to rise more than an inch, or to fail of water; it takes its course towards the castle, where emptying itself into a pool, it is no more seen. It is said there is no other spring from hence to Lincoln, which is fifteen miles. There have been vast quantities of human bones found in the town and adjacent villages, some not more than a foot below the surface of the earth, and others at the depth of seven. This town abounds with the remnants of antiquity; the sale of which has, for many years, been carried on by the inhabitants; for, after a hasty shower, the shepherds and school-boys go to seek them in the neighbouring declivities and quarries. This town gives the title of duke to the noble family of Bertie. Ancaster is distant from Sleaford six miles, Boston twenty-three, Grantham eight, Newark fifteen, Folkingham ten, Nottingham thirty-two, Stamford twenty-six, and London 115. Lat. 52. 30. N. lon. 30. 0. W.

ANCE'NIS, a town seated on the river Loire, in the department of Lower Loire, twenty miles east of Nantes.

AN'CESTOR, *f.* [*ancestor, Lat. anceſtre, Fr.*] One from whom a person descends, either by the father or the mother. It is distinguished from *predecessor*; which is not, like *anceſtor*, a natural, but civil, denomination. An hereditary monarch succeeds to his *anceſtors*; an elective, to his *predecessors*.

Most nations have paid honours to their ancestors. It was properly the departed souls of their forefathers that the Romans worshipped under the denominations of *lares*, *lemures*, and *household gods*. Hence the ancient tombs were a kind of temples, or rather altars, wherein oblations were made by the kindred of the deceased. The Chinese seem to have distinguished themselves above all other nations in the veneration they bear their ancestors. By the laws of Confucius, part of the duty which children owe their parents consists in worshipping them when dead. This service, which makes a considerable part of the natural religion of the Chinese, is said to have been instituted by the emperor Kun, the fifth in order from the foundation of that ancient empire.

ANCESTOR, in law, is one from whom an inheritance is derived. No person can be properly such an ancestor as that an inheritance in lands or tenements can be derived from him, unless he hath had actual seisin of such lands, either by his own entry, or by the possession of his own or his ancestor's lessee for years, or by receiving rent from the lessee of the freehold; or unless he hath had what is equivalent to corporal seisin in hereditaments that are incorporeal; such as the receipt of rent, the presentation to a church, and such like. 2 *Blackst.* 209.

AN'CESTREL, *adj.* Claimed from ancestors; relating to ancestors.

AN'CESTRY,

ANCESTRY, *f.* Lineage; a series of ancestors, or progenitors; the persons who compose the lineage.—A tenacious adherence to the rights and liberties transmitted from a wife and virtuous *ancestry*, public spirit, and a love of one's country, are the support and ornaments of government. *Addison*. The honour of descent; birth.—Title and *ancestry* render a good man more illustrious, but an ill one more contemptible. *Addison*.

ANCHENTRY, *f.* [from *ancient*, and therefore properly to be written *ancientry*.] Antiquity of a family; ancient dignity; appearance or proof of antiquity.

ANCHILOPS, *f.* [*αγκυλον*, contraction, and *αψ*, eye.] In medicine, denotes an abscess, or collection of matter, between the great angle of the eye and the nose. If suffered to remain too long, or unskilfully managed, it degenerates, the stagnating humours corrupt, and an ulcer is produced. When the tumour is broke, and the tears flow involuntarily, whilst the os lacrymale is not carious, it is an *aglyops*; but when the ulcer is of a long standing, deep, fetid, and the os lacrymale becomes carious, it is a *stypula*. The cure is by restriction and excision, tying it at the root on the glandula lacrymalis, and, when ready, cutting it off. See *SURGERY Index*.

ANCHISES, a Trojan prince, son of Capys, and father of Æneas, by the goddess Venus. In his youth he fed cattle at the foot of mount Ida. After the burning of Troy, he could not fly from the city on account of his age; and therefore Æneas carried him on his back. He bore his household gods along with him, and died in Sicily, where his son erected a magnificent tomb to his memory.

ANCHOR, *f.* [*anchora*, Lat. of *αγκυρα*, Gr.] A heavy iron, composed of a long shank, having a ring at one end to which the cable is fastened, and at the other branching out into two arms or flocks, tending upwards, with barbs on each side. Its use is to hold the ship, by being fixed to the ground. It is used, by a metaphor, for any thing which confers stability or security.—Which hope we have as an *anchor* of the soul, both sure and steadfast, and which entereth into that within the veil. *Hebrews*. The forms of speech in which it is most used are, to *cast anchor*, to *lie* or *ride* at anchor.

The most ancient anchors are said to have been of stone; and sometimes of wood, to which a great quantity of lead was usually fixed. In some places, baskets full of stones, and sacks filled with sand, were employed for the same use. All these were let down by cords into the sea; and by their weight stayed the course of the ship. Afterwards they were composed of iron, and furnished with teeth, which, being fastened to the bottom of the sea, preserved the vessel immovable; whence *odortes*, and *dentes*, are frequently taken for anchors in the Greek and Latin poets. At first there was only one tooth, whence anchors were called *ἑποστόμοι*; but in a short time the second was added by Eupalamus, or Anacharis, the Scythian philosopher. The anchors with two teeth were called *αμφιβολοι* or *αμφιστομοι*; and from ancient monuments appear to have been much the same with those used in our days, only the transverse piece of wood upon their handles, the stock, is wanting in all of them. Every ship had several anchors; one of which, surpassing all the rest in bigness and strength, was particularly termed *ῥεγα*, or *sacra*; and was never used but in extreme danger; whence *sacram anchoram solvere*, is proverbially applied to such as are forced to their last refuge.

The anchors now made are contrived so as to sink into the ground as soon as they reach it, and to hold a great strain before they can be loosened or dislodged from their station. They are composed of a shank, a stock, a ring, and two arms with their flocks. The stock serves to guide the flocks in a direction perpendicular to the surface of the ground; so that one of them sinks into it by its own weight as soon as it falls, and is still preserved steadily in that position by the stock, which, together with the shank, lies flat on the bottom. In this situation it must necessarily sustain a great effort before it can be dragged through the

earth horizontally. Indeed this can only be effected by the violence of the wind or tide, or both of them, sometimes increased by the turbulence of the sea, and acting upon the ship so as to stretch the cable to its utmost tension, which accordingly may dislodge the anchor from its bed, especially if the ground be soft and oozy, or rocky. When the anchor is thus displaced, it is said, in the sea-phrases, to *come home*. Every ship has, or ought to have, three principal anchors, with a cable to each, viz. the sheet, *maitresse-ancre* (which is the *anchora sacra* of the ancients); the best bower, *second ancre*; and small bower, *ancre d'affourche*, so called from their usual situation on the ship's bows. There are besides smaller anchors, for removing a ship from place to place in a harbour or river, where there may not be room or wind for sailing; these are the stream anchor, *ancre de toue*; the kedge and grappling, *grapin*: this last, however, is chiefly designed for boats.

In England, France, and Holland, anchors are made of forged iron; but in Spain they are sometimes made of copper, and likewise in several parts of the South Sea. M. Bouguer, in his *Traité de Navire*, directs to take the length of the shank in inches, and to divide the cube of it by 1160 for the weight. The reason is obvious; because the quotient of the cube of 201 inches, which is the length of an anchor weighing 7000 lb. divided by the weight, is 1160; and therefore, by the rule of three, this will be a common divisor for the cube of any length, and a single operation will suffice. The same author gives the following dimensions of the several parts of an anchor. The two arms generally form the arch of a circle, whose centre is three-eighths of the shank from the vertex, or point where it is fixed to the shank; and each arm is equal to the same length, or the radius; so that the two arms together make an arch of 120 degrees: the flocks are half the length of the arms, and their breadth two-fifths of the said length. With respect to the thickness, the circumference at the throat, or vertex of the shank, is generally made about a fifth part of its length, and the small end two-thirds of the throat; the small end of the arms of the flocks, three-fourths of the circumference of the shank at the throat. These dimensions should be enlarged when the iron is of a bad quality, especially if cast iron is used instead of forged iron.

ANCHOR of Brandy, in Holland, ten English wine gallons.

To ANCHOR, *v. n.* To cast anchor; to lie at anchor. To stop at; to rest on:

My intention, hearing not my tongue,
Anchors on Isabel.

Shakespeare.

To ANCHOR, *v. a.* To place at anchor; as, he *anchored* his ship. To fix on:

My tongue should to my ears not name my boys,
Till that my nails were *anchor'd* in thine eyes. *Shakespeare.*

ANCHOR-HOLD, *f.* The hold or fastness of the anchor; and, figuratively, security.—The old English could express most aptly all the conceits of the mind in their own tongue, without borrowing from any; as for example: the holy service of God, which the Latins called *religion*, because it knitted the minds of men together, and most people of Europe have borrowed the same from them, they called most significantly *ean-fastness*, as the one and only assurance and fast *anchor-hold* of our souls health. *Camden*.

ANCHOR-SMITH, *f.* The maker or forger of anchors.—Smithing comprehends all trades which use either forge or file, from the *anchor-smith* to the watch-maker; they all working by the same rules, though not with equal exactness; and all using the same tools, though of several sizes. *Moxon*.

ANCHORAGE, *f.* The hold of the anchor.—Let me resolve whether there be indeed such efficacy in nurture and first production; for, if that supposal should fail us, all our *anchorage* were loose, and we should but wander in

a wild sea. *Wotton*. The set of anchors belonging to a ship. The duty paid for the liberty of anchoring in a port.

ANCHORED, *part. adj.* Held by the anchor :—

Like a well-twisted cable, holding fast
The anchor'd vessel in the loudest blast.

Waller.

ANCHORESS, *f.* A nun.

ANCHORET, *f.* [*anchorette*, Fr. *anchoreta*, Lat. of *αγκυρητης*, of *αγκυρα*, and *χωρεω*, to retire.] A recluse; a hermit; one that retires to the more severe duties of religion.

ANCHOVY, *f.* in ichthyology, the English name of the clupea encrasicolus. See CLUPEA.

ANCHOVY-PEAR, *f.* in botany. See GRIAS.

ANCHURUS, in fabulous history, a son of Midas, king of Phrygia, who sacrificed himself for the good of his country. The earth having opened and swallowed up many buildings, the oracle was consulted, which gave for answer, that the gulf would never close, if Midas did not throw into it whatever he had most precious. The king parted with many things of immense value, yet the earth continued open, till Anchurus, thinking himself the most precious of his father's possessions, leaped into the gulf, which closed immediately. Midas erected there an altar of stones to Jupiter, and that altar was the first object which he turned into gold, when he had received his fatal gift from the gods. This unpolished lump of gold existed in the age of Plutarch.

ANCHUSA, *f.* [*αγκυσα*, *παρε το αγκυρι*, Gr. from its supposed constringent quality; or, as others say, because it strangles serpents.] In botany, a genus of the pentandria monogynia class, ranking in the natural order of asperifoliae. The generic characters are—Calyx: perianthium five-parted, oblong, round, acute, permanent. Corolla: monopetalous, funnel-shaped; tube cylindrical, the length of the calyx; limb semiquinquefid, from erect, expanding, obtuse; throat closed with five small scales; convex, prominent, oblong, converging. Stamens: filaments very short, in the throat of the corolla; antheræ oblong, incumbent, covered. Pistillum: germs four; style filiform, the length of the stamens; stigma obtuse, emarginate. Pericarpium: none; but the calyx enlarged, and erect, contains the seeds in its bosom. Seeds: four; oblongish, obtuse, gibbose.—*Essential Character.* Corolla, funnel-shaped, the throat enclosed with an arch of scales. Seeds engraved at the base.

Species. 1. *Anchusa officinalis*, or officinal or garden alkanet or bugloss: leaves lanceolate, spikes imbricate, pointing one way. Stems from a foot to eighteen inches in height, and more, the thickness of a finger, slightly angular, hairy, and rough. Leaves seven inches long, above an inch broad, hairy, and rough. This plant flowers in June, July, and August; and the seeds ripen in a month. It grows wild in Italy, Spain, France, Germany, Sweden, Denmark, and Siberia, by road sides, and in corn fields. When tender in the spring, it is eaten boiled in Upland. The tube of the corolla is melliferous, and the bees are very fond of it. This is not the *anchusa*, but the *bugloss*, of the officinal writers. It appears to be nearly similar to borage; the leaves being less juicy, and the roots more mucilaginous; these, with the leaves and flowers, are ranked among the articles of the materia medica, but they are very seldom made use of. In China, this plant is in great esteem, for gently promoting the eruption in the small-pox.

2. *Anchusa angustifolia*, or narrow-leaved alkanet: racemes almost naked in pairs. Grows to the height of two feet when cultivated in gardens, but, in the places where it grows wild, is rarely more than a foot. The leaves are narrow, and less hairy than those of the first; the spikes of flowers come out double, and have no leaves about them; the flowers are small, and of a red colour. The roots will continue three or four years in poor land. Haller thinks that this is not a distinct species from the first; Linnæus acknowledges that they are very much alike; but, according to Retzius, most authors have mista-

ken the three first species. It is found wild in Italy, Germany, and Switzerland; flowering in July and August, by way-sides, and the borders of ploughed fields. Boerhaave recommended the juice in the pleurisy, and in maniacal cases.

3. *Anchusa Italica*, or Italian alkanet: leaves lucid, strigose; racemes two-parted, two-leaved, flowers somewhat unequal, bearded at the throat. This differs from the first species in size; in that the flowers are equal and funnel-shaped; in this they are salver-shaped; they are much more imbricate in that, the segments of the calyx broader and shorter; those of the corolla ovate; with the scales of the throat only slightly tomentose.

4. *Anchusa undulata*, or waved alkanet: strigose, leaves linear toothed, pedicels less than the bracteæ, fruit-bearing calyxes inflated. Height three feet, with many strong lateral branches, produced from the main stem near the ground. Leaves stiff, rough, six or seven inches long, and about half an inch broad at the top, closely embracing the branches at the base, where they are two inches broad; indented and waved on their edges; the upper surface beset with hairs, and very rough to the touch. The root commonly decays after the seeds are perfected; though sometimes, when it grows upon gravel, or in the joints of stone walls, it will live three or four years. Such plants are seldom more than a foot high, and have small narrow leaves; so that they appear like a different species. It is a native of Spain and Portugal. Gmelin also found it in Siberia.

5. *Anchusa tinctoria*, or dyer's alkanet: downy, leaves lanceolate, obtuse, stamens shorter than the corollas. This species rises near as high as the first, to which it bears great resemblance in its leaves and branches, only that they are more woolly; the stamens are also shorter than the corolla. The root is red. It much resembles the seventh species, and is entirely clothed with a white down. It grows about Montpellier, in Silesia, Spain, and Italy. Cultivated here in 1683, by Mr. James Sutherland. This plant is cultivated in the south of France, for the deep purplish red colour of the roots. It imparts a fine deep red to oils, wax, and all unctuous substances, as well as to spirit of wine. The spirituous tincture, on being inspissated, changes to a dark brown. Its chief use is for colouring plasters, lip-salves, &c. Roots of bugloss boiled in Brazil wood are substituted for those of alkanet; but these will not die oils red.

6. *Anchusa Virginica*, or Virginian alkanet: flowers scattered, stem smooth. This seldom rises a foot high in good ground, but not above half that height where the soil is poor. The flowers grow in loose spikes, upon a smooth stalk. It is perennial, and a native of North America, where it grows in the woods; and, being an early plant, generally flowers before the trees are in leaf; so that, where it abounds, the earth seems covered with bright yellow flowers. It is known in that country by the name of Puccoon.

7. *Anchusa lanata*, or woolly alkanet: leaves villose, calyxes shaggy, stamens longer than the corollas. Found by Brander near Algiers; and very like the fifth species.

8. *Anchusa sempervirens*, or evergreen alkanet: leaves ovate, peduncles two-leaved, racemed. It is found wild in Spain and Italy. With us it has crept out of gardens, and has been remarked growing spontaneously near Rochester, Haddiscoe in Suffolk, Cambridge, Birmingham, Worcester, and London; by road-sides, among rubbish, and from the joints of old walls. It flowers from May through a great part of the summer, and is perennial. Kine, horses, sheep, and goats, are said to eat it: and it has the same qualities with the first and second species.

9. *Anchusa Barrelieri*, or Barrelier's alkanet: leaves ovate-lanceolate; stem erect, peduncles racemed, pointing one way. Found in Piedmont by Bellardi.

10. *Anchusa paniculata*, or panicled alkanet or bugloss: leaves lanceolate strigose quite entire, panicle dichotomous divaricate, flowers peduncled, calyxes five-parted, with subulate

subulate segments. This is biennial; flowers in May and June, and is a native of Madeira.

Propagation and Culture. The roots seldom continue longer than two years, except when they grow in rubbish, or out of a wall. They may all easily be propagated by seeds, sown in the autumn, upon a bed of light sandy earth; and in the spring, when the plants are strong enough to remove, they should be planted in beds, at two feet distance; observing, if the season prove dry, to water them till they have taken root, after which they will require no farther care, but to keep them clear from weeds. If the seeds of the common sorts be permitted to scatter, the plants will rise in plenty. See BARLERIA, BORAGO, LITHOSPERMUM, MYOSOTIS, ONOSMA, and PULMONARIA.

ANCIENT, *adj.* [*ancien*, Fr. *antiquus*, Lat.] Old; that happened long since; of old time; not modern. *Ancient* and *old* are distinguished; *old* relates to the duration of the thing itself, as, An *old* coat, a coat much worn; and *ancient*, to time in general, as, An *ancient* dress, a habit used in former times. But this is not always observed, for we mention *old* customs; but though *old* be sometimes opposed to *modern*, *ancient* is seldom opposed to *new*, but when *new* means *modern*. Old; that has been of long duration.—With the *ancient* is wisdom, and in length of days understanding. *Job*, xii. 12. Past; former.

ANCIENT, *f.* Those that lived in old time were called *ancients*, opposed to the moderns:

And though the *ancients* thus their rules invade,
As kings dispense with laws themselves have made;
Moderns, beware! or, if you must offend
Against the precept, ne'er transgress its end. *Pope.*

ANCIENT, *f.* The flag or streamer of a ship, and, formerly, of a regiment. The bearer of a flag, as was *Ancient Pistol*; whence, in present use, ensign:

This is Othello's *ancient*, as I take it.
The same, indeed, a very valiant fellow. *Shakespeare.*

ANCIENT DEMESNE, in law, a tenure whereby all manors belonging to the crown in William the Conqueror's and Edward the Confessor's time were held. The numbers, names, &c. hereof were entered by the Conqueror, in a book called *Domesday Book*, still remaining in the Exchequer; so that such lands as by that book appeared to have belonged to the crown at that time, are called *ancient demesne*. The tenants of ancient demesne are of two sorts; one who hold their lands frankly by charter; the other by copy of court-roll, or by the verge, at the will of the lord, according to the custom of the manor. The advantages of this tenure are, 1. That tenants holding by charter cannot be rightfully impleaded out of their manor; and, when they are, they may abate the writ, by pleading the tenure. 2. They are free from toll for all things relating to their livelihood and husbandry; nor can be impannelled on any inquest. These tenants held originally by ploughing the king's land, ploughing his hedges, and the like service, for the maintenance of his household; and it was on this account that such liberties were given them, for which they may have writs of *monstraverunt* to such as take the duties of toll, &c. No lands are to be accounted ancient demesne, but such as are held in socage. Whether land be ancient demesne or not, shall be tried by the book of *Domesday*.

ANCIENTLY, *adv.* In old times.—The colewort is not an enemy, though that were *anciently* received, to the vine only, but to any other plant, because it draweth strongly the fattest juice of the earth. *Bacon.*

ANCIENTNESS, *f.* Antiquity; existence from old times.—The Fescenine and Saturnian were the same; they were called Saturnian from their *ancientness*, when Saturn reigned in Italy. *Dryden.*

ANCIENTRY, *f.* The honour of ancient lineage; the dignity of birth.—Of all nations under heaven, the Spaniard is the most mingled and most uncertain. Wherefore, most foolishly do the Irish think to ennoble themselves, by

wresting their *ancientry* from the Spaniard, who is unable to derive himself from any in certain. *Spenser.*

ANCIL'IA, *f.* See ANCYLE.

ANCIL'LON (David), a minister of the reformed church at Metz, where he was born on the 17th of March 1617. He went to Geneva in 1623; and studied divinity under Spanheim, Diodati, and Tronchin, who conceived a very great esteem for him. He left Geneva in April 1641, and offered himself to the synod of Charenton, in order to take upon him the office of a minister: his abilities were greatly admired by the examiners, and the whole assembly were so highly pleased with him, that they gave him the church of Meaux, the most considerable then unprovided for. He returned to his own country in the year 1653, where he remained till the revocation of the edict of Nantes in 1685. He retired to Francfort after this fatal blow; and, having preached at the French church at Hanau, the professors of divinity, and the German and Dutch ministers, attended his sermons frequently: the count of Hanau himself, who had never before been seen in the French church, came hither to hear Mr. Ancillon. This occasioned a great jealousy in the two other ministers; which tended to make his situation uneasy. He therefore went to Berlin; where he met with a kind reception from the elector, and was made minister of the city. Here he had the pleasure of seeing his eldest son made judge and director of the French in the same city, and his other son rewarded with a pension, and entertained at the university of Francfort upon the Oder. He had likewise the satisfaction of seeing his brother made judge of all the French in the states of Brandenburg; and his son-in-law, engineer to his electoral highness. He enjoyed these agreeable circumstances, and several others, till his death, which happened at Berlin the 3d of September, 1692, when he was seventy-five years of age. He published a book, in quarto, in which the whole dispute concerning Traditions is fully examined: he also wrote an apology for Luther, Zuinglius, Calvin, and Beza, and several other pieces.

ANCIS'TRUM, *f.* [*αγκιστρον*, Gr. a hook.] In botany, a genus of the diandria monogynia class, ranking in the natural order of rosaceæ. The generic characters are—Calyx: perianthium one-leaved, turbinate, truncate, four-toothed; teeth cylindrical-awned, erect, terminating in four reversed hooks. Corolla: superior, one-petalled, funnel-shaped with a very short tube, and a spreading quadrifid border; the divisions nearly equal, obtuse, the length of the tube. Stamina: filaments fastened to the base of the tube, longer than the corolla, capillary; anthers roundish. Pistillum: germ oblong; style filiform, the length of the corolla; stigma pencil-shaped. Pericarpium: none, but the calyx; in the bottom of which is the fruit. Seed: single, oblong.—*Essential Character.* Calyx, four-leaved. Corolla, none. Stigma, many-parted. Drupe, dry, hispid, one-celled.

Species. 1. *Ancistrum decumbens*: stems decumbent, peduncle scape-form solitary, flowers in a globular head, leaflets wedge-form deeply serrate hoary beneath, seed covered with the thickened calyx. It resembles burnet in the herb and manner of flowering; and is a native of New Zealand.

2. *Ancistrum lucidum*, or shining *ancistrum*: stems subdemerged, peduncles scape-form, spikes ovate, leaflets oblong quite entire acute subsaccicled. Native of Falkland Islands; flowers in May and June.

3. *Ancistrum latebrosum*, or hairy *ancistrum*: stems demerged, peduncles scape-form, spikes elongate, leaflets oblong gashed villose, fruits armed on every side. The structure of the fruit in this species is somewhat different from that in the first; but the difference is not considerable, and the structure of the other parts is nearly the same in both.

AN'CLAM, a town of the Western, Swedish, or Royal, Pomerania, in Upper Saxony. It made a good figure once among the Hanse-towns, and has an advantageous site among good corn lands and excellent pastures, with the convenience,

convenience of fishing and exporting their commodities, by means of the river Pene, on which it is seated. Formerly it was called Tanglim, and some have supposed it to have been the seat of the Angli, mentioned by Tacitus; some of whom removed from thence to the Elbe, and from that to England. Anclam is 20 miles S. of Gripswald. Lat. 53. 52. N. lon. 14. 2. E.

AN'CLE. See ANKLE.

AN'CLIFF, a village, two miles from Wigan in Lancashire, famous for a spring called the *burning-well*, which, upon the approach of a lighted candle, takes fire, and burns like spirit of wine for a whole day.

AN'COBER, or RIO CORBE, a territory on the gold coast of Guinea, with a river of the same name flowing through it; the banks of which are adorned with fine lofty trees, affording a very agreeable shade, and on the western bank there is a populous village.

AN'CON, *f.* [αγκων, Gr.] The top or point of the elbow; the backward and greater shooting part of the cubit, called *ulna*.

ANCO'NA (marquise of), a province in the pope's territories in Italy. It lies between the gulph of Venice and mount Appenine, which bound it on the north; Abruzzo on the east; the duchy of Spoleto, and that of Urbino, on the west. The air is indifferent; but the soil is fruitful, particularly in hemp and flax; and there is great plenty of wax and honey. It contains several large towns, as Fermo, Loretto, Recanati, Macerata, Jesi, Tolentino, Ascoli, Osimo, St. Severino, Monte Alto, Camerino, and Ripatransone, which are all archiepiscopal or episcopal sees.

ANCONA, a sea-port on the Adriatic sea, the capital of the marquise of that name, and the see of a bishop. Commerce has rapidly increased here of late years, through the patronage of Clement XII. who made it a free port, and built a mole to render the harbour safe. It is erected on the ruins of the ancient mole, raised by the emperor Trajan, and is above 1000 feet in length, 100 in breadth, and about 60 in depth, from the surface of the sea. Near this stands the Triumphal Arch of Trajan, which, next to the Maison Quarree, at Nismes, is the most beautiful and entire monument of Roman magnificence existing. Here, likewise, Clement erected a lazaretto, which advances a little way into the sea, in the form of a pentagon, and is an elegant, as well as useful, edifice. The Jews have a synagogue here, and are established in great numbers. Ancona is 116 miles N. by E. of Rome. Lat. 43. 38. N. lon. 13. 35. E.

ANCO'NES, *f.* in architecture, the corners or quoins of walls, cross-beams, or rafters. Vitruvius calls the *console* by the same name.

AN'CONY, *f.* in the iron-works, a piece of half-wrought iron, of the shape of a bar in the middle, but rude and unwrought at the ends. The process for bringing the iron to this state is this: they first melt off a piece from a sow of cast iron, of the proper size; this they hammer at the forge into a mass of two feet long, and of a square shape, which they call a *bloom*; when this is done, they send it to the finery; where, after two or three heats and workings, they bring it to this figure, and call it an *ancony*. The middle part, beat out at the finery, is about three feet long, and of the shape and thickness the whole is to be; this is then sent to the chafery, and there the ends are wrought to the shape of the middle, and the whole made into a bar.

ANCORA'RUM URBS, [Αγκυρων Πολις, Gr.] A city in the Nomos Aphroditopolites, towards the Red Sea; so called because there was in the neighbourhood a stone quarry, in which they hewed stone anchors before iron ones were invented. The gentilitious name is *Ancropolites*.

AN'COURT (Florent-Carton d'), an eminent French actor and dramatic writer, born at Fontainebleau, October 1661. He studied in the Jesuits college at Paris under father de la Rue. After he had gone through a course of philosophy, he applied himself to the civil law, and was admitted an advocate at seventeen years of age. But fall-

ing in love with an actress, he was induced to go upon the stage, and he married her. As he had all the qualifications necessary for the theatre, he soon greatly distinguished himself: and, not being satisfied with the applause only of an actor, he began to write pieces for the stage. His merit in this way procured him a very favourable reception at court; and Lewis XIV. shewed him many marks of his favour. His sprightly conversation and polite behaviour made his company agreeable to all the men of figure both at court and in the city, and the most considerable persons were extremely pleased to have him at their houses. Having taken a journey to Dunkirk, he took the opportunity of paying his compliments to the elector of Bavaria, who received him with the utmost civility; and, having detained him a considerable time, dismissed him with a present of a diamond valued at 1000 pistoles: he likewise rewarded him in a very generous manner, when, upon his coming to Paris, Ancourt composed an entertainment for his diversion. Ancourt began at length to grow weary of the theatre, which he quitted in 1718, and retired to his estate of Courcelles le Roy, in Berry, where he applied himself wholly to devotion, and composed a translation of David's Psalms in verse, and a sacred tragedy, which were never printed. He died the 6th of December 1726, being sixty-five years of age. The plays which he wrote are fifty-two in all; most of which were printed separately at the time when they were first represented: they were afterwards collected into five volumes, then into seven, and at last into nine. This last edition is the most complete.

AN'CRE, a small town of France, in the late province of Picardy, with the title of a marquise, seated on a little river of the same name. Lat. 49. 59. N. lon. 2. 45. E.

ANCUS MAR'TIUS, the fourth king of the Romans, succeeded by Tullius Hostilius, 639 years before Christ. He defeated the Latins, subdued the Fidenates, conquered the Sabines, Volscii, and Veientes, enlarged Rome by joining to it mount Janicula, and made the harbour of Ostia. He died about 615 years before the Christian era.

AN'CYLE, *f.* in antiquity, a kind of shield that fell, as was pretended, from heaven, in the reign of Numa Pompilius; at which time, likewise, a voice was heard, declaring that Rome should be mistress of the world as long as she should preserve this holy buckler. It was kept with great care in the temple of Mars, under the direction of twelve priests; and, lest any should attempt to steal it, eleven others were made so like, as not to be distinguished from the sacred one. These ancylia were carried in procession every year round the city of Rome.

ANCYLOBLE'PHARON, *f.* [αγκυλοφθαλμος, bent, and βλεφαρον, an eye-lid, Gr.] A disease of the eye, which closes the eye-lids. Sometimes the eye-lids grow together, and also to the tunica albuginea of the eye, from carelessness when there is an ulcer in these parts. Both these cases are called *ancycloblepharon* by the Greeks. This disorder must be distinguished from that coalition of the eye-lids which happens from viscid matter gluing them together. If the cohesion is on the cornea, the sight is inevitably lost. This hath sometimes happened in the small-pox. If there is only a growing together of the eye-lids, they may be separated with the specillum, and pledgets kept between them to prevent their re-union. If the eye-lids adhere to the eye, they are to be separated by a fine-edged knife; and their re-union is to be prevented by a proper use of injections, and lint placed between them, after dipping it in some proper liniment.

ANCYLOGLOSSUS, *f.* [αγκυλογλωσσος, αγκυλη, a contraction, and γλωσσα, the tongue, Gr.] A contraction of the ligaments of the tongue. Some have this imperfection from their birth, others from disease. In the first case, the membrane which supports the tongue is too short or too hard: in the latter, an ulcer under the tongue, healing and forming a cicatrix, is sometimes the cause: these speak with some difficulty. The ancycloglossi by nature are late before they speak; but, when they begin, they soon speak properly. These we call *tongue-tied*. Mauri-

ceau says, that in this case it is a small membranous production, which extends from the frænulum to the tip of the tongue, that hinders the child from sucking, &c. He advises to snip it with scissars in two or three places, taking care not to extend the points of the scissars so far as the frænulum. The instances rarely occur which require any kind of assistance; for, if the child can thrust the tip of its tongue to the outer edge of its lip, this disease does not exist; and, if the tongue is not greatly restrained, the frænulum will stretch by the child's sucking and crying.

ANCYLOS'SIS, *f.* in surgery, a distortion or stiffness of the joints, caused by a settlement of the humours, or a distension of the nerves, and therefore remedies of a mollifying and relaxing nature are required.

ANCY'RA, the capital of Galatia, at no great distance from the river Halys, said to be built by Midas, king of Phrygia, and to take its name from an anchor found there. It was greatly improved by Augustus, deemed the second founder of it, as appears from the *Marmor Ancyranum*. It is now called *Angura*, or *Angora*. Lat. 39. 30. lon. 32. 5. E.

ANCYROIDES, *f.* [*αγκυροειδης*, Gr.] The shooting forth of the shoulder-bone in the form of a peak.

ANCYS'TRUM, *f.* in botany. See ANCISTRUM.

AND, *conj.* The particle by which sentences or terms are joined, which it is not easy to explain by any synonymous word.—It shall ever be my study to make discoveries of this nature in human life, *and* to settle the proper distinctions between the virtues and perfections of mankind, *and* those false colours and resemblances of them that shine alike in the eye of the vulgar. *Addison*.—*And* sometimes signifies *though*, and seems a contraction of *and if*.—It is the nature of extreme self-lovers, as they will set an house on fire, *and* it were but to roast their eggs. *Bacon*.—In *and if*, the *and* is redundant, and is omitted by all later writers.—I pray thee, Launce, *an' if* thou see'st my boy, bid him make haste. *Shakespeare*.

ANDABA'TÆ, *f.* in antiquity, a sort of gladiators, who, mounted on horseback or in chariots, fought hood-winked, having a helmet that covered their eyes.

ANDALUSIA, [it is now become a fashion to pronounce it ANDALUSIA.] The most western province of Spain, having Estremadura and La Mancha on the north; the kingdom of Granada, the straits of Gibraltar, and the ocean, on the south; and, on the west, the kingdom of Algarva in Portugal, from which it is separated by the river Guadiana. It is about 250 miles long, and 150 broad. The chief cities and towns are Seville the capital, Baeza, Gibraltar, Corduba, Cadiz, Medina Sidonia, Jaen, Port St. Mary, &c. It is the best, most fruitful, and the richest, part of all Spain. There is a good air, a serene sky, a fertile soil, and an extent of sea-coast fit for commerce.

New ANDALUSIA, a division of the province of Terra Firma in South America, whose boundaries cannot be well ascertained, as the Spaniards pretend a right to countries in which they have never established any settlements. According to the most reasonable limits, it extends in length 500 miles from north to south, and about 270 in breadth from east to west. The interior country is woody and mountainous, variegated with fine valleys that yield corn and pasturage. The produce of the country consists chiefly in dyeing-drugs, gums, medicinal-roots, brazil-wood, sugar, tobacco, and some valuable timber. To this province also belonged five valuable pearl-fisheries. The capital of New Andalusia is Comana, Cumana, or New Corduba, situated in lat. 9. 55. N. about nine miles from the north sea. Here the Spaniards laid the foundation of a town in the year 1520. The place is strong by nature, and fortified by a castle capable of making a vigorous defence; as appeared in the year 1670, when it was assaulted by the buccaners, who were repulsed with great slaughter.

ANDAMAN or ANDE'MAN Islands, in the East Indies, situated on the east side of the entrance of the bay of Bengal, about eighty leagues distance from Tanaserim on the coast of Siam. The East-India ships sometimes

touch at them, and are supplied by the natives with rice, herbs, and fruits. Lat. from 10° to 15° N. lon. 92. 0. E.

ANDANAGAR, a beautiful, rich, and populous town, of the province of Deccan.

ANDAN'TE, in music, signifies a movement moderately slow, between *largo* and *allegro*.

ANDAY'E, a town in the department of the Lower Pyrenees, famous for its brandy. It is situated at the mouth of the river Bidassoa, opposite Fontarabia in Spain, eighteen miles from Bayonne. Lat. 43. 25. N. lon. 1. 45. W.

AN'DE, a river of Hampshire, that rises in the forest of Chute.

AN'DELY, a town in the department of Eure, and late province of Normandy, in France, is divided by a paved road into two little towns, Great and Little Andely; the former on the river Gambons, the latter on the Seine. The cloths manufactured here are very fine. It is twenty miles south-east of Rouen, and sixty north-west of Paris. Lat. 49. 20 N. lon. 1. 30. E.

ANDE'NA, in old writers, denotes the swarth made in mowing of hay, or as much ground as a man could stride over at once.

AN'DERAB, the most southern city of the province of Balkh, possessed by the Usbeck Tartars. It is very rich and populous, but a place of no great strength. The neighbouring mountains yield excellent quarries of lapis lazuli, in which the Bukhars drive a great trade with Persia and India. This city is situated at the foot of the mountains dividing the dominions of the Great Mogul and Persia from Great Bukharia. As there is no other way of crossing these mountains but by the road through this city, all travellers with goods must pay 4 per cent. On this account the khan of Balkh maintains a great number of soldiers in the place.

AN'DERNACHT, a small town of Cologne, seated on the Rhine, and near it there are some excellent mineral waters. There is some trade carried on here in large timber, which is floated down to this place, and hence to Holland. It is ten miles north-west of Coblenz. Lat. 50. 29. N. lon. 7. 22. E.

ANDE'RO (St.) a sea-port town in the bay of Biscay, in Old Castile, seated on a small peninsula. It is a trading-town, and contains about 700 houses, two parish-churches, and four monasteries. Here the Spaniards build and lay up some of their men of war. Lat. 43. 20. N. lon. 4. 30. W.

AN'DERSON (Sir Edmund), a younger son of an ancient Scotch family settled in Lincolnshire. He was some time a student of Lincoln-college, Oxford; and removed from thence to the Inner Temple, where he applied himself diligently to the study of the law, and became a barrister. In the nineteenth year of the reign of queen Elizabeth he was appointed her majesty's serjeant at law; and, some time after, one of the justices of the assize. In 1582 he was made lord chief justice of the common pleas, and in the year following was knighted. He held his office to the end of his life, died in the year 1605, and was buried at Eyworth in Bedfordshire. His works are, 1. Reports of many Principal Cases argued and adjudged in the time of Queen Elizabeth in the Common Bench. Lond. 1644, fol. 2. Resolutions and Judgments on the Cases and Matters agitated in all the Courts of Westminster, in the latter end of the reign of Queen Elizabeth; published by John Goldborough, Esq. Lond. 1653, 4to. Besides these, there is a manuscript copy of his Readings still in being.

AN'DERSON (Alexander), one of the brightest ornaments of the mathematical world, who flourished about 200 years ago. He was born at Aberdeen in Scotland, towards the latter part of the 16th century, and was professor of mathematics at Paris in the early part of the 17th, where he published several ingenious works in geometry and algebra, both of his own, and of his friend Vieta's. Alexander was cousin-german to a Mr. David Anderson,

of Finshaugh, a gentleman who also possessed a singular turn for mathematical and mechanical knowledge. This mathematical genius was hereditary in the family of the Andersons, and from them it seems to have been transmitted to their descendants of the name of Gregory in the same country: the daughter of the said David Anderson having been the mother of the celebrated mathematician James Gregory, and who herself first instructed her son James in the elements of the mathematics, upon her observing in him, while yet a child, a strong propensity to those sciences.

ANDES, or CORDILLERAS, a huge chain of mountains, or rather two ridges or cordilleras, running almost the whole length of South America, from the isthmus of Darien to the straits of Magellan, through Peru and Chili, a distance of 4300 miles; and in a line parallel to, and but a little distance from, the Pacific ocean. They are also the loftiest, as well as the most extensive, range of hills in the whole world. Even the plain of Quito, which may be considered as a base of the Andes, is elevated farther above the sea than the top of the Pyrenees; and, in different places, they rise more than one-third higher than the Pike of Teneriffe, heretofore accounted the highest part of the whole earth. The Andes may literally be said to hide their heads in the clouds: the storms often roll, and and the thunders burst, below their summits; which, tho' exposed to the rays of the sun, in the centre of the torrid zone, are covered with everlasting snows. From experiments made with a barometer, on the mountain of Cotopaxi, it appeared, that its summit was elevated 6252 yards, which is something more than three geographical miles, above the surface of the sea. These mountains give rise to the largest rivers in the world; and, when the volcanoes, which are numerous here, break out among the snows, the sudden thaws produce such torrents of water, as to deluge the plains, and carry off the inhabitants, both man and beast.

ANDES, a hamlet of Mantua in Italy, celebrated as the birth-place of Virgil. It is now called *Pietola*, two miles to the west of Mantua.

ANDETRIUM, or ANDRECIUM, an inland town of Dalmatia. It is described as situated near Salonæ, on a naturally strong and inaccessible rock, surrounded with deep valleys, and rapid torrents; from which it appears to be the citadel now called *Cissa*. Lat. 43. 20. lon. 17. 46. E.

ANDEUSE, a city of the late province of Languedoc in France, situated in Lat. 43. 45. N. lon. 3. 40. E.

ANDIRON, *f.* [supposed by Skinner to be corrupted from *hand-iron*; an iron that may be moved by the hand, or may supply the place of a hand.] Irons at the end of a fire-grate, in which the spit turns; or iron in which wood is laid to burn.—If you strike an entire body, as an *andiron* of brass, at the top, it maketh a more treble sound, and at the bottom a baser. *Bacon*.

ANDOMADUNUM, a city of Gallia Belgica; now *Langres* in Champagne, situated on an eminence on the borders of Burgundy, at the springs of the Marne. Lat. 48. 0. N. lon. 5. 22. E.

ANDOVER, [*andefaran*, Sax. i. e. the ferry of the river Anton,] is a borough-town in Hampshire, and stands on the river Ande, being a great thoroughfare on the direct western road, as well from Newbury to Salisbury, as from London to Exeter, Taunton, and all the manufacturing towns of Wiltshire, Somersetshire, &c. whereby it is greatly enriched, and is become a handsome, thriving, well-built, populous, place. It is said to have had its first charter from king John; but was last incorporated by queen Elizabeth; being governed by a bailiff, high-steward, recorder, ten approved men, (out of whom are chosen two justices,) and twenty-two capital burgesses, who annually chuse the bailiff, and he elects two sergeants at mace to attend him. Here is an hospital for six poor men, built and endowed by Mr. Pollen, formerly one of its representatives. Here is likewise a free grammar-school, founded in 1569, by John Hanford, Esq. for educating thirty poor

boys. The church is an ancient edifice, but stands high, and is very neat. In a large open square stands the market-house; a handsome spacious modern building, with a council-room over, where the business of the corporation is transacted, and where the public entertainments and assemblies are held. The market, which is pretty considerable, is held on Saturdays; and here are three fairs annually, viz. on Midlent Saturday, 12th of May, and 6th of November; exclusive of Weyhill fair, which is held on the 9th of October, and following days, on a fine open down, contiguous to the village of Weyhill, three miles distant from Andover; and is the greatest fair in this kingdom for hops and sheep. The whole west of England is supplied with hops from it, which are the produce of Farnham, Alton, Crondall, Froyle, and all the Surry and Hampshire growth; and with ewes for store sheep, it supplies the farmers of the counties of Berks, Oxford, Bucks, Bedford, Hertford, Middlesex, Kent, Surry, and Sussex; who depend almost entirely on this fair for their supply.

A considerable trade is carried on at Andover in the malting; as also in a manufacture of shalloons. The town is admirably situated on the margin of the fine open Wiltshire down, and at the edge of an extensive woodland country, which forms the north-western side of the opulent county of Hants. Andover was a place well known to the Romans; and near it they had camps, both on Quarley-hill, and at Brehill, where their sites may be still traced, many of the trenches not being filled up. A navigable canal is now completed from this town through Stockbridge and Romsey, to the sea at Southampton. A junction between this canal, and that at Basingstoke, as also betwixt Salisbury and Bristol, is now going on.

Andover is fourteen miles north by west of Winchester, and sixty-five west by south of London. Lat. 51. 14. N. lon. 1. 20. W.

ANDRA'DA (Diego de Payva d'), or ANDRA'DIUS, a learned Portuguese, born at Conimbrã, who distinguished himself at the council of Trent, where king Sebastian sent him as one of his divines. There is scarcely any Catholic author who has been more quoted by the Protestants than he, because he maintained some opinions a little extravagant concerning the salvation of the heathens. Andrada was esteemed an excellent preacher. His sermons were published in three parts, the second of which was translated into Spanish by Benedict de Alcoran. Many encomiums have been bestowed upon Andrada. Oforius, in his preface to the "Orthodox Explanations of Andradus," gives him the character of a man of wit, vast application, great knowledge in the languages, with all the zeal and eloquence necessary to a good preacher; and Roswedius says, that he brought to the council of Trent the understanding of a most profound divine, and the eloquence of a consummate orator.

ANDRACH'NE, *f.* [*αχνα*, Gr. glume or chaff.] In botany, a genus of the monoecia gynandria class, ranking in the natural order of tricoccæ. The generic characters are—*I. Male.* Calyx: perianthium five-leaved, equal, marcescent. Corolla: petals five, emarginate, slender, shorter than the calyx; nectary, leaflets five, semibifid, herbaceous, one within each petal, and less than it. Stamina: filaments five, small, inserted into the rudiment of each style; antheræ simple. *II. Female.* Calyx: perianthium five-leaved, equal permanent. Corolla: petals none; nectary as in the male. Pistillum: germ superior, globose; styles three, filiform, two-parted; stigmas globose. Pericarpium: capsule globose-trilobate, three-celled; cells bivalved, the size of the calyx. Seeds: in pairs, rounded on one side, triangular and obtuse on the other.—*Essential Character.* Male. Calyx, five-leaved; corolla, five-petalled; stamina, five, inserted into the rudiment of the style. Female. Calyx, five-leaved; corolla, none; styles, three; capsule, three-celled; seeds, two.

Species. 1. *Andrachne telephoides*: procumbent and herbaceous. This is a low plant, whose branches trail on the ground. The leaves are small, of an oval shape, smooth,

smooth, and of a sea-green colour. It is found wild in some parts of Italy, and in the Archipelago, from whence Tournefort sent the seeds to the royal garden at Paris: but, being a plant of no great beauty, it is seldom cultivated, except in botanic gardens for variety.

2. *Andrachne fruticosa*: erect, shrubby. This sort rises twelve or fourteen feet high; the branches have spear-shaped, pointed, smooth, leaves; the flowers are small, of an herbaceous white colour, some of which are male, and others female, but, when the latter are situated at too great a distance from the former, there are rarely any seeds within their covers; though they seem very fair to fight; whereby several persons have been deceived, who have found them without raising a single plant. Native of the East Indies and China, also of La Vera Cruz in New Spain.

3. *Andrachne arborea*: stem aborescent; leaves ovate, obtuse, hoary underneath. It has a strong woody stem, which rises more than twenty feet high, sending out branches on every side, which have oval blunt leaves, hoary on their under side, and having pretty deep furrows on their upper, placed alternately on the branches. It was discovered by the late Dr. William Houston growing naturally at Campeachy. There is also another sort raised from seeds, sent from Jamaica; the whole form of the seeds agrees with those of the third sort, as do also the plants, but the leaves are somewhat like those of the laurel, only much larger; this has not as yet flowered in Europe.

Propagation and Culture. If the seeds of the first sort are sown on a moderate hot-bed in March, they will arise in about a month after, when they may be transplanted each into a small pot, and plunged into another very moderate hot-bed to bring the plants forward, but in mild weather they should have plenty of air admitted to them, and be often refreshed with water: in June they will produce flowers, and the seeds will ripen in August and September, soon after which the plants will decay. The second and third sorts are very tender-plants, so that, when good seeds can be obtained, they should be sown in pots, plunging them in a hot-bed of tanner's bark, observing to water them as the earth becomes dry in the pots; and when the plants come up, and are fit to remove, they should each be planted in a small pot, plunged into a tan-bed, shading them until they have taken fresh root, after which they should have free air admitted to them in warm weather, but must constantly be kept in the bark-stove. See *ARBUTUS*.

ANDRAGH'RA, a river of Sumatra, on which the Dutch have a factory.

ANDRAPODIS'MUS, *f.* in ancient writers, the selling of persons for slaves. Hence also *andrapodistes*, a dealer in slaves, more particularly a kidnapper, who steals men or children to sell them; a crime for which the Thesallians were noted.

ANDRAPODOCA'PELI, *f.* in antiquity, a kind of dealers in slaves. The *andrapodocapeli* had a particular process for taking off moles and the like disfigurements on the faces of the slaves they kept for sale, by rubbing them with bran. At Athens, several places in the forum were appointed for the sale of slaves. Upon the first day of every month, the merchants called *ανδραποδοκαπηλοι* brought them into the market, and exposed them to sale; the crier, standing upon a stone erected for that purpose, called the people together.

ANDRA'RUM, a town of South Gothland, three miles south of Christianstad; here is the greatest alum-work in Sweden.

ANDRE'A (St.) a small village on the Malabar coast in the East Indies, founded originally by the Portuguese. It takes its name from a church dedicated to St. Andrew. On the shore of St. Andrea, about half a league out in the sea, lies Mud-bay, a place which few in the world can parallel. It is open to the wide ocean, and has neither island nor bank to break the force of the billows, which come rolling with great violence from all parts in the south-west monsoons: but on this bank of mud they lose

themselves in a moment; and ships lie on it as secure as in the best harbour, without motion or disturbance. It reaches about a mile under shore, and has been observed to shift its place from the northward about three miles in thirty years.

ANDRE'AS (John), a celebrated canonist in the 14th century, was born at Mugello, near Florence; and was professor of canon-law at Padua, Pisa, and afterwards at Bologna. It is said that he macerated his body with fasting; and lay upon the ground every night for twenty years together, covered only with the skin of a bear. Andreas had a beautiful daughter, named *Novella*, whom he loved extremely: and he is said to have instructed her so well in all parts of learning, that, when he was engaged in any affair which hindered him from reading lectures to his scholars, he sent his daughter in his room; and, lest her beauty should prevent the attention of the hearers, she had a little curtain drawn before her. To perpetuate the memory of this daughter, he intitled his commentary upon the Decretals of Gregory IX. the *Novellæ*. He married her to John Calderinus, a learned canonist. The first work of Andreas was his Gloss upon the Sixth Book of the Decretals, which he wrote when he was very young. He wrote also Glosses upon the Clementines; and a commentary in *regulas Sexti*, which he intitled *Mercuriales*, because he either engaged in it on Wednesdays (*diebus Mercurii*), or because he inserted his Wednesdays disputes in it. He enlarged the *Speculum* of Durant, in the year 1347. This is all which Mr. Bayle mentions of his writings, though he wrote many more. Andreas died of the plague at Bologna, in 1348, after he had been a professor forty-five years; and was buried in the church of the Dominicans.

ANDREAS (John), was born a Mahometan, at Xativa in the kingdom of Valencia, and succeeded his father in the dignity of alfaqui of that city. He was enlightened with the knowledge of the Christian religion by being present at a sermon in the great church of Valencia on the day of Assumption of the blessed Virgin, in the year 1487. Upon this he desired to be baptized; and, in memory of the calling of St. John and St. Andrew, he received the name of John Andreas. At the desire of Martin Garcia, bishop of Barcelona, he undertook to translate from the Arabic, into the language of Arragon, the whole law of the Moors; and, after having finished this undertaking, he composed his famous work of *The Confusion of the Sect of Mahumed*: it contains twelve chapters, wherein he has collected the fabulous stories, impostures, forgeries, brutalities, follies, obscenities, absurdities, impossibilities, and contradictions, which Mahomet, in order to deceive the simple people, has dispersed in the writings of that sect, and especially in the Alcoran, which, as he says, was revealed to him in one night by an angel, in the city of Meke; though in another place he contradicts himself, and affirms that he was twenty years in composing it. Andreas tells us, he wrote this work, that not only the learned amongst Christians, but even the common people, might know the different belief and doctrine of the Moors; and on the one hand might laugh at and ridicule such insolent and brutal notions, and on the other might lament their blindness and dangerous condition. This book, which was published at first in Spanish, has been translated into several languages; and all those who write against the Mahometans quote it very much.

ANDRE'NI (Isabella), a native of Padua, was an excellent poetess, and one of the best comedians in Italy, towards the beginning of the 17th century. The Intenti of Pavia thought they did their society an honour by admitting her a member of it; and she, in acknowledgment of this honour, never forgot to mention amongst her titles that of *academica infanta*: her titles were these, "Isabella Andreini, comica gelosa, academica infanta, detta l'accessa." She was also a woman of extraordinary beauty; which, added to a fine voice, made her charin both the eyes and ears of the audience. She died of a miscarriage, at Lyons, the 10th of June 1604, in the 42d year

of her age. Her death being a matter of general concern and lamentation, there were many Latin and Italian elegies printed to her memory: several of these pieces were placed before her poems in the edition of Milan, in 1605. Besides her sonnets, madrigals, songs, and eclogues, there is a pastoral of hers intitled *Myrtilla*, and letters, printed at Venice in 1610. She sung extremely well, played admirably on several instruments, understood the French and Spanish languages, and was not unacquainted with philosophy.

ANDRE/LINUS (*Publius Faustus*), born at Forli in Italy. He was a long time professor of poetry and philosophy in the university of Paris. Louis XII. made him his poet laureat; and Erasmus tells us he was likewise poet to the queen. His pen was not wholly employed in making verses; for he wrote also moral and proverbial letters in prose, which were printed several times. His poems, which are chiefly in Latin, are inserted in Vol. I. of the *Delicæ Poetarum Italicorum*. Mr. de la Monnoie tells us, "that Andrelinus, when he was but twenty-two years old, received the crown of laurel. That his love-verses, divided into four books, intitled *Livia*, from the name of his mistress, were esteemed so fine by the Roman Academy, that they adjudged the prize of the Latin elegy to the author." He died in 1518.

ANDREW, [*ανδρειας*, Gr. manly or courageous.] A man's name.

ANDREW (St.) the apostle, born at Bethsaida in Galilee, brother to Simon Peter. He had been a disciple of John the Baptist, and followed Jesus upon the testimony given of him by the Baptist: John i. 30, 37, &c. He followed our Saviour with another of John's disciples, and went into the house where Jesus lodged; here he continued from about four o'clock in the afternoon till it was night. This was the first disciple whom our Saviour received into his train. Andrew introduced his brother Simon, and they passed a day with Christ, after which they went to the marriage in Cana, and at last returned to their ordinary occupation. Some months after, Jesus, meeting them while they were both fishing together, called them to him, and promised to make them fishers of men. Immediately they left their nets, followed him, and never afterwards separated from him. After our Saviour's ascension, his apostles having determined by lot what parts of the world they should severally taste, Scythia and the neighbouring countries fell to St. Andrew, who, according to Eusebius, after he had planted the gospel in several places, came to Patræ in Achaia, where, endeavouring to convert the proconsul Ægeas, he was by that governor's orders scourged, and then crucified. The particular time of his suffering martyrdom is not known; but all the ancient and modern martyrologies, both of the Greeks and Latins, agree in celebrating his festival upon the 30th of November. His body was embalmed, and decently interred at Patræ by Maximilla, a lady of great quality and estate. Afterwards it was removed to Constantinople by Constantine the Great, and buried in the great church, which he had built to the honour of the apostles. There was a cross to be seen lately in the church of St. Victor at Marseilles, which was believed by the Romanists to be the same that St. Andrew was fastened to. It is in the shape of the letter X, and is inclosed in a silver shrine.

ANDREW, or *Knights of St. Andrew*, an order of knights, more usually called the order of the thistle. See **THISTLE**.

Knights of St. Andrew, is also an order instituted by Peter the Great of Muscovy, in 1693; the badge of which is a golden medal; on one side whereof is represented St. Andrew's cross, with these words, *Cazar Pierre monarque de tout le Russie*. This medal, being fastened to a blue ribbon, is suspended from the right shoulder.

St. Andrew's Day, a festival of the Christian church, celebrated on the 30th of November, in honour of the apostle St. Andrew.

ANDREW'S (St.) a town of Fifeshire in Scotland, once

the metropolis of the Pictish kingdom, lying in lat. 56. 18. N. lon. 2. 25. W. If we may credit legend, St. Andrew's owes its origin to a singular accident. St. Regulus, a Greek of Achaia, was warned by a vision to leave his native country, and visit Albion, an isle placed in the remotest part of the world; and to take with him the arm-bone, three fingers, and three toes, of St. Andrew. He obeyed, and set sail with his companions, but had a very tempestuous passage. After being tossed for some time on a stormy sea, he was at last shipwrecked on the coasts of Otholonia, in the territories of Hergustus king of the Picts, in the year 370. On hearing of the arrival of the strangers, with their precious relics, the king immediately gave orders for their reception, afterwards presenting the saint with his own palace, and building near it the church, which still bears the name of St. Regulus.

The town of St. Andrew's was erected into a royal borough by David I. in the year 1140, and their privileges afterwards confirmed. The charter of Malcolm II. is preserved in the tolbooth; and appears written on a bit of parchment, but the contents equally valid with what would at this time require whole skins. Here also are kept the silver keys of the city; which, for form's sake, are delivered to the king, if he should visit the place, or to a victorious enemy, in token of submission. In this place, likewise, is to be seen the monstrous ax which, in 1646, took off the heads of Sir Robert Spotswood and other distinguished loyalists. The town underwent a siege in 1337; at which time it was possessed by the English and other partizans of Baliol; but the loyalists, under the earls of March and Fife, made themselves masters of it in three weeks, by the help of their battering machines.

St. Andrew's is now greatly reduced. It is a mile in circuit, and contains three principal streets. On entering the west port, a well-built street, of great length and breadth, appears; but so grass-grown, and presenting such a dreary solitude, that it forms the perfect idea of having been laid waste by the pestilence. The cathedral was founded by bishop Arnold in 1161, but did not attain its full magnificence till 1318. Its length from east to west was 370 feet; that of the transept, 322. But, though this vast pile was 157 years in building, John Knox, in June 1559, effected its demolition in a single day; and so effectually has it been destroyed, that nothing now remains but part of the east and west ends, and of the south side. Near the east end is the chapel of St. Regulus; the tower of which is a lofty equilateral triangle, of twenty feet each side, and 103 feet high; the body of the chapel remains, but the two side-chapels are ruined. The arches of the windows and doors are round, and some even more than semicircles; an undoubted proof of their antiquity.

On the east side of the city are the poor remains of the castle, on a rock overlooking the sea. This fortress was founded, in 1401, by bishop Trail, who was buried near the high altar of the cathedral.

The celebrated university of this city was founded in 1411, by bishop Wardlaw. It consisted once of three colleges. 1. St. Salvator's, founded in 1458 by bishop Kennedy. This is a handsome building, with a court or quadrangle within: on one side is the church, on another the library; the third contains apartments for students: the fourth is unfinished. 2. St. Leonard's college was founded by prior Hepburn, in 1522. This is now united with the last, and the buildings sold, and converted into private houses. 3. The new, or St. Mary's, college, was established by archbishop Hamilton in 1553; but the house was built by James and David Bethune, or Beaton, who did not live to complete it. This is said to have been the site of a *schola illustris* long before the establishment even of the university; where several eminent clergymen taught, gratis, the sciences and languages. But it was called the new college, because of its late erection into a divinity college by the archbishop. The university is governed by a chancellor, an office originally designed to be perpetually vested in the archbishops of St. Andrew's; but since

the reformation, he is elected by the two principals, and the professors of both the colleges. The colleges have their rectors, and professors of different sciences, who are indefatigable in their attention to the instructions of the students, and to that essential article their morals. This place possesses several very great advantages respecting the education of youth. The air is pure and salubrious; the place for exercise dry and extensive; the exercises themselves are healthy and innocent. The university is fixed in a peninsulated country; remote from all commerce with the world, the haunt of dissipation.

The trade of St. Andrew's was once very considerable. So late as the reign of Charles I. this place had thirty or forty trading vessels, and carried on a considerable herring and white fishery, by means of buoys, in deep water; which fisheries had for ages been the grand source of their commerce and splendour. The harbour is artificial, guarded by piers, with a narrow entrance, to give shelter to vessels from the violence of a very heavy sea, by the encroachments of which it has suffered much. The manufactures this city might in former times possess are now reduced to one, that of golf-balls; which, trifling as it may seem, maintains a great number of people. It is, however, commonly fatal to the artists; for the balls are made by stuffing a great quantity of feathers into a leathern case, by help of an iron rod, with a wooden handle, pressed against the breast, which seldom fails to bring on a consumption.

ANDREWS (Lancelot), bishop of Winchester, was born at London in 1555, and educated at Cambridge. After several preferments, he was made bishop, first of Chichester, then of Ely, and, in 1618, was raised to the see of Winchester. This very learned prelate, who was distinguished by his piety, charity, and integrity, may be justly ranked with the best preachers and completest scholars of his age; he appeared to much greater advantage in the pulpit than he does now in his works, which abound with Latin quotations and trivial witticisms. His sermons, though full of puns, were suited to the taste of the times in which he lived, and were consequently greatly admired. He was a man of polite manners and lively conversation; and could quote Greek and Latin authors, or even pun, with king James. There is a pleasant story related of him in the Life of Waller the Poet. When that gentleman was young, he had the curiosity to go to court, and stood in the circle to see king James dine; where, among other company, there sat at table two bishops, Neale and Andrews. The king proposed aloud this question, Whether he might not take his subjects money when he needed it, without all this formality of parliament? Neale replied, "God forbid you should not; for you are the breath of our nostrils." Whereupon the king turned, and said to the bishop of Winchester, "Well, my lord, what say you?" "Sir (replied the bishop), I have no skill to judge of parliamentary cases." The king answered, "No put-offs, my lord; answer me presently." "Then, sir (said he), I think it lawful for you to take my brother Neale's money, for he offers it." He died at Winchester-house in Southwark, September 27, 1626, in the seventy-first year of his age; and was buried in the parish-church of St. Saviour's. Bishop Andrews had, 1. A share in the translation of the Pentateuch, and the historical books from Joshua to the first book of Chronicles exclusively. He also wrote, 2. *Tortura Torti*, in answer to a work of cardinal Bellarmine, in which that cardinal assumes the name of Matthew Tortus. 3. A manual of Private Devotions; and, 4. A manual of Directions for the Visitation of the Sick; besides the Sermons and Tracts, in English and Latin, published after his death.

ANDRIA, in Grecian antiquity, public entertainments first instituted by Minos of Crete, and, after his example, appointed by Lycurgus at Sparta, at which a whole city or a tribe assisted. They were managed with the utmost frugality, and persons of all ages were admitted, the

younger sort being obliged by the law-giver to repair thither as to schools of temperance and sobriety.

ANDRIA, is a city and a bishop's see in the territory of Bari, in the kingdom of Naples. It is pretty large, well peopled, and seated in a spacious plain, four miles from the Adriatic coast. Lat. 41. 15. N. lon. 17. 4. E.

ANDRIS'CUS, a man of mean extraction, who, pretending to be the son of Perseus, last king of Macedonia, took upon him the name of *Philip*, for which reason he was called *Pseudo-Philippus*, the *False Philip*. After a complete victory over Juventus, the Roman prætor sent against him, he assumed kingly power, but exercised it with vast cruelty. At last, the Romans obliged him to fly into Thrace, where he was betrayed and delivered into the hands of Metellus. This victory gained Macedonia once more into the power of the Romans, and to Metellus the name of *Macedonicus*, but cost the Romans 25,000 men. Andriscus adorned the triumph of Metellus, walking in chains before the general's chariot.

ANDRO'AS, or ANDRO'DAMAS, among ancient naturalists, a kind of pyritæ, to which they attributed certain magical virtues.

ANDROCLE'A, a daughter of Antipænus of Thebes, who with her sister Alcida, sacrificed their lives for the service of their country, when the oracle had promised a victory to the Thebans, who were engaged in a war against Orchomenos, if any one of noble birth devoted himself to the service of the nation. They received great honours after death; and Hercules, who fought on the side of Thebes, dedicated to them the image of a lion in the temple of Diana.

ANDROGE'US, in fabulous history, the son of Minos king of Crete, was murdered by the Athenian youth and those of Megara, who envied his being always victor at the Attic games. But Minos, having taken Athens and Megara, obliged the inhabitants to send him an annual tribute of seven young men and as many virgins to be devoured by the Minotaur; but Theseus delivered them from that tribute.

ANDRO'GYNAL, *adj.* [*ανρ and γυν, Gr.*] Having two sexes; hermaphroditical.

ANDRO'GYNALLY, *adv.* in the form of hermaphrodites; with two sexes.—The examples hereof have undergone no real or new transfection, but were *androgynally* born, and under some kind of hermaphrodites. *Brown.*

AN'DROGYNE, *f.* [*ανδρoγυνος, of ανρ, a man, and γυν, a woman, Gr.*] An hermaphrodite, or one that is both male and female, or that is castrated and effeminate. See under ANATOMY, p. 623.

ANDRO'GYNOUS, *f.* An appellation given, by astrologers, to such of the planets as are sometimes hot and sometimes cold; as Mercury, which is accounted hot and dry when near the sun, and cold and moist when near the moon. In zoology, an appellation given to animals which have both the male and female sex in the same individual. In botany, the term is applied to such plants as bear both male and female flowers on the same root.

ANDROI'DES, in mechanics. See AUTOMATON.

AN'DROLEPSY, *f.* in Grecian antiquity, an action allowed by the Athenians against such as protected persons guilty of murder. The relations of the deceased were empowered to seize three men in the city or house where the malefactor had fled, till he were either surrendered, or satisfaction made for the murder.

ANDRO'MACHE, the wife of the valiant Hector, the mother of Astyanax, and daughter of Eton king of Thebes in Cilicia. After the death of Hector, and the destruction of Troy, she married Pyrrhus; and afterwards Helenus the son of Priam, with whom she reigned over part of Epirus.

ANDRO'MEDA, in fabulous history, the daughter of Cepheus and Cassiope, king and queen of Ethiopia, whose mother was so rash as to think herself and daughters more beautiful than Juno and the Nereides. Juno, by way of

punishment, condemned Andromeda to be chained to a rock by the Nereides, and exposed naked, in order to be devoured by a sea-monster; but Perseus, mounted on the horse Pegasus, as he was passing by, saw Andromeda in this condition; and the monster appearing, he shewed him the head of Medusa, which turned him to stone; upon which the princess was rendered back to her father, who married her to Perseus. Andromeda was made a constellation in heaven after her death.

ANDROMEDA, in astronomy, a constellation of the northern hemisphere, representing the figure of Andromeda, almost naked, her feet at a distance from each other, and her arms extended and chained, as stated above; being one of the original forty-eight asterisms, or figures under which the ancients comprehended the stars, as derived to us from the Greeks, who probably had them from the Egyptians, or Indians. The Arabians, whose religion did not permit them to draw the figure of the human body on any occasion whatever, have changed this constellation into the figure of a sea-calf. Schickard has changed the name for that of the scripture-name *Abigail*. And Schiller has also changed the figure of the constellation for that of a sepulchre, and calls it the *Holy Sepulchre*. This constellation contains about twenty-seven stars that are visible to the naked eye; of which the principal are, α , *Andromeda's head*; β , in the girdle, and called *mirach* or *mizar*; γ , on the south foot, and named *alamah*, and sometimes *alhames*. The number of stars placed in this constellation by the catalogue of Ptolemy is twenty-three; by that of Tycho Brahe also twenty-three; by that of Hevelius forty-seven; and by that of Flamsteed sixty-six.

ANDROMEDA, *f.* [from the daughter of Cepheus and Cassiope, rescued from the sea-monster by Perseus.] In botany, a genus of the decandria monogynia class, ranking in the natural order of bicornes. The generic characters are—Calyx: perianthium five-parted, acute, very small, coloured, permanent. Corolla: monopetalous, campanulate, quinquefid; clefts reflex. Stamina: filaments subulate, shorter than the corolla, and scarcely fixed to it; anthers two-horned, nodding. Pistillum: germ roundish; style cylindric, longer than the stamens, permanent; stigma obtuse. Pericarpium: capsule roundish, five-cornered, five-celled, five-valved, opening at the corners; partitions contrary. Seeds: very many, roundish, shining.—*Essential Character*. Calyx, five-parted. Corolla, ovate, or campanulate, quinquefid at the edge. Capsule, superior, five-celled, with the partitions from the middle of the valves.

Species. 1. *Andromeda tetragona*: peduncles solitary, lateral; corollas bell-shaped; leaves opposite, imbricate, obtuse, revolute. This is like the *passerina filiformis*, but the flowers are very different, resembling those of the lily of the valley. The leaves are generally four-fold; whence it has the square appearance which acquired it the name of tetragona. Linnaeus first observed it growing very sparingly in Lapland, in the year 1732. Gmelin also found it on the mountains of Siberia.

2. *Andromeda hypnoides*: peduncles solitary, terminal; corollas bell-shaped; leaves crowded, awl-shaped. This little plant has the appearance of a moss, spreads over great tracts of ground in the Lapland Alps, and adorns them with its beautiful red flowers; it is found also in Denmark and Siberia.

3. *Andromeda cerea*: peduncles axillary, two-leaved, one-flowered; leaves alternate, ovate, serrate. Resembles the fourteenth species, but is smooth. This is from the island of Otaheite.

4. *Andromeda cærulea*: peduncles aggregate; corollas ovate; leaves scattered, linear, obtuse, flat. It grows wild on the mountains of Lapland; but more plentifully on those of Dalecarlia and Jemtia; and is found also in Denmark and Siberia.

5. *Andromeda mariana*, or Maryland andromeda: peduncles aggregate, branched; corollas ovate-cylindrical; leaves oblong-ovate, quite entire, deciduous. A native of North America. Of this there are two varieties: i. With

oval leaves; ii. With oblong leaves. They appear in June and July, and sometimes are succeeded by fruit, which seldom ripens in England.

6. *Andromeda ferruginea*, or rusty andromeda: peduncles aggregate, axillary; corolla subglobose; leaves elliptic, quite entire, beneath scaly-scariose. This is also a native of North America. It flowers in July and August.

7. *Andromeda polifolia*, or marsh andromeda: peduncles aggregate, corollas ovate, leaves alternate, lanceolate, revolute. This elegant little shrub is from six or eight inches to a foot in height, erect and branched. The calyx is red, and the corolla is of a pink colour. Native of America, and the northern countries of Europe, on turf-bogs; in Russia, Sweden, Denmark, Germany, Switzerland; and in Britain, on the moor of Cheshire, Lancashire, Westmoreland, Cumberland, Yorkshire, and Scotland, as on Brigflour-moss near Kendal, Middleton-moss by Lancaster, on Blackstone-edge between Hallifax and Rochdale, upon Solway-moss abundantly, and not unfrequent in peat-bogs in the low-lands of Scotland. It flowers about the end of May; and is called *mars chistus*, *wild rosemary*, *peley mountain*, *moorwort*, and *marsh holy rose*. There is some difference between the varieties of this species, as found in North America, in Europe, and in Newfoundland and Labrador.

8. *Andromeda bryantha*: flowers corymbed, leaves elliptic, stem prostrate. The antheræ adhere perpendicularly to the back of the filaments. Peduncles many-flowered. It comes up in thick clumps, like wild thyme, on the rocks of Kamtschatka.

9. *Andromeda dabocia*, or Irish whorts, or cantabrian heath, or trailing andromeda: racemes pointing one way, flowers quadrifid ovate, leaves alternate, lanceolate, revolute. This species has been observed to grow only in the Irish bogs, and flowers in June and July.

10. *Andromeda droseroides*, or clammy andromeda: racemes pointing one way; leaves linear, hairy, viscid. This is a native of the Cape of Good Hope.

11. *Andromeda paniculata*, or panicked andromeda: racemes terminal paniced; corollas roundish; leaves ovate rather entire. Stem about four feet high; the flowers grow in loose spikes from the ends of the branches; they appear in July, but do not produce seeds in this country. A native of Virginia.

12. *Andromeda japonica*: racemes paniced, cylindric, bracted; leaves elliptic, reflex, serrate at the tip. This is a tree. Branches coming out by threes or more in a sort of umbel, striated and angular, smooth, purplish, erect, knobbed from the fall of the leaves, and subdivided. Nao of Japan, near Nagasaki; flowering in December.

13. *Andromeda arborea*, or tree andromeda, or forrel-tree: panicles terminal, corollas rather downy, leaves elliptic, pointed, toothletted. In Virginia it is a shrub growing ten or twelve feet high; but in Carolina it rises twenty feet. The branches are very slender, bending downward. The flowers grow in long naked spikes from the sides of the branches; they are of an herbaceous colour, and ranged on one side of the stalk.

14. *Andromeda racemosa*, or branching or Pennsylvania andromeda: racemes terminal, simple, bracted; corollas cylindric; leaves oblong-lanceolate, serrate. This was found in Pennsylvania, by Kalm. It flowers in July.

15. *Andromeda axillaris*, or notch-leaved andromeda: racemes axillary, simple; corollas oblong; leaves ovate, acute, serrulate. Native of Carolina; and flowers from May to August.

16. *Andromeda coriacea*, or thick-leaved andromeda: racemes axillary, simple; leaves ovate, very entire, very shining; branchlets three-cornered. Found in North America; and flowers in July and August.

17. *Andromeda acuminata*, or acute-leaved andromeda: racemes axillary, simple; leaves ovate-lanceolate, acuminate, serrate. This is a shrub about four feet in height, upright, and the whole of it smooth, with round branches, which are leafy to a considerable extent. It flowers in

July and August. It is a native of North America, and was introduced in 1765.

18. *Andromeda calyculata*, or calyced andromeda: peduncles solitary, axillary, pointing one way; bracts two; leaves oval, scaly-dotted, obsoletely serrulate. It is a low shrub: the leaves shaped like those of the box-tree, and of the same consistence, with small punctures on them. The flowers grow in short spikes from the extremities of the branches; they are produced single, between two leaves, and are white. It grows in Sweden, Ingria, Siberia; and also in North America, on mossy land. There is some difference in the varieties from Russia, Newfoundland, and North America and Siberia.

19. *Andromeda anastomozans*: racemes crowded, leafy; leaves ovate slightly serrate, anastomosing underneath and dotted. A shrub with hairy branches; found by Mutis, in New Granada.

20. *Andromeda rupestris*: leaves oblong, alternate, serrulate. A native of New Zealand.

21. *Andromeda falcifolia*, or willow-leaved andromeda: racemes pointing one way, naked; corollas subcylindrical; leaves lanceolate, acute, quite entire. It was found by Commerfon, in the island of Mauritius.

22. *Andromeda buxifolia*, or box-leaved andromeda: racemes pointing one way, naked; corollas subcylindrical; leaves cordate-ovate, quite entire, with a little dagger point. It is a native of the isle of Bourbon, where it was found by Commerfon.

23. *Andromeda fasciculata*: peduncles aggregate, leaves alternate ovate-lanceolate, obtuse slightly crenulate, coriaceous.

24. *Andromeda jamaicensis*: peduncles aggregate, corollas ovate transparent, leaves alternate broad-lanceolate obtuse entire, beneath ash-coloured membranaceous.

25. *Andromeda octandra*: peduncles aggregate, corollas cylindric quadrifid, leaves alternate ovate-lanceolate entire membranaceous. Natives of Jamaica.

Propagation and Culture. Most of the sorts are hardy deciduous shrubs, delighting in moist ground. They may be increased by their creeping roots, which put up suckers at a distance, which may be taken off with roots, and transplanted where they are designed to remain; for they do not bear to be often removed. Such also as are imported from America by the seedmen may be propagated by seed, which must be sown in the spring, in a bed of moist earth. They may also be increased by layers, in autumn. The 13th sort requires to be sheltered from hard frost in winter, but in the summer should be frequently watered. It is a difficult plant to keep in gardens, as it grows naturally on boggy places, and requires a greater heat than that of this climate.

ANDRON, *f.* in Grecian antiquity, denotes the apartment in houses designed for the use of men; in which sense it stands opposed to *Gynæceum*. The Greeks also gave their dining-rooms the title of *andron*, because the women had no admittance to feasts with the men.

ANDRONA, *f.* in ancient writers, denotes a street, or public place, where people met and conversed together. In some writers, *androna* is more expressly used for the space between two houses; in which sense, the Greeks also use the term *andronas*, for the way or passage between two apartments. *Androna* is also used, in ecclesiastical writers, for that part in churches destined for the men. Anciently it was the custom for the men and women to have separate apartments in places of worship, where they performed their devotions asunder; which method is still religiously observed in the Greek church. The *andron*, or *androna*, was in the southern side of the church, and the women's apartment on the northern.

ANDRONICUS I. emperor of the East, caused Alexius II. who had been put under his care, to be strangled; and then took possession of the throne of Constantinople in 1183: but the people, becoming exasperated at his cruelties, proclaimed Isaac Angelus emperor, and put Andronicus in irons: they then thrust out his eyes; and, having

led him through the city in an ignominious manner, hanged him.

ANDRONICUS of CYRRHUS, built at Athens an octagon tower, with figures carved on each side, representing the eight principal winds. A brass triton at the summit, with a rod in its hand, turned round by the wind, pointed to the quarter from whence it blew. From this model is derived the custom of placing weather-cocks on steeples.

ANDROPHA'GI, in ancient history, the name of a nation whose country, according to Herodotus, was adjacent to Seythia. Their name, compounded of two Greek words, signifies *man-eaters*. Herodotus does not inform us whether their manner of subsisting corresponded with their name; whether they were so savage as to eat human flesh. See the article *ANTHROPOPHAGI*. They are represented, however, as the most barbarous and fierce of all nations. They were not governed by laws: the care of their cattle was their chief employment. Their dress was like that of the Scythians; and they had a language peculiar to themselves.

ANDROPO'GON, *f.* [*ανδροπωγων*, Gr. signifying man's beard.]. In botany, a genus of the polygamia monoecia class, of the natural order of gramina or grasses. The generic characters are—Hermaphrodite flowers sessile. Calyx: a glume, one-flowered, two-valved, oblong, obtuse, cartilaginous, awnless; the outer valve concave, flattish at the back, embracing the inner, which is narrower, with its edges. Corolla: a two-valved glume, less and more slender than the calyx; outer valve smaller, frequently very small, within the inner valve of the calyx, sharp or bifid at the end, in most of the species awned; awn terminating, or from the cleft of the glume, long, with a bent joint, and twisted at bottom; the inner valve lanceolate, doubled at the edges; nectary two-leaved; leaflets thickish, diaphanous. Stamina: filaments three, capillary, very tender; antheræ oblong, forked at both ends, incumbent. Pistillum: germ oblong; styles two, capillary; stigmas oblong, feathered. Pericarpium: none, glumes of the corolla and calyx involving and inclosing the seed. Seed: solitary, oblong, covered; armed with the awn of the corolla, which easily falls off. Male flowers peduncled, single, or in pairs to each hermaphrodite. Calyx, corolla, and stamina, as in the others; only that the corolla has no awn.—*Essential Character.* Hermaphrodite. Calyx, glume one-flowered; corolla, glume awned at the base; stamina, three; styles, two; seed, one. Male. Calyx and corolla the same; stamina, three.

Species. 1. *Andropogon caricofum*: spike solitary, imbricate; seeds shaggy; awns naked, contorted. A native of Amboyna and Japan.

2. *Andropogon contortum*: spike solitary; male flowers awnless on the back of the spike; female flowers on the belly of it, twice as long as the males, with twisted approximating awns, longer than the whole spike. A native of the East Indies.

3. *Andropogon crinitum*: spike solitary, shaggy; awns naked, jointed, very long. A native of Japan; found by Thunberg.

4. *Andropogon divaricatum*: spike oblong; flowers woolly, remote, divaricate; awn flexuose, naked. Native of Virginia.

5. *Andropogon gryllus*: peduncles of the panicle entirely simple, three-flowered; the hermaphrodite floccule sessile, awned, ciliate, bearded at the base. A native of Piedmont, Verona, Montpellier, Carniola, the Grisons, and Switzerland.

6. *Andropogon saccharoides*: branches of the panicle simple, florets in pairs, hermaphrodite awned sessile, the other awnless pedicelled withering, pedicel and rachis woolly. Native of Jamaica.

7. *Andropogon nutans*: panicle nodding; awns twisted, polished; glumes of the calyx shaggy. A native of Virginia and Jamaica.

8. *Andropogon ciliatum*: panicle nodding; outer calyx many-

many-flowered, ciliate; awns contorted, hairy. Found by Thunberg on the mountains of Nagasaki in Japan; flowering in September.

9. *Andropogon ferratum*: panicle loose; one floscule sessile, villose at the base; the other pedicelled, with the pedicel villose, and shorter than the calyx. 10. *Andropogon cotuliferum*: panicle spreading, villose; awn twisted, naked; pedicels clubbed or swelling at top, and hollowed like a saucer or dish. Natives of Japan.

11. *Andropogon cymbarium*: panicle scattered; bractes boat-form; flowers transverse, awned, three-fold. A native of the East Indies.

12. *Andropogon squarrosus*: panicle crowded, glumes awl-shaped, rugged. Koenig observed it in Ceylon, swimming on deep pools. It is used by the natives for its pleasant smell: they also make fans of it.

13. *Andropogon prostratus*: peduncles in five-flowered umbels without calyces, the hermaphrodite floscule awned. A native of the East Indies.

14. *Andropogon fastigiatum*: spikes of the panicle solitary, peduncles elongate subfastigiate, rachis woolly, floscules awned, male fertile. Native of Jamaica.

15. *Andropogon alopecuroides*: panicle loose, rachis woolly, a twisted awn to each floscule. A native of Jamaica and Virginia.

16. *Andropogon distachyum*: spikes two, terminal: culm undivided. This species is above a foot high, with flat leaves and solitary flowers. Linnæus says, from Burser, that it grows wild in Switzerland. Scheucher had it from Smyrna.

17. *Andropogon schænanthus*, or sweet rush, or camel's hay: spike of the panicle conjugate, ovate-oblong; rachis pubescent, floscules sessile with a twisted awn. Native of Arabia and India. Cultivated in the gardens of China and Cochinchina, where the inhabitants use it to season their meat. This is brought over from Turkey in bundles, about a foot long. When in perfection, it has an agreeable smell, with a warm, bitterish, not unpleasant, taste. It was formerly employed as a warm stomachic and deobstruent; but, in this country, more common aromatic vegetables have now superseded its use. Perennial.

18. *Andropogon virginicus*: spikes of the panicle conjugate, peduncles simple, rachis woolly, floscules awnless, the male one wasting. A native of America.

19. *Andropogon bicornis*: spikes of the panicle conjugate, peduncles branching very much, rachis woolly, awn caducous, male floscule wanting. Native of the East Indies, on dry hills, and there called by the English *fox-tail grass*.

20. *Andropogon hirtum*: spikes of the panicle conjugate, calyces shaggy. A native of Portugal, Italy, Sicily, and Smyrna.

21. *Andropogon insulare*: panicle loose, smooth; floscules double, awnless; one pedicel shorter, calyces woolly. A native of Jamaica.

22. *Andropogon barbatus*: spikes digitate, calyces permanent, corollas ciliate. A native of the East Indies.

23. *Andropogon pubescens*: spikes digitate, calyces subtriflorous, outer petals awned; keel and edge of the hermaphrodite flower ciliate. This is a native of Jamaica, from whence it was sent by Mr. Gilbert Alexander. It was introduced at Kew, in 1779; and flowers from July to September. It is perennial.

24. *Andropogon nardus*: branches of the panicle superdecapound, proliferous. Indian nard, or spikenard, as brought to us, is a congeries of small tough reddish-brown fibres, forming a bunch about the size of a finger. It was kept in the shops only as an article in *mithridate* and *theriaca*, and is said to be used among the orientals as a spice. It is moderately warm and pungent, accompanied with a flavour not disagreeable. There is an account of the true *Nardus Indica*, in the Philosophical Transactions, by Dr. Blane. It was discovered in India by his brother, in December 1786, after crossing the river Rapti, about twenty miles from the foot of the northern mountains; where,

perceiving the air to be perfumed by an aromatic smell, and asking the cause, he was told that it proceeded from the roots of the grass trodden out of the ground by the elephants and horses. The country was wild and uncultivated, and this was the common grass which covered the surface of it, growing in large tufts close to each other, very rank, and in general from three to four feet in length. Transplanted into a garden at Lucknow, it thrived exceedingly, and in the rainy season shot up spikes about six feet high. The whole plant has a strong aromatic odour; but both the smell and the virtues reside principally in the husky roots, or lower parts of the stalks, which in chewing have a bitter, warm, pungent, taste, accompanied with some degree of that kind of glow in the mouth which cardamoms occasion. It is remarkable, that the circumstance of the discovery corresponds, in a striking manner, with an occurrence related by Arrian: that, during the march of Alexander the Great through the deserts of Gedrosia, the air was perfumed by the spikenard, which was trampled under foot by the army; and that the Phœnicians collected large quantities of it, as well as of myrrh, in order to carry them into their own country, as articles of merchandize. Gedrosia, or Gedrosia, answers to the modern Mackran, or Kedge-Mackran, a maritime province of Persia, situated between Kerman (the ancient Carmania) and the river Indus, being of course the frontier of Persia towards India; and this desert lies in the middle of the tract of country between the river Indus and the Persian gulph, and within a few days march of the Arabian or Erythrean sea; which is the northern part of the Ethiopic ocean, and not the Red Sea. It should seem that the nard was found towards the eastern part of it; for Alexander was then directing his route to the westward, and the length of march through the desert afterwards was very great. Garcias ab Horto, a Portuguese, who resided many years at Goa in the sixteenth century, has given a figure of the roots, or rather the lower part of the stalks, which corresponds with Dr. Blane's specimens; he says, that there is but one species of nardus known in India, either for the consumption of the natives, or for exportation to Persia and Arabia. It is remarkable, that he is perhaps the only author who speaks of it in its recent state from his own observation. Rumphius mentions having seen a dried specimen, of which the leaves were almost five feet long; and that Mackran was one of the countries from whence it was brought. It is probable that the nardus of Pliny, and great part of what is now imported from the Levant, and found under that name in the shops, is a plant growing in the countries on the Euphrates, or in Syria, where the great emporiums of the eastern and western commerce were situated. There is a *Nardus Assyria* mentioned by Horace; and Dioscorides speaks of the *Nardus Syriaca* as different from the *Indica*, which certainly was brought from some of the remote parts of India; for both Dioscorides and Galen, by way of fixing more precisely the country from whence it comes, call it also *Nardus Gangites*. It is called by the natives *terankus*, which means literally, in the Hindoo language, fever-restrainer, from the virtues they attribute to it in that disease. They infuse about a drachm of it in half a pint of hot water, with a small quantity of black pepper. This infusion serves for one dose, and is repeated three times a day. It is esteemed a powerful medicine in all kinds of fevers, whether continued or intermittent. It was highly valued anciently as an article of luxury as well as medicine. The favourite perfume which was used at the ancient baths and feasts was the *unguentum nardinum*; and it appears, from a passage in Horace, that it was so valuable, that as much of it as could be contained in a small box of precious stone, was considered as a sort of equivalent for a large vessel of wine, and a handsome quota for a guest to contribute at an entertainment, according to the custom of antiquity. It may here be remarked, that as its sensible qualities do not depend on a principle so volatile as essential oil, like most other aromatic vegetables, this would be a great recommendation

commendation to the ancients, as its virtues would thereby be more durable; and they were not acquainted with the method of collecting essential oils, being ignorant of the art of distillation. The fragrance and aromatic warmth of the nardus depends on a fixed principle, like that of cardamoms, ginger, and some other spices. I tried, says Dr. Blane, to extract the virtues of the nardus by boiling water, by maceration in wine, and proof spirits, but it yielded them sparingly and with difficulty to all these menstrua. It had a high character among the ancients as a remedy both external and internal. It is one in the list of ingredients in all the antidotes, from those of Hippocrates, as given on the authority of Myrepsus, and Nicolaus Alexandrinus, to the officinals which have kept their ground till modern times, under the name of *mithridate* and *Venice treacle*. It is recommended by Galen and Alexander Trallian in the dropsy and gravel. Celsus and Galen recommend it both externally and internally in pains of the stomach and bowels. The first occasion on which the latter was called to attend Marcus Aurelius was, when that emperor was severely afflicted with an acute complaint in the bowels, answering by the description to that we now call the *cholera morbus*; and the first remedy he applied was warm *oleum nardinum* on wool to the stomach. He was so successful in the treatment of this illness, that he ever afterwards enjoyed the highest favour and confidence of the emperor. It appears that the natives of India consider it as an efficacious remedy in fevers, and its sensible qualities promise virtues similar to those of other simples now in use among us in such cases. Besides a strong aromatic flavour, it possesses a pungency to the taste little inferior to the *serpentaria*, and much more considerable than the *contrayerva*. It is mentioned in a work attributed to Galen, that a medicine composed of this, and some other aromatics, was found useful in long protracted fevers, which are the cases in which medicines of this class are employed in modern practice.

25. *Andropogon nuticum*: spikes digitate, mostly three; floscules alternate, sessile awnless. A native of the Cape of Good Hope.

26. *Andropogon ischaemum*: many digitate spikes, floscules sessile, awned and awnless, pedicels woolly. A native of the southern parts of Europe, growing on mountains, hills, and other dry situations.

27. *Andropogon fasciculatum*, or many-spiked andropogon: spikes fascicled, very many, smooth; calyxes two-flowered; valves acute, smooth, and even, the outer like petals and awned, the inner floscule barren. A native of Jamaica; and flowers from July to September.

28. *Andropogon polydactylon*: spikes fascicled, outer petals awned, those of the lower floscule ciliate-bearded. A native of Jamaica.

29. *Andropogon glaucum*: panicle leafy, involuclers and calyxes two-flowered, calyxes of the sessile flowers three-valved, of the peduncled ones two-valved. Native of the East Indies; from whence it was sent by Koenig.

30. *Andropogon ferratum*: spike simple imbricate with two rows of awned sessile flowers, and two of awnless pedicelled ones, calyxes one-valved. Native of Bengal; found there by Koenig.

31. *Andropogon incurvatum*: spikes filiform subdigitate, flowers twin, the female pedicelled and awned, the male sessile and awnless, calyxes one-valved. Found by Koenig in Tranquebar, near rivers.

32. *Andropogon binatum*: spikes twin, woolly, one valve of the calyxes acuminate, the other truncate three-toothed, the larger petal awned. Observed in the East Indies by Koenig.

33. *Andropogon aciculatum*: panicle contracted upright, peduncles three-flowered, male flowers two pedicelled acuminate, female sessile awned. Native of the East Indies, in barren places.

34. *Andropogon Bladhii*: spikes about eight, hermaphrodite floscule sessile awned, neuter peduncled ciliate awnless. Native of China, and sent from thence by Bladh.

35. *Andropogon provinciale*: spikes fascicled smooth, floscules alternate subsessile, directed one way, awned. Native of the south of France; from whence the seeds were sent by Dahl.

Propagation and Culture. Few of these grasses have been propagated in European gardens. The greater part of them would require the protection of a stove, since they are natives of the East or West Indies. See *SACCHARUM* and *STIPA*.

AN'DROS, one of the ancient Cyclades, lying between Tenedos and Eubœa; being one mile distant from the former, and ten from the latter. The ancients gave it various names, viz. Cauros, Lafia, Nonagria, Epagris, Antandros, and Hydrusia. The name of Andros it received from Andreus, appointed, according to Diodorus Siculus, by Rhadamanthus, one of the generals, to govern the Cyclades, after they had of their own accord submitted to him. As to the name of *Antandros*, the same author tells us, that Ascanius the son of Æneas, being taken prisoner by the Pelasgians, gave them this island for his ransom, which on that account was called *Antandros*, or "delivered for one man." The name of *Hydrusia* it obtained in common with other places well supplied with water. It had formerly a city of great note, bearing the same name, and situated very advantageously on the brow of a hill, which commanded the whole coast. In this city, according to Strabo and Pliny, stood a famous temple, dedicated to Bacchus. Near this temple, Mutianus, as quoted by Pliny, tells us, there was a spring called the *gift of Jupiter*; the water of which had the taste of wine in the month of January, during the feasts of Bacchus, which lasted seven days. The same author adds, that the waters, if carried to a place whence the temple could not be seen, lost their miraculous taste. Pausanias makes no mention of this spring; but says, that, during the feast of Bacchus, wine flowed, or was at least by the Andrians believed to flow, from the temple of that god. The priests, no doubt, found their account in keeping up this belief, by conveying, through secret conduits, a great quantity of wine into the temple.

The Andrians were the first of all the islanders who joined the Persians at the time Xerxes invaded Greece; and therefore Themistocles, after the victory at Salamis, resolved to attack the city of Andros, and oblige the inhabitants to pay large contributions for the maintenance of his fleet. Having landed his men on the island, he sent heralds to the magistrates, acquainting them, that the Athenians were coming against them with two powerful divinities, *persuasion* and *force*; and therefore they must part with their money by fair means or foul. The Andrians replied, that they had likewise two mighty deities who were very fond of their island, viz. *poverty* and *impossibility*; and therefore could give no money. Themistocles, not satisfied with this answer, laid siege to the town; which he probably made himself master of and destroyed, as we are informed by Plutarch, that Pericles, a few years after, sent thither a colony of 250 Athenians. It was, however, soon retaken by the Persians; and, on the overthrow of that empire by Alexander the Great, submitted to him, along with the other islands. On his death it sided with Antigonus, who was driven out by Ptolemy. The successors of the last-mentioned prince held it to the times of the Romans; when Attalus, king of Pergamos, besieged the metropolis at the head of a Roman army; and, having taken it, was by them put in possession of the whole island. Upon the death of Attalus, the republic claimed this island, as well as his other dominions, in virtue of his last will.

Andros is now subject to the Turks; and contains a town of the same name, with a great many villages. It is the most fruitful island in all the Archipelago, and yields a great quantity of silk. There are said to be about 6000 inhabitants, besides those of the villages Arni and Amoldeos, who are about 200, have a different language and customs, and are called *Albanois*. There are seven monasteries,

naderies, a great number of churches, and a cathedral for the bishops of the Roman catholic persuasion; but most of the inhabitants are of the Greek communion. The Jesuits had a house and a church in this island; but they were forced to quit them long ago. Here are some delightful valleys; but the air is bad, and the water of the city worse. A cadi, assisted by a few of the principal persons of the island, has the management of civil affairs, and his residence is in the castle; an aga, who presides over the military force, lives in a tower without the city. About two miles from the present town are still to be seen the ruins of a strong wall, with the fragments of many columns, chapiters, bases, broken statues, and several inscriptions, some of which mention the senate and people of Andros, and the priests of Bacchus; from which it is probable that this was the site of the ancient city. Lat. 37. 50. N. lon. 25. 30. E.

ANDROS, an island in the Irish sea, called Hedros by Ptolemy. Now Bardsey, distant about a mile from the coast of North Wales.

ANDROSACE, *f.* [*ανδρος σανος*, Gr. the shield of a man, from the form of the calyx, in the common species.] In botany, a genus of the pentandria monogynia class, ranking in the natural order of præciæ. The generic characters are—Calyx: involucre many-leaved, many-flowered, very small; perianthium one-leaved, five-cornered, semiquinquefid, acute, erect, permanent. Corolla: monopetalous, salver-shaped; tube ovate, involved in the calyx; border flat, five-parted; divisions ovate-oblong, obtuse, entire; throat beset with glands. Stamina: filaments very short, within the tube; antheræ oblong, erect, included. Pistillum: germ globose; style filiform, very short; stigma globose, included. Pericarpium: capsule globose, sitting on a flat calyx, one-celled, opening into five parts at the top. Seeds: very many, roundish, gibbous on one side, flat on the other. Receptaculum: erect, free.—*Essential Character.* An involucre to the umbel; tube of the corolla ovate, with a glandulous mouth; capsule one-celled, globose.

Species. 1. *Androsace maxima*, or oval-leaved androsace: perianthiums of the fruit very large. There are six or more seeds in a capsule; they are dark brown or blackish, and slightly pubescent. The flowers appear in April, or the beginning of May; the seeds ripen in June, and the plants soon after perish. It grows naturally among corn, in Austria, Bohemia, and other parts of Germany, in the Valais, Piedmont, Carniola, and Hungary. Annual.

2. *Androsace elongata*, or cluster-flowered androsace: leaves lanceolate-toothed, fruiting umbel elongate, corollas shorter than the angular calyx. Native of Austria, near Vienna, up to the very suburbs. It flowers in April, and perfects its seeds in June.

3. *Androsace septentrionalis*, or tooth-leaved androsace: leaves lanceolate-toothed, smooth; perianthiums angular, shorter than the corollas. Root annual, (according to Miller biennial.) Native of Lapland, Sweden, Denmark, Switzerland, Germany, Russia, in mountainous situations.

4. *Androsace villosa*, or hairy androsace: leaves hairy, perianthiums shaggy. Root perennial. Common in the Swiss Alps, Jura, &c. in the mountains of Austria and Carniola, in the Pyrenees, &c.

5. *Androsace lactea*, or grass-leaved androsace: leaves lanceolate, smooth; umbel many times larger than the involucre. Root perennial. Native of the mountains of Switzerland, Austria, and Carniola. Flowering, as does the foregoing, in July and August.

6. *Androsace carnea*, or awl-leaved androsace: leaves awl-shaped, smooth; umbel equalling the involucre. Native of the Alps and Pyrenees.

7. *Androsace filiformis*: leaves ovate-toothed petioled, rays of the umbel capillary, corollas exceeding the bell-shaped calyx. It is a native of Siberia.

Propagation and Culture. These, being low plants, with small flowers, making no great appearance, are only preserved in botanic gardens. All the sorts, except the first,

require a shady situation. The seeds should be sown soon after they are ripe; otherwise they seldom grow the same year. If permitted to scatter, they will come up of themselves, and often succeed better than those which are sown. The annual sorts perish as soon as the seeds are ripe; but the others will live in an open border for several years, and require no other care, but to keep them clean from weeds. See *ARETIA*.

ANDROSÆMUM, *f.* in botany. See *HYPERICUM*.

ANDRO'TOMY, *f.* [of *ανηρ* and *τεμνω*, Gr. to cut.] A dissection of human bodies.

AN'DRUM, *f.* a kind of hydrocele, to which the people of Malabar are very subject. Its origin is derived from the vicious quality of the country waters, impregnated with corrosive muriatic salts, the source of most other diseases that affect the Malabrians. Its signs or symptoms are an erysipelas of the scrotum, returning every new moon, by which the lymphatics, being eroded, pour a serous saline humour into the cavity of the scrotum. The andrum is incurable; those once seized with it have it for life: but it is not dangerous, nor very troublesome to those used to it; though sometimes it degenerates into an hydroscrocele. The method of prevention is by a heap of sand fetched from a river of the province Mangatti, and strewed in the wells. This is practised by the rich. As to the cure, they have only a palliative one; which is by incision, or tapping, and drawing off the water from the scrotum once in a month or two.

ANDRY'ALA, *f.* [*ανδρος αλη*, *viri erratio, anxietas animi*.] In botany, a genus of the syngenesia polygamia æqualis class, ranking in the natural order of compositæ semisculosæ. The generic characters are—Calyx: common, many-parted, short, rounded, villose; scales very many, subequal, subulate. Corolla: compound imbricate, uniform; corollules hermaphrodite, numerous, equal; each ligulate, linear, truncate, five-toothed. Stamina: filaments five, capillary, very short; anthera cylindrical, tubulose. Pistillum: germ ovate; style filiform, the length of the stamens; stigmas two, reflex. Pericarpium: none; calyx converging, globose. Seeds: solitary, ovate; downy capillary, the length of the calyx. Receptaculum: villose, flattish.—*Essential Character.* Receptaculum villose; calyx many-parted, subequal, rounded; down simple, sessile.

Species. 1. *Andryala integrifolia*, or hoary andryala: lower leaves runcinate; upper ovate-oblong, tomentose. Near a foot and a half in height, with woolly branching stems, having leaves scatteringly set on them, which are oblong and downy. The flowers are yellow, and are produced in small clusters at the top of the stalks. It flowers in July, and the seeds ripen in September. This species is annual, growing naturally in the south of France, Spain, Italy, and Sicily.

2. *Andryala cheiranthifolia*, or various-leaved andryala: leaves runcinate; upper ones lanceolate, entire; down glanduliferous. Native of the island of Madeira. Observed there by Mr. Francis Masson, and introduced in 1777. It is perennial, three feet high, and full of milk.

3. *Andryala pinnatifida*, or pinnatifid-leaved andryala: leaves tomentose, pinnatifid; calyxes tomentose, hairy; hairs rather stiff. A native of Madeira, and of the Canary islands; and was found there by Mr. Francis Masson. It is biennial, and flowers in July and August.

4. *Andryala crithmifolia*, or samphire-leaved andryala: leaves pinnate, linear, tomentose. Native of Madeira. It is biennial, and flowers from June to August.

5. *Andryala ragulina*, or downy andryala: leaves lanceolate, undivided, denticulate, acute, tomentose, flowers solitary. One yellow flower terminates every branch in June and July. This plant, being very hoary, makes a pretty appearance, intermixed with others whose leaves are green. It will not live abroad, except in a dry soil and warm situation. Robert More, Esq. sent it from Spain; it has also been received from the Cape and Algiers. Linnæus says it is a native of the islands of the Archipelago.

6. *Andryala lanata*, or woolly andryala: leaves oblong-ovate,

ovate, slightly-toothed, woolly; peduncles branching. This flowers in June, and the seeds ripen in August. The whole plant is white: and a native of the south of Europe.

Propagation and Culture. All these plants may be propagated from seeds; those of the hardy sorts should be sown in the spring, in the place where the plants are to remain. They require no other culture, but to thin them when they are too close, and too keep them clean from weeds. The second, third, fourth, and fifth, require the protection of a green-house, where they flower all the summer, till late in the autumn, frequently perfecting their seeds, by which they may be propagated. The perennial sorts may also be propagated by their creeping roots. See LEONTODON.

ANDUX'AR, an ancient, large, and populous, city, of Andalusia. It has several fine buildings, a strong castle, and is seated on the Guadalquivir, over which there is a stately bridge. It vends great quantities of silk, and the country abounds in corn, wine, oil, honey, &c. It is twenty-five miles east of Corduba. Lat. 37. 55. N. lon. 3. 34. W.

ANEAU' (Bartholomew), a native of Bourges in France, a man of eminent learning in the 16th century, educated under Melchior Volmar. He was professor at Lyons, where he propagated the doctrines of the reformation secretly for a long time: but, on the festival of the holy sacrament 1565, as the procession was passing on towards the college, there was a large stone thrown from one of the windows upon the host and priest who carried it. The people, enraged at this, broke into the college, and assassinated M. Aneau, whom they imagined to have been the occasion, and the college itself was shut up next day by order of the city.

AN'ECDOTE, *f.* [ἀνέκδοτος, Gr. of ἀ priv. and ἐκδίδωμι, published.] A term used by some authors for the titles of *secret histories*; but it more properly denotes a relation of detached and interesting particulars. Procopius gives this title to a book which he published against Justinian and his wife Theodora; and he seems to be the only person among the ancients who has represented princes such as they are in their domestic relation. Varillas has published *Anecdotes of the House of Medicis*.

ANEC'DOTES is also an appellation given to such works of the ancients as have not yet been published. In which sense, M. Muratori gives the name *Anecdota Græca* to several writings of the Greek fathers, found in the libraries, and first published by him. F. Martene has given a *The-saurus Anecdotarum Novus*, in folio, 5 vols.

ANE'E, *f.* in commerce, a measure for grain, used in some provinces of France. At Lyons, it signifies also a certain quantity of wine, which is the load an ass can carry at once, and which is fixed at eighty English quarts, wine-measure.

ANEMO'GRAPHY, *f.* [ἀνέμος and γραφω, Gr.] The description of the winds.

ANEMO'METER, *f.* [of ἀνέμος, the wind, and μέτρον, Gr. measure.] A machine for measuring the force and velocity of the wind. Various machines of this kind have been invented at different times, and by different persons. The following by Mr. Martin has been often experienced, and found to answer the intention. An open frame of wood, ABCDEFGHI, is supported by the shaft or arbour I. In the two cross-pieces HK, LM, is moved an horizontal axis QM, by means of the four sails, ab, cm, Of, gh, exposed to the wind in a proper manner. Upon this axis is fitted a cone of wood, MNO; upon which, as the sails move round, a weight R, or S, is raised by a string round its superficies, proceeding from the smaller to the larger end NO. Upon this larger end or base of the cone, is fixed a rocket wheel k, in whose teeth the click X falls, to prevent any retrograde motion from the depending weight. The structure of this machine sufficiently shews that it may be accommodated to estimate the variable force of the wind; because the force of the weight will continually increase as the string advances on the conical sur-

face, by acting at a greater distance from the axis of motion; consequently, if such a weight be added on the smaller part M, as will just keep the machine in equilibrium in the weakest wind, the weight to be raised, as the wind becomes stronger, will be increased in proportion, and the diameter of the cone NO may be so large in comparison to that of the smaller end at M, that the strongest wind shall but just raise the weight at the greater end. If, for example, the diameter of the axis be to that of the base of the cone NO as 1 to 28; then, if S be a weight of one pound at M on the axis, it will be equivalent to twenty-eight pounds when raised to the greater end: if, therefore, when the wind is weakest, it supports one pound on the axis, it must be twenty-eight times as strong to raise the weight to the base of the cone. If therefore a line or scale of twenty-eight equal parts be drawn on the side of the cone, the strength of the wind will be indicated by that number on which the string rests.

ANE'MONE, *f.* [from ἀνέμος, Gr. the wind: because the flower is supposed not to open except the wind blows; or rather, because it grows in situations much exposed to the wind.] In botany, a genus of the polyandria polygynia class, ranking in the natural order of multifloræ. The generic characters are—Calyx: none. Corolla: petals in two or three rows, three in a row, somewhat oblong. Stamina: filaments numerous, capillary, half the length of the corolla; antheræ twin, erect. Pistillum: germ numerous, in a head; styles acuminate; stigmas obtuse. Pericarpium: none; receptacle globular or oblong, hollowed and dotted. Seeds: very many, acuminate, retaining the style.—*Essential Character.* Calyx none; petals six or nine; feeds many.

Species. 1. *Hepatica*, with a subcalyculate flower. 1. *Anemone hepatica*, or *hepatica*: leaves three-lobed, quite entire. The leaves of the year before remain; they are heart-shaped, three-lobed, obtuse, smooth, beneath veined in net-work. The bud has generally four outer scales, ovate and membranaceous; three inner, concealing the leaves and flowers. The flower lies a year complete in all its parts within the bud. This plant is asfringent, but not in use. It is found wild in Sweden abundantly, in Denmark, Switzerland, France, Spain, Italy, and other parts of Europe; in woods and among bushes; with blue, red, and white, flowers, single. It flowers in March. There are many varieties of *hepatica* common in gardens; as, 1. Single and double blue. 2. Single and double red or peach-coloured. 3. Single and double white. 4. Single and double variegated red and white. 5. Single and double violet-coloured. 6. With striped leaves. Parkinson mentions a white with red stamens. These are some of the greatest ornaments of the spring; the flowers are produced in February and March in great plenty, before the green leaves appear, and make a very beautiful figure in the borders of the pleasure-garden, especially the double sorts, which commonly continue a fortnight longer in flower than the single ones, and the flowers are much fairer.

11. *Pulsatilla*, with the peduncle involucred, and the seeds tailed. 2. *Anemone patens*, or woolly-leaved *anemone*:

mone: peduncles involucred, leaves digitate, multifid. Root perennial. A native of Siberia about Tobolski, and of Lower Lusatia. It was cultivated in 1759 by Miller.

3. *Anemone sulphurea*: peduncle involucred; leaves triply-pinnate, hairy, flat, acutely-gashed, seeds tailed. Differs from the vernal in having sharper petals, yellow within.

4. *Anemone baldensis*: leaves biternate, shaggy. Unknown to latter writers. The fruit resembles that of the garden anemone. It grows wild about Aigle, &c. in Switzerland, Monte Baldo, Monte Cenis, &c.

5. *Anemone vernalis*: peduncle involucred, leaves pinnate, flowers erect. Flower red without, white within; leaves approaching those of meadow-rue; stem half a foot high. When the flower is young it is white, with a bluish or purple on the outside, where it is hairy: these hairs afterwards become yellow. It grows in the woods bordering on the mountains, in barren sands, in Sweden, Germany, and on the high Alps of Switzerland.

6. *Anemone cernua*: peduncle involucred, leaves pinnate, flowers nodding. Differs from the last in the nodding of the flower, and in the leaves having more pinnas, finely cut. Thunberg found it in Japan near Jeddo, flowering early in spring.

7. *Anemone pulsatilla*, or pasque-flower: peduncle involucred, petals straight, leaves bipinnate. This is acrid, and will raise blisters; the distilled water will vomit; it cannot therefore be safe to give it in disorders of the lungs. It grows wild on open hills in dry soils, in Sweden, Denmark, Switzerland, France, Italy, Germany, Carniola, Siberia, &c. and in England, on chalky downs; as Gogmagog-hills; Barnack-heath, near Stamford; about Leadstone-hall, near Pontefract; near Charlbury, in Oxfordshire; Lexham, Bury, Newmarket, &c. flowering in April. It has the Italian name *pulsatilla* from the downy seed being beaten about by the wind. There is a variety with double, and another with white, flowers.

8. *Anemone pratensis*, or meadow anemone: peduncle involucred, petals reflex at the tip, leaves bipinnate. The flower of this is less than that of the former, and of a darker colour; it hangs down like that, but the tips of the petals are bent back. It is very common in the barren stony fields of Oeland and Scania, also in Denmark, Germany, and Piedmont. The leaves are shorter, the stalks do not rise so high, and the flowers do not expand so wide, as in the former.

9. *Anemone Alpina*, or Alpine anemone: stem-leaves ternate, connate, superdecompound, multifid; seeds shaggy, tailed. Flower almost as big as a tulip, white, with a tinge of purple. It grows wild on the Alps, Jura, and in Austria.

10. *Anemone apiifolia*: stem-leaves ternate, connate, superdecompound, multifid, very slender, extremely hairy underneath. It has no smell, and is a native of the Leontine Alps. It may be doubted whether this be really distinct from the ninth species.

III. *Anemones* with a leafy stem and tailed seeds. 11. *Anemone coronaria*, or narrow-leaved garden anemone: radical leaves ternate-decompound, involucre leafy. It grows naturally in the Levant, particularly in the islands of the Archipelago, where the borders of the fields are covered with it of all colours: but the flowers are single, though rendered double by culture. In France it was long cultivated, before it was much known in Holland or England. We find it however in our gardens so early as 1596. Parkinson, in 1629, says that some reckoned up thirty sorts with single flowers, of which he mentions only the watchet or pale blue, the ordinary purple, and the scarlet, with some of their intermediate varieties. Of those with double flowers he gives twelve varieties: 1. Common double red or scarlet. 2. Party-coloured crimson. 3. Crimson velvet. 4. Great double bluish. 5. White. 6. Lesser bluish. 7. Purple. 8. Blue. 9. Rose-coloured. 10. Carnation. 11. Purple velvet. 12. Purple velvet of three colours. He observes, that the art of raising them

from seed was not then familiarly known to our nation, although it was very frequent in the Low Countries; and he gives directions for that purpose. Mr. Ray, in his history, enumerates near three hundred varieties of this and the broad-leaved sort. Mr. Rea, in his *Flora* or *Complete Florilege*, specifies the following varieties of the narrow-leaved, or soft-leaved, anemone, as it was called by the Walloons, who brought them over out of France and Flanders to sell: 1. Common double red. 2. Variable. 3. Elegant red. 4. Scarlet. 5. Variegated scarlet. 6. White with a scarlet thrum. 7. Nacara or yellowish scarlet. 8. Double brimstone. 9. Green. 10. Great white. 11. Greatest or white of Bourdeaux. 12. Blush, called *columbina*. 13. Rose-coloured. 14. Variegated rose. 15. Spotted bluish. 16. Purple. 17. Lavender-coloured. 18. Blue. 19. White with a purple thrum or plush, called *perfect in beauty*. 20. Red with a dark or murrey purple thrum, called *amarant*. 21. Variegated amarant. 22. Five-coloured. 23. Dark purple striped with white. Besides these, he gives a list of seventy-four varieties raised from seed in France and Flanders, all fine, different, and many rare: and another, translated out of French, by the accomplished Sir Thomas Hanmer, containing forty-seven sorts. The catalogues of our modern seedsmen have usually about 150 or 200. The principal colours in anemones, according to Mr. Miller, are white, red, blue, and purple; and these in some are curiously intermixed: but the most prevailing colours amongst our English-raised anemones are white and red; though we have received from France great variety of blues and purples, which are exceeding fine flowers, and being intermixed with those of English growth, make a beautiful variety. The plain colours in the modern catalogues are, red, crimson, rose-coloured, purple, lilac, clear and pale blue, ash-coloured, and white. The principal variegated ones are, red and white striped, rose and white, blue and white, red white and purple: but there are innumerable shades of these and the other colours. A double anemone, in order to be a fine one, should have a strong upright stem, about nine inches high; the flower should be from two to near three inches in diameter, the outer petals should be firm, horizontal except that they turn up a little at the end, and the smaller petals within these should lie over each other gracefully, so as to form an elegant whole. The plain colours should be brilliant and striking; the variegated ones should be clear and distinct.

12. *Anemone hortensis*, or broad-leaved garden anemone: leaves digitate, seeds woolly. Broad-leaved garden anemone; or *hard-leaved* anemone, as it was formerly called by the Walloons who imported the roots; or *star* anemone, as the single varieties are sometimes named: is found wild, with single flowers, in Italy, Provence, and Germany. Clusius discovered it near the Rhine, with red, and with purple, flowers; Ray also remarked it with these colours, in many parts of Italy; and Haller in Switzerland. Clusius found it with white flowers in Germany; and it has been seen of the same colour in Austria. Parkinson enumerates several varieties of this also, both with single and double flowers: as single and double yellow; purple starre anemone, darker and paler; violet purple; purple striped; carnation; gredeline, between a peach-colour and a violet; cochenille, of a fine reddish violet or purple; cardinal, of a rich crimson red; blood-red, of a deeper, but not so lively, a red; crimson; flamell, near unto a scarlet; incarnadine, of a fine delayed red or flesh-colour; Spanish incarnate, of a lively flesh-colour, shadowed with yellow; bluish, of a fair whitish red; nutmegge, of a dark whitish colour, striped with veins of a bluish-colour; monk's-gray, pale whitish tending to a gray, such as the monks and friers were wont to wear with us; great orange tawny; lesser orange tawny. Of double flowers the most remarkable are, the great double anemone of Constantinople, or Spanish marigold; great double orange tawny; double anemone of Cyprus; double Persian anemone. Rea mentions, the common great double

ble variable anemone; common double and variegated scarlet; red and purple; and variegated of these colours; besides single of divers sorts and colours. He says, that the best star-anemones come from Brittany, where they raise yearly many fine sorts. This species also was cultivated here by Gerard in 1597.

13. *Anemone palmata*: leaves heart-shaped, sublobate; calyx six-leaved, coloured. This, having a six-parted calyx, connects the hepaticas with the anemones. Clusius found it in Portugal by the Tagus. The leaves are large; the corolla consists of ten or more petals, yellow without and orange within.

IV. *Anemonoides* with a naked flower, and tailless seeds.

14. *Anemone Sibirica*: stem one-flowered, involucre leafy, obtuse. Found in Siberia by Gmelin.

15. *Anemone sylvestris*, or large white-flowered wood anemone: peduncle naked; seeds roundish, shaggy, awnless. This approaches near to our wood anemone, but the seeds of it are round and hairy; the flower is large and white, but having little beauty is seldom planted in gardens; yet there is in the flowers, especially before they expand, a simple elegance, somewhat like that of the snow-drop, which affords a pleasing contrast to the more showy flowers of the garden. Parkinson notices its creeping roots, its large white flowers standing on the tops of the flower-stalks, which sometimes grow two together, but most commonly single; the leaves on the stalk, he observes, are more finely divided than those of the root, and its seeds are woolly. It is a native of many parts of Germany. Linnæus observed it once in Sweden; it is found also in Alsace and Siberia. It flowers in May, and ripens its seeds in June.

16. *Anemone fragifera*: peduncle naked; seeds roundish, woolly, awnless, gashes of the leaves acute, lanceolate. Native of Carinthia.

17. *Anemone Virginiana*, or Virginian anemone: peduncles alternate, very long; fruit cylindric; seeds shaggy, awnless. It is a native of North America, and flowers in May and June.

18. *Anemone capetala*, or ten-petalled anemone: stem one-flowered, flower ten-petalled, leaves ternate, lobate, radical. Native of Brazil.

19. *Anemone Pennsylvanica*, or Pennsylvanian anemone: stem dichotomous, leaves sessile stem-clasping, the lowest ternate, trifid, gashed. This is so like the *dichotoma*, that a person might easily be deceived: but the leaves at the first dichotomy of the stem are not two, but three: sessile, more veined, less horizontal. It is a native of Canada and Pennsylvania, and was cultivated in 1766 by Mr. Jas. Gordon.

20. *Anemone dichotoma*: stem dichotomous; leaves sessile, all opposite, stem-clasping, trifid, gashed. It flowers about Midsummer, and ripens its seeds. It is a native of Canada, and Siberia; from whence it was sent growing, by David de Gorter, physician in ordinary to the empress of Russia, into Sweden, in the year 1760.

21. *Anemone trifolia*: leaves ternate, ovate, entire, ferrate; stem one-flowered. A native of France, Carniola, and Siberia; growing in woods, and flowering at the end of April.

22. *Anemone quinquefolia*: leaves quinate, oval, serrate; stem one-flowered. Native of Virginia and Canada.

23. *Anemone nemorosa*, or wood anemone: seeds acute, leaflets gashed, stem one-flowered. The root of the wood anemone is perennial; the height of the whole plant from five to ten inches. It grows in woods, among bushes, and in hedges, in most parts of Europe, and sometimes in pastures. In many of our woods the ground is almost covered with the flowers in March, April, and May. In fine clear weather the blossoms are expanded, and become so erect as to face the sun; but, in the evening, and in wet weather, they are closed and hang down. It is acrid, and in some degree poisonous; according to Linnæus, cattle brought from open to woody pastures, and eating of this plant, have been affected with the bloody flux, and have

made bloody urine. The paper in which dried specimens of this plant are preserved being stained brown, it is probable that it may be employed as a dye. When the flowers become double, the wood anemone is cultivated by the gardeners; and, were the same pains taken with it as with the foreign anemones, it might probably be much improved in the eye of the florist. The leaves have frequently a parasitical plant growing on their backs, which deceived Bobart and the great Dillenius, who took it for a fern, and figured it as such in the third edition of Ray's Synopsis. This error, though detected more than sixty years since, has been lately revived, and has given occasion to Mr. Relhan to ascertain that this appearance is occasioned, not by eggs of an insect as some supposed, but by the *acidium fuscum*.

24. *Anemone Apennina*, or mountain wood anemone: seeds acute, leaflets gashed, petals lanceolate, numerous. It flowers in April, at the same time as the wood anemone, with which it has some affinity in its foliage; but the root is much thicker and more knobby, the petals much narrower, more than twice as many, and of a light pleasant purplish blue: when they first expand, the outside has a rich purplish tint, which is lost when the flowers have been some time exposed to the sun. Native of the Apennines, near Rome; and of some few places in England; as Lord Spencer's park at Wimbledon, near Harrow-on-the-Hill, in a wood by Luton Hoe in Bedfordshire, and near Berkhamstead in Hertfordshire. It is a very ornamental plant, suitable to the flower-garden or plantation; and loves a light loamy soil.

25. *Anemone ranunculoides*, or yellow wood anemone: seeds acute, leaflets gashed, petals roundish, stem mostly one-flowered. This differs from the wood anemone in having a yellow corolla, two petals alternately outer, and two inner, and one having one side within and the other side without the next petal; whereas that has three outer and three inner petals; it differs also in the peduncles being accompanied with two leaflets, the latter of which is furnished with three at the base. It flowers a day or two earlier than the other. This sometimes has two flowers on a stem, the peduncles villose, short, so that the flower scarcely rises above the leaves. It grows wild in Sweden, Denmark, Switzerland, France, Germany, Austria, Carniola, Italy, Siberia, and Geneva; flowers in April. With us it has been found near King's Langley in Hertfordshire, and near Wrotham in Kent.

26. *Anemone narcissiflora*, or narcissus-flowered anemone: flowers umbelled; seeds oval-depressed, naked. It grows wild on the mountains of Italy, Switzerland, Austria, and Siberia. Introduced in 1773 by John earl of Bute.

27. *Anemone fasciculata*: flowers umbelled, collected, leaves multifid. This very much resembles the last, so that Linnæus doubts whether it be a distinct species, and Haller thinks that it is only a variety. It was first observed by Tournefort in the Levant, and is found in the mountains about the lake Baikal.

28. *Anemone thalictroides*, or meadow-rue-leaved anemone: flowers umbelled; stem-leaves simple, verticillate; radical leaves biternate. It grows wild in Virginia and Canada.

Propagation and Culture. The plants of this genus are mostly hardy perennials, and may be increased both by seeds and by the roots.

The *hepaticas* are some of the greatest beauties of the spring. The flowers are produced in February and March in great plenty, before the green leaves appear, and make a handsome figure in the borders of the pleasure-garden, especially the double sorts, which commonly continue a fortnight longer in flower than the single ones, and the flowers are much fairer. The single sorts produce seeds every year, whereby they are easily propagated, and also new flowers may be that way obtained. The best season for sowing the seeds is in the beginning of August, either in pots or boxes of light earth, which should be placed so

as to have only the morning sun until October, when they should be removed into the full sun, to remain during the winter season; but, in March, when the young plants will begin to appear, they must be removed again to a shady situation, and in dry weather frequently watered, and about the beginning of August they will be fit to be transplanted; at which time you should prepare a border facing the east, of good fresh loamy earth, into which you should remove the plants, placing them about six inches distance each way, closing the earth pretty fast to their roots, to prevent the worms from drawing them out of the ground, which they are very apt to do at that season; and, in the spring following, they will begin to shew their flowers; but it will be three years before they flower strong, and till then you cannot judge of their goodness; when, if you find any double flowers, or any of a different colour from the common sorts, they should be taken up, and transplanted into the borders of the flower-garden, where they should continue at least two years before they are taken up, or parted; for it is remarkable in this plant, that, where they are often removed and parted, they are very subject to die; whereas, when they are permitted to remain undisturbed for many years, they will thrive exceedingly, and become very large roots. The double flowers, which never produce seeds, are propagated by parting their roots, which should be done in March, at the time when they are in flower; but you should be careful not to separate them into very small heads, nor should they be parted oftener than every third or fourth year, if you intend to have them thrive, for the reason before given. They delight in a strong loamy soil, and in an eastern position, where they may have only the morning sun, though they will grow in almost any aspect, not too warm, and are never injured by cold. Mr. Bradley relates a remarkable change that was made in the colours of these flowers. Some roots of the double blue hepatica were sent to Mr. Harrison, of Henley-upon-Thames, from Mr. Keys's garden in Tottenham-fields, whose soil was so different from the ground they were planted in at Henley, that when they came to blossom there they produced white flowers, and were therefore returned back to their first station, where they retook the blue colour they had at first.

The *pulsatillas* (2—10) may be propagated by seeds, which should be sown in boxes or pots filled with very light sandy earth, observing not to cover the seeds too deep with mould, which will prevent their rising, for they require no more than just to be covered. These boxes should be placed where they may have the morning sun until ten o'clock, but must be screened from it in the heat of the day; and, if the season proves dry, the earth should be often refreshed with water. The best time for sowing these seeds is in July or August, soon after they are ripe, for, if they are kept till spring, they seldom grow. These boxes or pots, in which the seeds are sown, should remain in this shady situation until the beginning of October, when they should be moved where they may enjoy the full sun during the winter season. About the beginning of March, the plants will begin to appear, at which time the boxes should be again removed where they may have only the forenoon sun; for, if they are too much exposed to the heat, the young plants will soon be destroyed. They should also be carefully kept clean from weeds, which, if suffered to grow among them, will in a short time overbear them. When the leaves are entirely decayed (which is commonly in July), you should then take up all the roots, which, being nearly of the colour of the ground, will be difficult to find while small; therefore you should pass the earth through a fine wire sieve, which is the best method to separate the roots from the earth. The roots, being taken up, should be immediately planted again on beds of light fresh sandy earth, about three or four inches asunder, covering them about three inches thick with the same light earth. The spring following most of these plants will produce flowers, but they will not be so large and fair as in the succeeding years, when the roots

are larger. The roots of these plants generally run down deep, and, being of a fleshy substance somewhat like carrots, will not bear to be kept long out of the ground; therefore, when they are removed, it should be done early in the autumn, that they may take fresh root before the frost comes on; for, if they are transplanted in the spring, they will not produce strong flowers. These plants thrive best in a loamy soil, for in very light dry ground they are apt to decay in summer.

The *garden anemones* (11, 12) are natives of the east, from whence their roots were brought originally; but have been so greatly improved by culture, as to render them some of the chief ornaments to our gardens in the spring. We shall therefore proceed to give ample directions for their culture; by which, if duly observed, every person may have these flowers in perfection. Take a quantity of fresh untried earth (from a common, or some other pasture land) that is of a light sandy loam, or hazel mould, observing not to take it above ten inches deep below the surface; and, if the turf be taken with it the better, provided it has time to rot thoroughly before it is used: mix this with a third part of rotten cow-dung, and lay it in a heap, keeping it turned over at least once a month for eight or ten months, the better to mix it, and rot the dung and turf, and to let it have the advantages of the free air: in doing this be careful to rake out all great stones, and break the clods, but by no means sift or screen the earth, which is found very hurtful to many sorts of roots; for, when the earth is made very fine, upon the first great rains of winter or spring, the small particles thereof join closely together, and form one solid mass, so that the roots often perish for want of some small stones to keep the particles asunder, and make way for the tender fibres to draw nourishment for the support of the root. This earth should be mixed twelve months before it is used, if possible; but, if you are constrained to use it sooner, you must turn it over the oftener, to mellow and break the clods; and observe to rake out all the parts of the greed-sward that are not quite rotten before you use it, which would be prejudicial to your roots if suffered to remain. The beginning of September is a proper season to prepare the beds for planting, which, if in a wet soil, should be raised with this sort of earth six or eight inches above the surface of the ground, laying at the bottom some of the rakings of your heap to drain off the moisture; but, in a dry soil, three inches above the surface will be sufficient: this compost should be laid at least two feet and a half thick, and in the bottom there should be about four or five inches of rotten neat-dung, or the rotten dung of an old melon or cucumber bed, so that you must take out the former soil of the beds to make room for it. And observe, in preparing your beds, to lay them, if in a wet soil, a little round, to shoot off the water; but, in a dry one, let it be nearer to a level; in wet land, where the beds are raised above the surface, it will be proper to fill up the paths between them in winter, either with rotten tan or dung, to prevent the frost from penetrating into the sides of the beds, which often destroys the roots. The earth should be laid in the beds at least a fortnight or three weeks before you plant the roots, that it may settle; and, when you plant them, stir the upper part of the soil about six inches deep with a spade; then rake it even and smooth, and with a stick draw lines each way of the bed at six inches distance, so that the whole may be in squares, that the roots may be planted regularly: then with three fingers make a hole in the center of each square, about three inches deep, laying therein a root with the eye uppermost; and, when you have finished your bed, with the head of a rake draw the earth smooth, so as to cover the crown of the roots about two inches. The best season for planting these roots, if for forward flowers, is about the latter end of September; and, for those of a middle season, any time in October; but observe to perform this work, if possible, at or near the time of some gentle showers; for, if the roots are planted when the ground is perfectly dry,

and

and there should no rain fall for three weeks or a month after, they will be very apt to grow mouldy upon the crown, and, if they once get this distemper, they seldom come to good after. You may also reserve some of your anemone-roots till after Christmas, before you plant them, left by the severity of the winter your early-planted roots should be destroyed; which sometimes happens in very hard winters, especially where they are not covered to protect them from the frost. These late-planted roots will flower a fortnight or three weeks after those which were planted in autumn, and many times blow equally as fair, especially if it prove a moist spring, or that care be taken to refresh them gently with water. In the beginning of April your first planted roots will begin to flower, which will continue for three weeks or more, according to the heat of the weather, or the care taken in covering them, during the heat of the day, with mats or cloths: after these are past flowering, the second planted sorts will come to succeed them, and these will be followed by those planted in the spring; so that you may have these beauties continued for near two months together, or sometimes longer, if the season prove favourable, or proper care be taken to shade them in the heat of the day. The beginning of June, the leaves of your first blown roots will begin to decay; soon after which time you must take them out of the ground, clearing them from decayed stalks, and washing them, to take the earth clean from the root; then spread them on a mat in a dry shady place till they are perfectly dried, when you may put them up in bags, and hang them out of the reach of mice, or other vermin, which will destroy many of the roots if they can come at them. Observe also to take up the latter planted roots as soon as their leaves decay; for if they are suffered to remain long after in the ground, and there should fall some showers of rain, they would soon put forth fresh fibres, and make new shoots, when it would be too late to remove them. At the time when you take up the roots, is the proper season for breaking or parting them, which may be done by separating those that you would choose to make all possible increase from, into as many parts as you can conveniently, provided each one of them has a good eye or bud; but, those you intend to blow strong, should by no means be parted too small, which greatly weakens their flowering. You should observe, in planting the roots, to distribute the different colours, so as to make an agreeable mixture of each in every bed, which will greatly add to their beauty.

ANEMONE PUSILLA, *f.* in botany. See DRYAS.

Sea-ANEMONE. See ANIMAL-FLOWER.

ANEMONIDES, *f.* in botany. See ANEMONE.

ANEMONOSPERMOS, *f.* in botany. See ARCTOTIS and GORTERIA.

ANEMOSCOPE, *f.* [of *ανέμος*, the wind, and *σκοπεω*, Gr. to view.] A machine invented to foretell the changes of the wind, or weather; and sometimes for an instrument shewing by an index what the present direction or course of the wind is. Of this latter sort was that used by the ancients, and described by Vitruvius; and we have many of them at present in large or public buildings, where an index within a room or hall points to the name of the quarter from whence the wind blows without; which is simply effected by connecting an index to the lower end of the spindle of a weather-cock. Of this kind is the anemoscope in one of the turrets of the Queen's Palace, in St. James's Park. But the best machine for shewing the course and velocity of the wind, was invented by the late Mr. Pickering, and published in the Philosophical Transactions, No. 473. His anemoscope is four feet and a quarter high, consisting of a broad and weighty pedestal, a pillar fastened into it, and an iron axis of about half an inch diameter fastened into the pillar. Upon this axis turns a wooden tube; at the top of which is placed a vane, of the same materials, twenty-one inches long, consisting of a quadrant, graduated, and shod with an iron rim, notched to each degree; and a counter-

poise of wood, as in the figure, on the other. Through the centre of the quadrant runs an iron pin, upon which are fastened two small round pieces of wood, which serve as moveable radii to describe the degrees upon the quadrant, and as handles to a velum or sail, whose pane is one foot square, made of canvas, stretched upon four battens, and painted. On the upper batten, next to the shod rim of the quadrant, is a small spring which catches at every notch corresponding to each degree, as the wind shall, by pressing against the sail, raise it up; and prevents the falling back of the sail, upon lessening of the force of the wind. At the bottom of the wooden tube is an iron index, which moves round a circular piece of wood fastened to the top of the pillar on the pedestal, on which are described the 32 points of the compass.

In the above figure of this machine, *a* is the pedestal; *b*, the pillar on which the iron axis is fitted; *c*, the circle of wood, on which are described the thirty-two points of the compass; *e*, the wooden tube upon its axis; *f*, the velum; *g*, the graduated quadrant; *h*, the counterpoise of the vane. The adjoining figure represents the velum, which takes off: *a* is the plane of the velum; *b*, the spring; *c*, the wooden radii; *dd*, the holes through which the pin in the centre of the quadrant goes. Its uses are the following: 1. Having a circular motion round the iron axis, and being furnished with a vane at top, and index at the bottom, when once you have fixed the artificial cardinal points, described on the round piece of wood on the pillar, to the same quarters of the heavens, it gives a faithful account of that quarter from which the wind blows. 2. By having a velum or sail elevated by the wind along the arch of the quadrant to an height proportionable to the power of the column of wind pressing against it, the relative force of the wind, and its comparative power, at any two times of examination, may be accurately taken. 3. By having a spring fitted to the notches of the iron with which the quadrant is shod, the velum is prevented from returning back upon the fall of the wind; and the machine gives the force to the highest blast, since the last time of examination, without the trouble of watching it.

ANE'NT, *prep.* [a word used in the Scotch dialect.] Concerning; about; as, He said nothing *anent* this particular. Over against; opposite to; as, He lives *anent* the market-house.

ANES or Awns, *f.* The spires or beards of corn.

ANETHIFOLIUS, *f.* in botany. See PROTEA.

ANE'THUM, *f.* [*ανέθον*, Gr. from its running up quick or straight.] In botany, a genus of the pentandria digynia class, ranking in the natural order of umbellatæ, or umbelliferæ. The generic characters are—Calyx: umbel universal and partial manifold; involucre, neither universal nor partial; perianthium proper obsolete. Corolla: universal uniform; floscules all fertile, proper; petals five, involute, entire, very short. Stamina: filaments capillary; antheræ roundish. Pistillum: germ inferior; styles approximating, obsolete; stigmas obtuse. Pericarpium: none; fruit subovate, compressed, striated, bipartite. Seeds: two; subovate, margined, convex, and striated on one side, flat on the other.—*Essential Character.* Fruit subovate, compressed, striated; petals involuted entire.

Species. 1. *Anethum graveolens*, or common dill: fruit compressed. Dill differs from fennel, which it otherwise resembles very much, in having an annual root, a smaller and lower stem, seldom exceeding three quarters of a yard; the leaves more glaucous, and of a less pleasant smell; the seeds broader, flatter, surrounded with a membranaceous rim, and of a less pleasant flavour than fennel seeds; the umbels of flowers yellow, but smaller than those of fennel. This plant has a peculiar strong smell, but aromatic. The bruised herb is anodyne and resolvent. The seeds are aromatic, and contain an ethereal oil; are useful therefore in flatulencies; for this purpose they rub the bellies of children with the oil prepared by infusion: the essential oil is also good in the cholic. A distilled water, drawn off to the quantity of a gallon from a pound of the seeds, was ordered in the London Pharmacopœia; and occasionally made the basis of carminative draughts and juleps: its flavour is more agreeable than that of the seeds in substance. Along with the water arises a considerable quantity of essential oil, which is given from one to three or four drops, or more, as a carminative; and in hiccoughs. No mention is made of this in the last edition of the London Pharmacopœia. It grows wild among the corn in Spain and Portugal; also in Italy on the coast. It is annual, and was cultivated in 1597.

2. *Anethum segetum*: three stem-leaves, fruits oval. Annual. A native of Portugal.

3. *Anethum fœniculum*, or fennel or finckle: fruit ovate. Native of Germany, Spain, Italy, Madeira, China, &c. It flowers in July, and the seeds ripen in autumn. Height five or six feet. Of this species there are three varieties: i. *Fœniculum vulgare*, or common fennel: Has a strong fleshy root, which penetrates deep into the ground, and will continue several years. It flowers in July, and the seeds ripen in autumn. It has sown itself in many places where it has been introduced in such plenty, as to appear as if it were a native in England; but it is no where found at a great distance from gardens. It is however enumerated among our native plants, by Hudson, Withering, &c. though certainly not originally so: and is now common on chalk-cliffs, as about Marazion in Cornwall, in Sussex, about Gravesend, and other parts of Kent; and in many inland places, as Nottingham castle, near Spetchly in Worcestershire, Burwell, and other places in Cambridgeshire. ii. *Fœniculum dulce*, or sweet fennel: The sweet fennel has been by many supposed only a variety of the common sort. The leaves of it are very long and slender, growing more sparsely, and do not end in so many points as those of the common sort; the stalks do not rise so high, and the seeds are longer, narrower, and of a lighter colour. These seeds are generally imported from Germany or Italy, and are by some preferred to those of the common sort for use, being much sweeter. The tender buds of fennel are eaten in salads. The leaves boiled are used as sauce for fish, and they are eaten raw with pickled fish. In Spain they put them up with olives and pickled pork. A pound of sweet fennel seeds impregnates a gallon of water strongly with their flavour, in distillation. A great quantity of yellowish essential oil floats on the surface of the water, mild and sweetish like oil of aniseeds, and, like it also, congealing by a slight cold into a white mass like butter. These seeds contain likewise a considerable quantity of gross expressed oil, which is extracted, along with the aromatic matter of the fennel, by digestion in rectified spirit, but rises to the surface upon inspissating the filtered tincture: the concentrated extract retains much the greatest part of both taste and finell. The seeds of common fennel are warmer and more pungent, but less sweet, and of a less grateful flavour. There is the same difference in the preparations from them: the spirituous tincture of sweet fennel is yellowish; of this, greenish. The leaves impregnate water by distillation with a grateful flavour, and yield a considerable portion of essential oil. An extract made from them by rectified spirit, is likewise no inelegant aromatic. The

roots, taken up early in the spring, have a pleasant sweetish taste, with a slight aromatic warmth. They are ranked among the aperient roots, and supposed by some to be equivalent in virtue to the *ginseng*; from which however they differ considerably in their sensible qualities. iii. *Fœniculum Azoricum*, or Azorian fennel or finocchio: The finocchio is supposed to have been originally brought from the Azorian islands; it has been long cultivated in Italy as a salad-herb; and there are some few gardens in England, where it is now cultivated, but in small quantities, for there are not many English palates which relish it, nor is it easy to be furnished with good seeds; those which are annually brought from Italy seldom prove good; and it is difficult to save it in England, because the winter frequently kills those plants which are left for seeds, and, when any good plants of the early sowing are left for seeds, they do not ripen, unless the winter should prove very favourable. This sort has very short stalks, which swell just above the surface of the ground to four or five inches in breadth, and almost two thick, being fleshy and tender: this is the part which is eaten when blanched, with oil, vinegar, and pepper, as a cold salad. When the plants are permitted to run for seeds, the stalks do not rise more than a foot and a half high, having a large spreading umbel standing on the top. The seeds of this sort are narrow, crooked, and of a bright yellow colour; they have a very strong smell like anise-seed, and are very sweet to the taste.

Propagation and Culture. Dill is propagated by sowing the seeds, which should be done in autumn soon after they are ripe; for, if they are kept out of the ground till spring, they frequently miscarry; or, if any of the plants come up, they often decay before they have perfected their seeds. They love a light soil, and will not bear to be transplanted, but must be sown where they are to remain, and should be allowed eight or ten inches room to grow, otherwise they will draw up very weak, and produce few lateral branches, whereby their leaves will decay, and be rendered useless, nor will they produce so good seeds; therefore the best way is, when the plants are come up, to hoe them out, as is practised for onions, carrots, &c. leaving the plants about eight or ten inches asunder every way, observing to keep them clear from weeds; and, when the seeds begin to be formed, you should cut up those that are intended to be put into the pickle for cucumbers, leaving those that are intended for the use of the seeds until they are ripe; at which time they should be cut, and spread upon a cloth to dry, and then beat out for use. If you let the seeds fall upon the ground, the plants will rise the next spring without any care.

The best time to sow the seeds for fennel is, soon after they are ripe; the plants will come up in the autumn, or the following spring, and require no other care but to keep them clear from weeds, and thin the plants where they are too close; it will grow in any soil or situation.

For the cultivation of finocchio, your first care must be to procure good seeds from some person who has been careful in the choice of the plants, otherwise there will be little hope of having it good; for the plants will run up to seed before they swell to any size, and thus not be fit for use: then make choice of a good spot of light rich earth, not dry nor very wet, for in either extreme this plant will not thrive. The first crop may be sown about a fortnight in March, which, if it succeeds, will be fit for use in July; and, by sowing at several times, there may be a supply for the table till the frost puts a stop to it. After having well dug and levelled the ground, you must make a shallow drill by a line, into which you must scatter your seeds pretty thin; for, if your plants are six inches asunder in the rows, it will be full near enough; however, you must expect some of your seeds to fail, and therefore you should scatter them about two inches distance; then cover the seeds about half an inch thick with earth, laying it smooth: these drills should be made eighteen inches asunder, or more, that there may be room to clean

the ground, as also to earth up the plants when they are full grown. When the plants come up, which will be in about three weeks or a month after sowing, you must with a small hoe cut up all the weeds between them, and, where the plants are too close; they should be thinned to about three inches distance; and as they advance, and the weeds spring again, they should, from time to time, be hoed; and, at the last time of thinning them, they should be left seven or eight inches asunder at least. If your kind be good, the stems of the plants will increase to a considerable bulk just above the surface of the ground; which part should be earthed up in the manner of celery, to blanch, about a fortnight or three weeks before it is used, and this will cause it to be very tender and crisp. Your second crop should be sown about three weeks after the first, and so continue sowing every three weeks or a month till the end of July, after which time it will be too late for the plants to come to any perfection. But you should observe to sow in April, May, and June, on a moister soil than that which you sowed the first on; as also what you sow in the latter part of July, should be sown on a drier soil, and in a warmer situation; because this crop will not be fit for use till late in autumn, and therefore will be subject to injuries from too much wet or cold weather, if on a moist soil. But as the ground is often extremely dry in June and July, and the seeds more apt to miscarry and not come up, you should therefore observe to water and shade the beds where this seed is sown at that season, until the plants come up. And, if the season should prove dry, the plants must be duly watered, otherwise they will run up to seed before they are of any size; therefore there should be a channel made where every row of plants grows, to detain the water which is poured on them. In the autumn, if there should happen sharp frosts, it will be very proper to cover the plants with some pease-haulm, or other light covering, to prevent their being pinched; by which method they may be continued for use till the middle of winter. A small bed of this plant will be sufficient at each sowing for a middling family; and, for a large family, a bed of about twenty feet long, and four feet broad, will be full enough at a time.

A'NEURISM, *f.* [from *ανευρνω*, Gr. to dilate much; of *ανα*, asunder, and *ευρος*, broad.] A disease of the arteries, in which, either by a preternatural weakness of any part of them they become excessively dilated; or, by a wound through their coats, the blood is extravasated amongst the adjacent cavities. See **SURGERY**.

ANE'W, *adv.* [from *a* and *new*.] Over again; another time; repeatedly. This is the most common use:

That, as in birth, in beauty you excel,
The muse might dictate, and the poet tell:
Your art no other art can speak; and you,
To shew how well you play, must play *anew*. *Prior*.

Newly; in a new manner.—He who begins late, is obliged to form *anew* the whole disposition of his soul, to acquire new habits of life, to practise duties to which he is utterly a stranger. *Rogers*.

ANFRAC'TUOUS, *adj.* [from *anfractus*, Lat.] Winding; mazy; full of turnings and winding passages.—Behind the drum are several vaults and *anfractuous* cavities in the ear-bone, so to intend the least sound imaginable, that the sense might be affected with it; as we see, in subterraneous caves and vaults, how the sound is redoubled. *Ray*.

ANFRAC'TUOUSNESS, *f.* Fullness of windings and turnings.

ANFRAC'TURE, *f.* [from *anfractus*, Lat.] A turning; a mazy winding and turning.

ANGA'RI, or **ANGA'RIL**, *f.* in antiquity, denote public couriers, appointed for the carrying of messages. The ancient Persians, Budæus observes, had their *αγγελιστον εφορνια*; which was a set of couriers on horseback, posted at certain stages or distances, always in readiness to receive the dispatches from one, and forward them to another, with wonderful celerity, answering to what the moderns

call *posts*, *q. d. positi*, as being posted at certain places or stages. The angari were also called by the Persians *ajlandæ*; by the Greeks *ημεροδρομοι*, on account of the long journeys they made in one day, which according to Suidas amounted to no less than 1500 stadia.

ANGA'RIA, *f.* in Roman antiquity, a kind of public service imposed upon the provincials, which consisted in providing horses and carriages for the conveyance of military stores, and other public burdens. It is sometimes also used for a guard of soldiers, posted for the defence of a place. In a more general sense, it is used for any kind of oppression or services performed through compulsion, such as pressing horses, men, ships, &c. for the public service.

ANGA'ZYA, one of the Comorra islands, lying between the north end of Madagascar and the coast of Zanguebar in Africa, from lat. 10° to 15° S. It is inhabited by Moors, who trade with divers parts of the continent, in cattle, fruits, and other commodities of the island, which they exchange for calicoes and other cotton cloths. The houses here are built of stone, and lime made of calcined oyster-shells; with which the walls and roof are plastered in a very elegant manner. The government of Angazya is pure aristocracy; the island being subject to ten lords, who have all the title of *sultan*. The people are very careful of their women; never permitting strangers to see them, without permission from a sultan, or an order which the stranger brings with him. Many of them read and write Arabic with great facility; and some even understand Portuguese, which they learn from their intercourse with Mosambique, whither they trade in vessels of forty tons burthen.

ANGEIO'GRAPHY, *f.* [of *αγγειον*, a vessel; and *γραφη*, a description, from *γραφω*, Gr. to write or describe.] A description of vessels in the human body; nerves, veins, arteries, and lymphatics.

ANGEIO'LOGY, *f.* [from *αγγειον* and *λογος*, Gr.] A treatise or discourse of the vessels of a human body.

ANGEIOMONOSPER'MOUS, *f.* [of *αγγειον*, a vessel, *μονος*, alone or single, and *σπερμα*, Gr. seed.] Such plants as have but one single seed in the seed-pods.

ANGEIO'TOMIST, *f.* A person skilled in the course of the blood-vessels, or who can dissect them readily.

ANGEIO'TOMY, *f.* [from *αγγειον*, a vessel, and *τομή*, Gr. to cut.] An opening of the vessels as in arteriotomy and phlebotomy. It also signifies a particular dissection of the vessels for anatomical purposes.

A'NGEL, *f.* a spiritual intelligent substance, the first in rank and dignity among created beings. The word *angel* is Greek (*αγγελος*), and signifies a messenger; the Hebrew *מלאך* signifies the same thing. The angels are in Daniel, chap. iv. ver. 13, &c. called *כְּשִׁיפִים* or watchers, from their vigilance: for the same reason they are, in the remains we have of the prophecy attributed to Enoch, named *egregori*; which word imports the same in Greek.

Angels, therefore, in the proper signification of the word, do not import the nature of any being, but only the office, to which they are appointed, especially by way of message, or intercourse between God and his creatures; in which sense they are called the *ministers of God*, who do his pleasure, and *ministering spirits* sent forth to minister for them who shall be heirs of salvation. That there are such beings as we call angels, that is, certain permanent substances, invisible, and imperceptible to our senses, endued with understanding and power superior to that of human nature, created by God, and subject to him as a supreme Being; ministering to his divine providence in the government of the world by his appointment, and more especially attending the affairs of mankind; is a truth so fully attested by Scripture, that it cannot be doubted. Nay, the existence of such invisible beings was generally acknowledged by the ancient heathens, though under different appellations: the Greeks called them *demons*; and the Romans *genii*, or *lares*. Epicurus seems to have been the only one among the old philosophers who absolutely rejected

rejected them. Indeed, the belief of middle intelligences influencing the affairs of the world, and serving as ministers or interpreters between God and man, is as extensive as the belief of a God; having never, so far as we know, been called in question by those who had any religion at all.

The creation of angels is not indeed expressly mentioned by Moses in the first of Genesis, yet it is generally considered by judicious expositors as implied. The reason why the sacred historian is silent on this subject, is supposed by Berrington to be the natural proneness of the Gentile world, and even of the Jews, to idolatry. And it is thought, if they worshipped mere material elements, which was the case, much more might they be inclined to worship such superior and sublime beings as angels. But a better reason is perhaps given by other writers, viz. that this first history was purposely and principally for information concerning the visible world; the invisible, of which we know but in part, being reserved for a better life.

On what day they were created has been matter of conjecture. It is a point on which learned men have differed. The Socinians, indeed, hold, says bishop Hopkins, that it was long before the account given by Moses, but it must have been within the six days creation; because, as we are informed, that within this space God made heaven and earth, and all things that are therein. All the writers that we have seen on this subject, think they were included in the first day's work, when the heavens were framed.

It has been thought by some persons, that the words of Job, "When the morning stars sang together, and all the sons of God shouted for joy," militate against the creation of angels within the six days. About the meaning of these words, however, expositors are not agreed; but, admitting that they refer literally to angels, Dr. Lightfoot, Caryl, and others, see no difficulty in the passage. The doctor thinks they were created on the first day, with the heavens; and that they were spectators of God's works in the other parts of creation, and praised and magnified the Lord for his works all along; singing and shouting when God laid the foundation of the earth, as the Jews did at the laying the foundation of the temple, Ezra iii.

On a subject of this nature, it would be imprudent to indulge a spirit of conjecture. Scripture is the only standard by which truth and error can be tried, and to this we must ultimately appeal. It is acknowledged that Moses has not expressly mentioned angels by name; yet, as we have remarked, their creation is undoubtedly implied: for the heavens must include all that are in them; and therefore it is that the divine penman says, in the conclusion of his narrative, "Thus the heavens and the earth were finished, and all the host of them." Of the *hosts* of heaven, the angels must form a considerable part; they are expressly called the *heavenly host*, and the *armies of heaven*, Dan. iv. 35. Luke ii. 13. And, if divine authority be admitted as decisive, the reasons adduced by Jehovah for the sanctification of a sabbath, demonstrate that they did not exist previous to the creation of the heavens. It is, surely, asserted with propriety, that in *six days* the Lord made heaven and earth, the sea, and ALL that *in them is*. Similar to which is a declaration of the divine historian relating to the same fact: "And God blessed the seventh day and sanctified it; *because* that in it he had rested from ALL his work which God created and made," Gen. ii. 3. Now, if angels existed prior to the six days of the creation, the language of Moses is far from being accurate and intelligible; and especially when it is considered that the obscurity might have been removed by adding, "from all the work which God had *then* created and made."

But, if angels were created before the heavens, where could they exist? For, as the learned Gill has remarked, "though angels have no bodies, and so are not in place circumscriptively; yet as they are creatures they must have an *ubi*, a somewhere in which they are definitively; so that they are here, and not there, and much less every where. Now where was there an *ubi*, a somewhere, for

them to exist in, before the heavens and the earth were made? It is most reasonable, therefore, to conclude, that as God prepared an habitation for all the living creatures before he made them; as the sea for the fishes, the expanse, or air, for the fowls, and the earth for men and beasts; so he made the heavens first, and then the angels to dwell in them."

That this was the fact, will appear very evident, if the words of Moses be impartially considered. "In the beginning (says he), God created the heavens and the earth;" which words must refer to either the beginning of *creation* or of *time*: if to the former, and angels previously existed, the language is neither *intelligible* nor conformable to *truth*: if to the latter, the difficulty remains; for what is time but the measure of created existence. "Time (says the judicious Charnock) began with the foundation of the world: before the beginning of the creation and the beginning of time, there could be nothing but eternity; nothing but what was uncreated, that is, nothing but what was without beginning." But, if angels were in a pre-existent state, the historian's language is unaccountably strange and inaccurate: for if the phrase *in the beginning*, which is remarkably emphatical, refer to the creation of the heavens and the earth *only*, they are unhappily expressed; so expressed, indeed, as to convey no meaning to those who consider words as the vehicle of thought, and as intended to express clearly to others the meaning of the writer. For the *natural obvious* sense is as follows: "In the beginning of the creation of the heavens and the earth, God created the heavens and the earth;" which language is not only a departure from that perspicuity and precision which distinguish all his narrations, but entirely irrational and absurd.

That the words *in the beginning* refer to the first creation, cannot be doubted, if it be remembered that JEHOVAH himself founds a claim to *eternity* on this very ground: "Before the day was, I am he." "Before the mountains were brought forth, or ever thou hadst formed the earth and the world, even from everlasting to everlasting, thou art God." Isa. xliii. 13. Ps. ix. 2. See also Prov. viii. 22, 23, &c. Now there could be no propriety in this kind of reasoning, if angels or any other creature existed before the creation of the world, because all claims to eternity from such premises would apply even to Gabriel as well as to JEHOVAH. "Before the world was," is, in Scripture language, a phrase always expressive of eternity; and on this principle the evangelist John asserts the divinity of Jesus Christ in the first chapter of his history. For this purpose he alludes to the words of Moses, and introduces his divine master to notice by celebrating the first act of his creative power. "In the beginning (says he) was the Word;" that is, Dr. Doddridge remarks, before the foundation of the world, or the first production of any creature: and Dr. Sherlock is of opinion, that the words, in their most common and usual acceptation, signify the first creation of all things, and are a demonstration of the divinity of Christ. Of the same mind was Dr. Owen. He says, that, if the phrase *beginning* does not absolutely and formally express *eternity*, yet it doth a pre-existence to the whole creation, which amounts to the same thing; for no thing can pre-exist before all creatures but the nature of God, which is eternal, unless we suppose a creature before the creation of any. But what is meant by this expression is fully declared by other passages of Scripture: "I was set up from everlasting, before the *beginning*, or ever the earth was;" "Glorify thou me with thine own self, with the glory which I had with thee before the world was;" both which passages not only explain the text, but undeniably prove the pre-existence of Christ the son of God.

If, therefore, the words of Moses be impartially viewed in their obvious and natural meaning, and compared with other passages of Scripture that relate to the same subject, we have no doubt but every unprejudiced mind will perceive, that as he intended to give a summary history of the creation of all things both in heaven and earth,

earth, he has done it in language intelligible and accurate, and in terms sufficiently explicit.

As to the nature of these beings, we are told, that they are spirits: but whether pure spirits divested of all matter, or united to some thin bodies, or corporeal vehicles, has been a controversy of long standing. Not only the ancient philosophers, but some of the Christian fathers, were of opinion, that angels were clothed with ethereal, or fiery, bodies, of the same nature with those which we shall one day have when we come to be equal to them. But the more general opinion, especially of later times, has been, that they are substances entirely spiritual, tho' they can at any time assume bodies, and appear in human or other shapes.

That the angelical powers and abilities vastly excel those of man, cannot be denied, if we consider, that their faculties are not clogged or impeded, as ours are, by any of those imperfections which are inseparable from corporeal beings: so that their understandings are always in perfect vigour; their inclinations regular; their motions strong and quick; their actions irresistible by material bodies, whose natural qualities they can controul, or manage to their purposes, and occasion either blessings or calamities, public or private, here below; instances of which are too numerous to mention.

Besides their attendance on God, and their waiting and executing his commands, they are also presumed to be employed in taking care of mankind and their concerns: and that every man had such a tutelar or guardian angel, even from his birth, was a firm belief and tradition among the Jews; and our Saviour himself seems to have been of the same sentiment. The heathens were also of the same persuasion, and thought it a crime to neglect the admonitions of so divine a guide. Socrates publicly confessed himself to be under the direction of such an angel, or demon, as several others have since done. And in this tutelar genius of each person they believed his happiness and fortune depended. Every genius did his best for the interest of his client; and, if a man came by the worst, it was a sign the strength of his genius was inferior to that of his opponent, that is, of an inferior order; and this was governed by chance. There were some genii, whose ascendant was so great over others, that their very presence entirely disconcerted them; which was the case of that of Augustus in respect of that of Marc Antony; and, likewise, for the same reason, perhaps, some persons seem to have wit, and to speak well, when others are absent, in whose presence they are confounded, and out of countenance. The Romans thought the tutelar genii of those who attained the empire to be of an eminent order; on which account they had great honours shewn them. Nations and cities also had their several genii. The ancient Persians so firmly believed the ministry of angels, and their superintendence over human affairs, that they gave their names to their months, and the days of their month; and assigned them distinct offices and provinces: and it is from them the Jews confess to have received the names of the months and angels, which they brought with them when they returned from the Babylonish captivity. After which, we find, they also assigned charges to the angels, and in particular the patronage of empires and nations; Michael being the prince of the Jews, as Raphael is supposed to have been of the Persians.

The Mahometans have so great a respect for the angels, that they account a man an infidel who either denies their existence, or loves them not. They believe them to be free from sin, enjoying the presence of God, to whom they are never disobedient: that they have subtle pure bodies, being created of light; and have no distinction of sexes, nor do they need the refreshment of food or sleep. They suppose them to have different forms and offices: that some adore God in several postures; others sing his praises, and intercede for men; some carry and encompass his throne; others write the actions of men, and are assigned guardians to them. As the numbers of these celestial spi-

rits are very great, it is likewise reasonable to believe that there are several orders and degrees among them; which is also confirmed by Scripture; whence some speculative men have distributed them into nine orders, according to the different names by which they are there called; and reduced those orders into three *hierarchies*: to the first of which belong seraphim, cherubim, and thrones; to the second, dominions, virtues, and powers; and to the third, principalities, arch-angels, and angels. They imagine farther, that there are some who constantly reside in heaven; others who are ministers, and sent forth, as there is occasion, to execute the orders they receive from God by the former. The Jews reckon but four orders or companies of angels, each headed by an arch-angel; the first order being that of Michael, the second of Gabriel, the third of Uriel, and the fourth of Raphael; but, though the Jews believe them to be four, yet it seems there were rather seven. The Persians also held, there were subordinate degrees among the angels.

Although the angels were originally created perfect, good, and obedient to their Master's will, yet some of them sinned, and kept not their first estate, but left their habitation; and so, of the most blessed and glorious, became the most vile and miserable, of all God's creatures. They were expelled the regions of light, and cast down to hell, to be reserved in everlasting chains under darkness, until the day of judgment. With heaven they lost their heavenly disposition, which delighted once in doing good and praising God; and fell into a settled rancour against him, and malice against men: their inward peace was gone; all desire of doing good departed from them; and, instead thereof, revengeful thoughts and despair took possession of them, and created an eternal hell within them. When, and for what offence these apostate angels fell from heaven, and plunged themselves into such an abyss of wickedness and woe, are questions very hard, if not impossible, to be determined by any clear evidence of scripture. As to the time, we are certain that it could not be before the sixth day of creation; because on that day it is said, "God saw every thing that he had made, and behold it was very good;" but that it was not long after is very probable, as it must have preceded the fall of our first parents. Some have imagined it to have been after; and that carnality, or lust to converse with women upon earth, was the sin that ruined them. Lactantius supposes the angels, who were guilty of this enormity, had been sent down by God to guard and take care of mankind; and, being endued with free-will, were charged by him not to forfeit the dignity of their celestial nature, by defiling themselves with the corruptions of the earth; but that the devil at length enticed them to debauch themselves with women. He adds, that, being not admitted into heaven by reason of the wickedness into which they had plunged themselves, they fell down to the earth, and became the devil's ministers; but that those who were begotten by them, being neither angels nor men, but of a middle nature, were not received into hell, no more than their parents were into heaven. Hence arose two kinds of demons, celestial and terrestrial. These are unclean spirits, the authors of whatever evils are committed, and whose prince is the devil. From hence very probably proceeded the notions of *Incubi*, or demons who are supposed to have carnal knowledge of women. Others have supposed, that the angels, being informed of God's intention to create man after his own image, and to dignify his nature by Christ's assuming of it, and thinking their glory to be eclipsed thereby, envied man's happiness, and so revolted: and with this opinion that of the Mahometans has some affinity; who are taught, that the devil, who was once one of those angels who are nearest to God's presence, and named *Azazel*, forfeited paradise for refusing to pay homage to Adam at the command of God. But, on what occasion soever it first shewed itself, pride seems to have been the leading sin of the angels; who, admiring and valuing themselves too much on the excellence of their nature

ture and the height of their station, came at length to entertain so little respect for their Creator, as to be guilty of downright rebellion and apostasy. 'Tis certain from scripture, that these fallen angels were in great numbers, and that there was also some order and subordination preserved among them; one especially being considered as their prince, and called by several names, *Belzebub*, *Satan*, or *Sammael*, by the Jews; *Ahrimam* by the Persians; and *Eblis* by the Mahometans. Their constant employment is not only doing evil themselves, but endeavouring by all arts and means to seduce and pervert mankind, by tempting them to all kinds of sin, and thereby bringing them into the same desperate state with themselves.

ANGEL is likewise a title given to bishops of several churches. In this sense is St. Paul understood by some authors, where he says, "Women ought to be covered in the church, because of the angels." The learned Dr. Prideaux observes, that the minister of the synagogue, who officiated in offering up the public prayers, being the mouth of the congregation, delegated by them as their representative, messenger, or angel, to speak to God in prayer for them, was therefore, in the Hebrew language, called the *angel* of the church; and from thence the bishops of the seven churches of Asia are, by a name borrowed from the synagogue, called the *angels* of those churches.

ANGEL, in commerce, the name of a gold coin formerly current in England. It had its name from the figure of an angel represented upon it, weighed four pennyweights, and was twenty-three and a half carats fine. It had different values in different reigns; but is at present only an imaginary sum, or money of account, implying ten shillings.

ANGEL, *adj.* Resembling angels; angelical:

I have mark'd

A thousand blushing apparitions

Start into her face; a thousand innocent shames

In *angel* whiteness bear away those blushes. *Shakespeare.*

Or virgins visited by *angel* powers,

With golden crowns, and wreaths of heav'nly flow'rs. *Pope.*

ANGEL FISH, *f.* in ichthyology, a species of *squalus*. See *SQUALUS*.

ANGEL-LIKE, *adj.* Resembling an angel:

In heav'n itself thou sure wert drest

With that *angel-like* disguise.

Waller.

ANGEL-SHOT, *f.* [perhaps properly *angle-shot*, being folded together with a hinge.] Chain-shot, being a cannon bullet cut in two, and the halves being joined together by a chain.

ANGE'LIC, *adj.* [*angelicus*, Lat.] Partaking of the nature of angels; angelical; above human:

My fancy form'd thee of *angelic* kind,

Some emanation of th' all-beauteous mind.

Pope.

ANGELIC GARMENT (*angelica vestis*), among our ancestors, was a monkish garment, which laymen put on a little before their death, that they might have the benefit of the prayers of the monks. It was from them called *angelical*, because they were called *angeli* who by these prayers *animæ salutis succurrebant*. Hence, where we read the phrase *monachus ad succurrendum* in our old books, it must be understood of one who had put on the habit when he was at the point of death.

ANGE'LICA, *f.* [from the angelic or supposed super-excellent qualities of the roots and seeds.] In botany, a genus of the pentandria digynia class, ranking in the natural order of umbellatæ or umbellifere. The generic characters are—Calyx: universal umbel manifold, roundish; partial, when flowering exactly globular; universal involucre three or five leaved, small; partial eight-leaved, small; proper perianthium five-toothed, scarcely observable. Corolla: universal uniform; floscules all fertile, partial, petals five, equal, lanceolate, flattish, incurved, caducous. Stamina: filaments simple, longer than the corolla; antheræ simple. Pistillum: germ inferior; styles

reflex; stigmas obtuse. Pericarpium: none; fruit roundish, angular, solid, bipartite. Seeds: two, ovate; flat on one side, and margin'd; convex on the other, scored with three lines.—*Essential Character.* Fruit roundish, angular, solid, with reflex styles. Corollas equal, with petals bent inwards.

Species. 1. *Angelica archangelica*, or garden angelica: the odd leaflet of the leaves lobed. Root thick, branched, very long, brown on the outside, white within. Fruit elliptic, swelling, lens-shaped, slightly emarginate at both ends, grooved and winged, whitish or pale straw-colour; splitting into two seeds, which are convex on one side, with a stiff marginal wing, and three on the back similar to it; flat on the other side, with a single raised longitudinal streak. This is the structure of the seeds in the garden plant; the wild one has no dorsal wings, but only three curved risings, and those very low ones. Scopoli remarks, that, in this species, the back of the seed is more convex than in the *sylvestris*, and truly furrowed; so that it cannot be said to be marked with lines, but to be really angular. Native of the northern parts of Europe. It flowers with us from June to August; and was cultivated here in 1568. Mr. Miller makes a distinct species of the angelica which grows naturally in Hungary and some parts of Germany. He affirms, that, from many years experience in the culture of this plant, he could never observe any alteration in it; for all the plants which he raised from seeds proved exactly the same as the parent plant; and, when planted in the same soil with the common sort, they were twice their size. The leaves were also much larger, and deeper sawed on the edges, the umbels much larger, and the flowers were yellow. The stalks of garden angelica were formerly blanched, and eaten as celeri. The young shoots are in great esteem among the Laplanders. In Norway bread is sometimes made of the roots. The gardeners near London, who have ditches of water running through their gardens, propagate great quantities of this plant, for which they have a large demand from the confectioners, who make a sweetmeat with the tender stalks of it cut in May. The roots are one of the principal aromatics of European growth, though not much regarded in the present practice. The other parts of the plant have the same flavour, but their active principles are far more perishable. The seeds, which come nearest to the roots, can scarcely be kept till the spring after they are gathered. These, however, are the only part of the plant which is ordered by the London college, and that only in compound spirit of aniseed. The college formerly directed the roots brought from Spain to be kept in the shops; but they are probably more efficacious on their native northern mountains; and accordingly that direction is now dropped.

2. *Angelica sylvestris*, or wild angelica: leaflets equal, ovate-lanceolate, ferrate. Our wild angelica grows to the height of six feet, with a smooth stem. The fruit has four wings, and three ridges on each side. It is perennial, and is found common in moist woods and hedges, and by the sides of rivers, flowering in July and August. This, possessing only the same properties with garden angelica in a far lower degree, has been long neglected. The herb, however, dyes a good yellow.

3. *Angelica verticillaris*: leaves very much divaricate, leaflets ovate, ferrate, stem verticilled with peduncles. Height of the stem six feet and more, with a glaucous bloom on it. Flowers green. A native of Italy and Silesia.

4. *Angelica atropurpurea*, or purple angelica: the outermost pair of leaves coadjoined; the terminal leaf petioled. A native of North-America.

5. *Angelica lucida*, or shining angelica: leaflets equal, ovate, gaih-ferrate. It flowers in June, and the seeds ripen in August. Native of Canada.

6. *Angelica Razulii*: leaves bipinnate, leaflets lanceolate, ferrate, decurrent. Native of the Apennines and Piedmontese mountains. It was found on the former by M. Rafouls, an apothecary at Perpignan, whence the trivial name.

Propagation

Propagation and Culture. All the sorts may be increased by seeds. The common angelica delights to grow in a very moist soil; the seeds of this plant should be sown soon after they are ripe; for, if they are kept until the spring, seldom one seed in forty will grow. When the plants are come up about six inches high, they should be transplanted at a great distance, for their leaves extend very wide. The best place for this plant is upon the sides of ditches, or pools of water; where, being planted about three feet asunder, they will thrive exceedingly. The second year after sowing, they will shoot up to flower; therefore, if you have a mind to continue their roots, you should cut down these stems in May, which will occasion their putting out heads from the sides of the roots, whereby they may be continued for three or four years; whereas, if they had been permitted to seed, their roots would perish soon after; where it is cultivated for the seeds, there should be new plantations annually made to supply the places of those which die, for, when they are permitted to seed, they last but two years. See *ÆGROPODIUM*, *CHÆROPHYLLUM*, *CICUTA*, *LASERPITIUM*, *SELINUM*, and *SMYRNIUM*.

ANGELICA-TREE. See *ARALIA*.

ANGELICAL, *adj.* [*angelicus*, Lat.] Resembling angels.—It discovereth unto us the glorious works of God, and carrieth up, with an *angelical* swiftness, our eyes, that our mind, being informed of his visible marvels, may continually travel upward. *Raleigh*. Partaking of the nature of angels:

Others, more mild,
Retreated in a silent valley, sing
With notes *angelical* to many a hap
Their own heroic deeds, and hapless fall
By doom of battle.

Milton.

Belonging to angels; suiting the nature or dignity of angels.—It may be encouragement to consider the pleasure of speculations, which do ravish and sublime the thoughts with more clear *angelical* contentments. *Wilkins*.

ANGELICALNESS, *f.* The quality of being angelical; resemblance of angels; excellence more than human.

ANGE'LICS, or **ANGELICI**, in church-history, an ancient sect of heretics, supposed by some to have got this appellation for their excessive veneration of angels; and by others, from their maintaining that the world was created by angels.

ANGELICS is also the name of an order of knights, instituted in 1191, by Angelus Flavius Comnenus, emperor of Constantinople.

ANGELICS is also a congregation of nuns, founded at Milan, in 1534, by Louisa Torelli, countess of Guastalla. They observe the rule of St. Augustine.

ANGELITES, in ecclesiastical history, a sect of Christian heretics, in the reign of the emperor Anastasius, and the pontificate of Symmachus, about the year 494, so called from Angelium, a place in the city of Alexandria, where they held their first meetings. They were called likewise *Severites*, from one Severus, who was the head of their sect; as also *Theodosians*, from one among them named Theodosius, whom they made pope at Alexandria. They held that the persons of the Trinity are not the same; that none of them exists of himself, and of his own nature; but that there is a common god or deity existing in them all, and that each is God by a participation of this deity.

AN'GELO (Michael). There were five celebrated Italian painters of this name, who flourished in the 16th and 17th centuries; but the two most distinguished of them are these. First, **MICHAEL ANGELO BUONAROTI**, who was a most incomparable painter, sculptor, and architect, born in 1474, in the territory of Arezzi, in Tuscany. He was the disciple of Dominico Ghirlandajo; and erected an academy of painting and sculpture in Florence, under the protection of Lorenzo di Medicis; which, upon the troubles of that house, was obliged to remove to Bologna.

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About this time he made an image of Cupid, which he carried to Rome, broke off one of its arms, and buried the image in a place he knew would soon be dug up, keeping the arm by him. It was accordingly found, and sold to cardinal St. Gregory for an antique; until Michael, to their confusion and his own credit, discovered his artifice, and confirmed it by the deficient arm which he produced. His reputation was so great at Rome, that he was employed by pope Sixtus to paint his chapel; and by the command of pope Paul III. executed his most celebrated piece *The last Judgment*. He has the character of being the greatest designer that ever lived; and it is universally allowed that no painter ever understood anatomy so well. He died immensely rich at Rome, in 1564. In the beginning of the present century, the senator Buonaroti caused the vault to be opened at Florence in which his body was deposited; it was found perfect; and the dress of green velvet, and even the cap and slippers, in which he was buried, were entire. He appeared to have been a small well-set man, with a countenance of great severity.

The late president of the Royal Academy carried his veneration for this great man so far, that he used to seal his letters with his head; and, in the picture which he painted of himself for the Royal Academy, has represented himself standing near a bust of Michael Angelo. So impressed was Sir Joshua Reynolds with the transcendent powers of Michael Angelo, that in the last speech, which, unfortunately for the lovers of art, he delivered as president of the Royal Academy, he thus concludes: "Gentlemen, I reflect, not without vanity, that these discourses bear testimony of my admiration of this truly divine man; and I should desire, that the last words which I should pronounce in this academy, and from this place, might be the name of Michael Angelo, Michael Angelo!"

One of the great ornaments of the present English school of painting, who has studied the works of this sublime artist with the greatest attention, and who has imitated them with the greatest success, (Mr. Fuseli,) gives the following character of his master and his model. "Sublimity of conception, grandeur of form, and breadth of manner, are the elements of Michael Angelo's style. By these principles he selected or rejected the objects of imitation. As painter, as sculptor, as architect, he attempted, and above any other man succeeded, to unite magnificence of plan and endless variety of subordinate parts with the utmost simplicity and breadth. His line is uniformly grand. Character and beauty were admitted only as far as they could be made subservient to grandeur. The child, the female, meanness, deformity, were by him indiscriminately stamped with grandeur. A beggar rose from his hand the patriarch of poverty; the hump of his dwarf is impressed with dignity; his women are moulds of generation; his infants teem with the man; his men are a race of giants. This is the '*terribilis via*' hinted at by Agostino Caracci, but perhaps as little understood by him as by Vafari, his blind adorer. To give the appearance of perfect ease to the most perplexing difficulty, was the exclusive power of Michael Angelo. He has embodied sentiment in the movements of St. Lorenzo, and in the chapel of Sixtus traced the characteristic line of every passion that sways the human race, without descending to individual features, the face of Biagio Cefena only excepted. The fabric of St. Peter, scattered into an infinity of jarring parts by Bramante and his followers, he concentrated, suspended the cupola, and to the most complex gave the air of the most simple of all edifices. Though as a sculptor he expressed the character of flesh more perfectly than all that went before or came after him, yet he never submitted to copy an individual; whilst in painting he contented himself with a negative colour, and as the painter of mankind rejected all meretricious ornament. Such was Michael Angelo as an artist. Sometimes he no doubt deviated from his principles, but it has been his fate to have had beauties and faults ascribed to him which belonged only to his servile copyists or unskilful imitators."

S P

Secondly,

Secondly, MICHAEL ANGELO DE CARAVAGGIO, born at that village in Milan, in 1569. He was at first no more than a bricklayer's labourer; but he was so charmed at seeing some painters at work, that he immediately applied himself to the art; and made such a progress in a few years, that he was admired as the author of a new style in painting. It was observed of Michael Angelo Buonaroti, that he was incomparable in designing, but knew little of colouring; and of Caravaggio, that he had as good a goût in colouring as he had a bad one in designing. There is one picture of his in the Dominican church at Antwerp, which Rubens used to call his master. It is said of this painter, that he was so strangely contentious, that the pencil was no sooner out of his hand but his sword was in it. He died in 1609.

ANGELO (St.) a small but strong town of Italy, in the Capitanata. There are several other towns and castles of the same name in Italy, and particularly the castle of St. Angelo at Rome. Lat. 41. 43. N. lon. 15. 56. E.

ANGÉLOS (Los), a province of Mexico, the ancient republic of Tlascala, of which a city called *Tlascala* was once the capital. That city is now reduced to an inconsiderable village, and has given place to another, called *Puebla des los Angeles*, or the City of Angels. It is situated in lat. 19. 13. N. and lon. 103. 12. W. It was formerly an Indian town; but in 1530 was entirely abandoned by the natives, on account of the cruelties of the Spaniards. A succeeding viceroy of Mexico, by a milder treatment, recalled them; and the town is now exceedingly rich and populous, so as even to vie with Mexico itself in magnificence. It is situated on the river Zacatula, in a fine valley, about twenty-five leagues to the eastward of Mexico. In the middle is a beautiful and spacious square, from whence run the principal streets in direct lines, which are crossed by others at right angles. One side is almost entirely occupied by the magnificent front of the cathedral; while the other three consists of piazzas, under which are the shops of tradesmen. The city is the see of a bishop, suffragan to the archbishop of Mexico; and we may form a judgment of the wealth of the place by the revenue of the cathedral and chapter, which amounts to 300,000 pieces of eight annually. It must be remembered, however, that in all popish countries the wealth of the laity by no means bears the same proportion to that of the clergy as in Britain. What contributes greatly to encrease the riches of this province is, that here is situated the city of Vera Cruz, the natural centre of all the American treasures belonging to Spain.

ANGÉLOT, *f.* in commerce, a small, fat, rich sort of cheese, brought from Normandy. It is made chiefly in the Pays de Bray, whence it is also denominated *angelot de Bray*. It is commonly made in vats, either square or shaped like a heart.

ANGELOT, *f.* A musical instrument somewhat resembling a lute.

ANG'ER, *f.* [A word of no certain etymology, but, with most probability, derived by Skinner from *ange*, Sax. vexed; which, however, seems to come originally from the Latin *ango*.]—*Anger* is uneasiness or discomposure of the mind, upon the receipt of any injury, with a present purpose of revenge. *Locke*.

Anger is like

A full hot horse, who being allow'd his way,
Self-mettle tires him. *Shakespeare.*

Anger is, according to some, a transient hatred, or at least very like it. *South*. Pain, or smart, of a sore or swelling. In this sense it seems plainly deducible from *angor*.—I made the experiment, setting the moxa where the first violence of my pain began, and where the greatest *anger* and soreness still continued, notwithstanding the swelling of my foot. *Temple*.

Anger is either deliberate or instinctive; and the latter kind is rash and ungovernable, because it operates blindly, without affording time for deliberation and foresight.

Bishop Butler very justly observes, that anger is far from being a selfish passion, since it is naturally excited by injuries offered to others as well as to ourselves; and was designed by the Author of nature not only to excite us to act vigorously in defending ourselves from evil, but to interest us in the defence or rescue of the injured and helpless, and to raise us above the fear of the proud and mighty oppressor.

Neither, therefore, is all anger sinful: hence the precept, "Be ye angry and sin not." It becomes sinful, however, and contradicts the rule of scripture, when it is conceived upon slight and inadequate provocations; and when it continues long. It is then contrary to the amiable spirit of charity, which "suffereth long, and is not easily provoked." Hence these other precepts, "Let every man be slow to anger;" and, "Let not the sun go down upon your wrath." These precepts, and all reasoning indeed upon the subject, suppose the passion of anger to be within our power; and this power consists not so much in any faculty we have of appealing our wrath at the time, (for we are passive under the smart which an injury or affront occasions, and all we can then do is to prevent its breaking out into action,) as in so mollifying our minds by habits of just reflection, as to be less irritated by impressions of injury, and to be sooner pacified. Add to this, the indecency of extravagant anger; how it renders us, whilst it lasts, the scorn and sport of all about us, and leaves us, when it ceases, sensible and ashamed; the inconveniences and irretrievable misconduct into which our irascibility has sometimes betrayed us; the friendships it has lost us; the distresses and embarrassments in which we have been involved by it, and the fore repentance which on one account or other it always costs us.

Physicians and naturalists have recorded many instances of very extraordinary effects produced by the passion of anger. Bórrichius cured a woman of an inveterate tertian ague, which had baffled the art of physic, by putting the patient in a furious fit of anger. Valeriola made use of the same means, with like success, in a quartan ague. The same passion has been equally salutary to paralytic, gouty, and even dumb, persons; to which last it has sometimes given the use of speech. Etmüller gives divers instances of very singular cures wrought by anger; among others, he mentions a person laid up in the gout, who, being provoked by his physician, flew upon him, and was cured. It is true, the remedy is somewhat dangerous in the application, when a patient does not know how to use it with moderation. We meet with several instances of persons to whom it has proved suddenly mortal. There are also instances wherein it has produced the epilepsy, jaundice, cholera morbus, diarrhoea, &c. In fact, this passion throws the whole nervous system into preternatural commotions, and surprisingly augments the systole of the heart and contiguous vessels. It also injures the tone of the whole machine. By the spasmodic effect it produces on the stomach and intestines, very dangerous consequences are liable to ensue. Its effect on the biliary and hepatic ducts is also very surprising; since, by an intense constriction of these parts, a sudden and universal jaundice has frequently been produced. The liver is sometimes also rendered schirrhous, and stones are generated in the gall-bladder and biliary ducts, in consequence of an obstruction of the bile. Besides these effects, it is evident from experience, that anger has a great tendency to excite enormous hæmorrhages, either from the nose, the lungs, the veins of the anus, or, in women, from the uterus, especially in those previously disposed to such evacuations.

To ANGER, *v. a.* To make angry; to provoke; to enrage.—Who would *anger* the meanest artisan, which carrieth a good mind? *Hooker*.—There are some late taxes and impositions introduced, which rather *anger* than grieve the people. *Clarendon*. To make painful.—He turneth the humours back, and maketh the wound bleed inwards, and *angereth* malign ulcers and pernicious imposthumations. *Bacon*.

ANG'ERLY,

AN'GERLY, *adv.* In an angry manner; like one offended; it is now written *angrily*.

Why, how now, Hecate? you look *angrily*. *Shakespeare*.

Such jesters' dishonest indiscretion is rather charitably to be pitied, than their exception either *angrily* to be grieved at, or seriously to be confuted. *Carew*.

ANGERMAN'NIA, a province in the kingdom of Sweden, bounded on the N. by Lapland and Bothnia, on the E. by the gulph of Bothnia and Medelpadia, and on the W. by Jemti and Herndel. It is full of rocks, mountains, and forests; and there is one very high mountain called *Scull*. It has excellent iron-works, and lakes abounding with fish.

AN'GERMOND, a town of the duchy of Berg, in Germany, on the E. side of the Rhine, subject to the Elector Palatine. Lat. 51. 10. N. lon. 6. 20. E.

ANGERO'NIA, a goddess of silence, whom the Romans invoked to obtain the art of being silent at proper times. She is said to have presided over councils, because secrecy is required therein. She is represented under the figure of a woman holding her finger to her mouth.

ANGERONA'LIA, *f.* in antiquity, solemn feasts held by the Romans the 21st of December, in honour of Angeronia, the goddess of patience and silence. Festus and Julius Modestus, quoted by Macrobius, Saturn. lib. i. c. 10. derive the name from *angina*, "quinzy;" and suppose the goddess to have been thus denominated, because she presided over that disease. Others suppose it formed from *angor*, "grief, pain;" to intimate that she gave relief to those afflicted therewith. Others deduce it from *ango*, "I press, I close;" as being reputed the goddess of silence, &c.

AN'GERS, a city of France, and capital of the duchy of Anjou, in the department of Maine and Loire. It is seated a little above the place where the Sarthe and the Loire lose themselves in the Maine. This last river divides the city into two equal parts, called the High and the Low Town. There are twelve parishes in the city, and four in the suburbs, which contain upwards of 36,000 inhabitants. Its greatest extent is along the declivity of a hill, which reaches quite down to the river side. The castle was built by St. Louis, about the middle of the 13th century. The walls, fosses, and numerous towers, of the castle, which yet subsist, evince its former magnificence; and its situation in the centre of the city, on a rock overhanging the river, conduces to give it an air of grandeur, though at present in decay. It was the principal residence of the kings of Sicily, as dukes of Anjou, but is now in a state of total ruin. The cathedral of Angers is a venerable structure; and, although it has undergone many alterations in the course of ages since its construction, yet the architecture is singular, and deserves attention. Here lies interred with her ancestors the renowned Margaret, daughter of René, king of Sicily, and queen of Henry VI. of England. She expired, after her many intrepid, but ineffectual, efforts, to replace her husband on the throne, in the year 1482, at the castle of Dampierre, in Anjou. The university of Angers was founded in 1398, and the academy of belles lettres in 1685. This last consists of thirty academicians. At the end of the suburbs of Bressigny are the quarries of Angers, so famous for the fine slate which is got from thence. The pieces are of the thickness of a crown piece, and a foot square. All the houses in Angers are covered with this slate, which has gained it the appellation of the *Black City*. The walls with which king John of England surrounded it, in 1214, remain nearly entire, and are of very great circumference. Lat. 47. 28. N. lon. 0. 30. W.

ANGHIE'RA, a town of Italy, in the duchy of Milan, and capital of a county of the same name. It is seated on the eastern side of the lake Maggiore, in lat. 45. 42. N. long. 9. 5. E.

AN'GILD, *f.* [*ane*, one, and *gild*, Sax.] A tribute or fine; was a single compensation for an offence. So *anthlote* and *anfcot*, was a single payment of scot and lot.

ANGINA, *f.* in medicine, a violent inflammation of the throat, otherwise called *quinzy*. See *MEDICINE*.

ANGIO'GRAPHY, &c. See *ANGEOGRAPHY*, &c.

ANGIOPTERIS, *f.* in botany. See *ONOCLEA*.

ANGIO'SPERMIA, *f.* in the Linnæan system of botany, the second order in the class didynamia. It consists of those plants, of that class, whose seeds are inclosed in a pericarpium. In this order the stigma is generally obtuse. These are the *personati* of Tournefort.

ANGIT'IE (*LUCUS* or *NEMUS*), situated on the west side of the Lacus Fucinus. The inhabitants are called *Lucenses*, by Pliny. Angitia was sister of Medea, who taught antidotes against poison and serpents, according to Sil. Italicus. But Servius on Virgil says, that the inhabitants called Medea by this name for the same reason. The town is now called *Luco*.

AN'GLE, *f.* [*angle*, Fr. *angulus*, Lat.] The inclination of two lines meeting one another in a point. See *GEOMETRY*.

ANGLE OF INCIDENCE, in optics, the angle which a ray of light makes with a perpendicular to that point of the surface of any medium on which it falls; though it is sometimes understood of the angle which it makes with the surface itself.

ANGLE OF REFRACTION, generally means the angle which a ray of light, refracted by any medium, makes with a perpendicular to that point of the surface on which it was incident; but has sometimes been understood of the angle which it makes with the surface of the refracting medium itself.

ANGLE, *f.* [*angel*, Ger. and Dut.] An instrument to take fish, consisting of a rod, a line, and a hook:

The patient fisher takes his silent stand,
Intent, his *angle* trembling in his hand;
With looks unmov'd, he hopes the scaly breed,
And eyes the dancing cork and bending reed. *Pope*.

To **ANGLE**, *v. n.* To fish with a rod and hook. To try to gain by some insinuating artifices, as fishes are caught by a bait:

The pleasant'st angling is to see the fish
Cut with her golden oars the silver stream,
And greedily devour the treacherous bait;
So *angle* we for Beatrice. *Shakespeare*.

ANGLE-ROD, *f.* [*angel-rode*, Dut.] The stick to which the line and hook are hung.

AN'GLER, *f.* He that fishes with an angle.—Neither do birds alone, but many sorts of fishes, feed upon insects; as it is well known to *anglers*, who bait their hooks with them. *Ray*.

ANGLER, *f.* in ichthyology, the English name of a species of lophus. See *LOPHUS*.

AN'GLES, an ancient German nation, originally a branch of the Suevi; who, after various migrations, settled in that part of Denmark, and duchy of Sleswick, which to this day is called *Angel*, and of which the city of Flensburg is the capital. Here they were known, even in the time of Tacitus, by the name of *Angli*. The origin of this name is variously accounted for. According to Saxo-Grammaticus, they were called *Angli* from Angulus, son to Humblus, king of Denmark. Widschind, a Saxon writer, will have them to be called *Angli*, from an island in the corner or angle of the sea, which they conquered. Goropius derives their name from the Saxon word *Angel*, or *Engel*, signifying a fish-hook; the Angles, like the other Saxon nations, being greatly addicted to piracy, and on that account being so named by the neighbouring nations; as if, like hooks, they caught all that was in the sea. To this nation the British ambassadors are said to have applied when soliciting succours against the Scots and Picts. The Angles, therefore, came over in greater numbers than any other Saxon nation; and accordingly had the honour of giving the name of *Anglia* to England.

AN'GLESEY (Isle of), is the most western county of North Wales. It is twenty-four miles in length, eighteen in breadth, and sends one member to parliament. It is separated from Caernarvonshire by a strait called *Menai*, and on every other side is surrounded by the sea. It is a fertile spot, and abounds in corn, cattle, flesh, fish, and fowls. At Port Aethwy, the most general ferry into the island, there is a great passage of cattle. It is computed that the island sends forth annually from 12,000 to 15,000 heads, and multitudes of sheep and hogs. It is also computed that the remaining stock of cattle is 30,000. In 1770, upwards of 90,000 bushels of corn were exported, exclusive of wheat. The improvement in husbandry has greatly increased since the suppression of smuggling from the Isle of Man; before that time every farmer was mounted on some high promontory, expecting the vessel with illicit trade; but, since that period, he applies in earnest to industry and cultivation. Not but that the island was in a most remote time famous for its fertility: Mon, Mam Gymry, the Nursing-mother of Wales, was a title it assumed even in the 12th century.

This island is divided into seventy-four parishes, of which most of the churches are situated near the shores. By an account given on the 13th of August, 1563, there were 2010 households, or families, in Anglesey; allowing five to a family, the whole number of inhabitants in that period was 10,050. In 1776; the number of houses in Anglesey was about 3,956: allowing five persons to a family, the whole number of inhabitants was at that time 19,780; which wants only 340 of doubling the number of inhabitants in the intervening space. The chief town is Beaumaris.

In ancient times this island was called *Mon*, *Mona*, or *Moneg*. It was the great nursery of the religion of the Druids; being the residence of the Grand Druid, or chief pontiff, and consequently of all the learned doctors in that religion. Many ancient monuments of Druidism still remain in the island. At Tre'r Dryw, or the habitation of the arch druid, are several mutilated remains, which have been described by Mr. Rowlands. His *Bryn Gwyn*, or royal tribunal, is a circular hollow of 180 feet in diameter, surrounded by an immense agger of earth and stones, evidently brought from some other place, as there is not the least mark of their being taken from the spot. It has only a single entrance. This is supposed to have been the grand consistory of the druidical administration. Not far from it was one of the *Gorffedlau*, now in a manner dispersed, but which once consisted of a great copped heap of stones, on which sat a druid, instructing the surrounding people *multa de Deorum immortalium vi et potestate disputare, et juventuti tradunt*. Cæf. lib. vi. Here were also the relics of a circle of stones, with the *cromlech* in the midst; but all extremely imperfect. Two of the stones are very large; one, which serves at present as part of the end of a house, is twelve feet seven inches high, and eight feet broad; and another eleven feet high, and twenty-three feet in girth. Some smaller stones yet remain. This circle, when complete, was one of the temples of the druids, in which their religious rites were performed. It is the conjecture of Mr. Rowlands, that the whole of these remains were surrounded with a circle of oaks, and formed a deep and sacred grove: *Jam per se roborum elegunt lucos, neque ulla sacra sine ea fronde consuevit*. Plin. Hist. Nat. xv. 44. Near this is *Caer Leb*, or the moated entrenchment; of a square form, with a double rampart, and broad ditch intervening, and a smaller one on the outside. Within are foundations of circular and of square buildings. This Mr. Rowland supposes to have been the residence of the arch druid, and to have given the name, *Tre'r Dryw*, to the township in which it stands. At Tre'r Wry are several faint traces of circles of stones, and other vestiges of buildings; but all so dilapidated, or hid in weeds, as to become almost formless. *Bod-drudan*, or the habitation of the druids, *Tre'r-Beirdd*, or that of the bard, and *Bodowyr*, or that of the priests, are all of them hamlets, nearly surrounding the seat of the

chief druid, composing the essential part of his suite. At the last is a thick cromlech, resting on three stones.

The shore near Porthamel, not far from hence, is famed for being the place where Suetonius landed, and put an end in this island to the Druid reign. His infantry passed over in flat-bottom boats, perhaps at the spot still called *Pant yr Yscrappie*, or the valley of *skiffs*. His cavalry crossed partly by fording, partly by swimming. Of the conflict on this occasion we have the following animated description by Tacitus: *Stat pro litore diversa acies, densa armis virisque, intercurfantibus fœminis in modum furarum, veste ferali, crinibus dejectis, facies, preforebant; druidæque circum, preces diras sublati ad cælum manibus fundentes. Novitate aspectus percutere militem, ut quasi hærentibus membris, immobile corpus vulneribus præberent. Dein cohortationibus ducti, et se ipsæ stimulant, ne muliebri et fanaticum agmen pavescerent, inferunt signa, sternuntque obvios et igni suo involvunt. Præsidium posthac impositum vicis, excisq; luci, sævis superstitionibus sacri. Nam cruore captivo dolere aras, et hominum fibris consulere deos fas habebant.* Thus Englished: "On the shore stood a motley army in close array, and well armed; with women running wildly about in black attire with dishevelled hair, and like the furies brandishing their torches; surrounded by the druids, lifting up their hands to heaven, and pouring forth the most dreadful imprecations. The soldier stood astonished with the novelty of the sight. His limbs grew torpid, and his body remaining motionless resigned to every wound. At length, animated by their leader, and rousing one another not to be intimidated with a womanly and fanatic band, they displayed their ensigns, overthrew all who opposed them, and flung them into their own fires. After the battle, they placed garbisons in the towns, and cut down the groves consecrated to the most horrible superstitions: for the Britons held it right to sacrifice on their altars with the blood of their enemies, and to consult the gods by the inspection of their entrails." There are no traces of any Roman works left in this country. Their stay was so short, that they had not time to form any thing permanent.

Near the ferry of Moel y Don appear the fine woods of Sir Nicholas Bayley, skirting the Menai for a considerable way. The wooded part of the island is on this side. It commences at Llanidan, and recalls the ancient British name of Anglesey, *Ynys Dywyll*, or the Dark Island, on account of the deep shade of its groves: but at present it is (except in this part) entirely divested of trees; and the climate so averse to their growth, that in most parts it is with great difficulty the gentry can raise a plantation round their houses. Plas Newydd, the seat of Sir Nicholas Bayley, lies close upon the water, protected on three sides by venerable oaks and ashes. The view up and down this magnificent river-like strait is extremely fine. The shores are rocky; those on the opposite side covered with woods; and beyond soar a long range of Snowdonian alps. Here stood a house built by Gwennllian, a descendant of Cadrod Hardd. The mansion has been improved, and altered to a castellated form by the present owner.

In the woods are some very remarkable druidical antiquities. Behind the house are to be seen two vast cromlechs. The upper stone of one is twelve feet seven inches long, twelve broad, and four thick, supported by five tall stones. The other is but barely separated from the first: is almost a square, of five feet and a half, and supported by four stones. The number of supporters to cromlechs are merely accidental, and depend on the size or form of the incumbent stone. These are the most magnificent we have, and the highest from the ground; for a middle-sized horse may easily pass under the largest. In the lands of Llugwy, indeed, there is a most stupendous one of a rhomboidal form. The greatest diagonal is seventeen feet and a half, the smaller fifteen, and the thickness three feet nine inches; but its height from the ground is only two feet: it was supported by several stones. The Welsh, who ascribe every thing stupendous to our famous British king,

king, call it *Arthur's Quoit*. In the woods at this place are some druidical circles nearly contiguous to each other.

At a small distance from Beaumaris, on the shore, stand the remains of Llanvaes, or the Friars. It was founded by prince Llewelyn ap Ierwerth, and according to the general tradition of the country, over the grave of his wife Joan, daughter of king John, who died in 1237, and was interred on the spot. Here also were interred a son of a Danish king, lord Clifford, and many barons and knights who fell in the Welsh wars. It was dedicated to St. Francis, and consecrated by Howell bishop of Bangor, a prelate who died in 1240. The religious were Franciscans, or minor friars. Their church and house were destroyed, and their lands wasted, in the insurrection made soon after the death of Llewelyn, last Welsh prince, by his relation Madoc. Edward II. in consideration of their misfortunes, remitted to them the payment of the taxes due to him, which before the war were levied at the rate of 12l. 10s. These friars were strong favourers of Owen Glendwr. Henry IV. in his first march against Owen, plundered the convent, put several of the friars to the sword, and carried away the rest; but afterwards set them at liberty, made restitution to the place, but peopled it with English recluses. It possibly was again reduced to ruin: for Henry V. by patent, establishes here eight friars, but directs that two only should be Welsh. At the dissolution, Henry VIII. sold the convent and its possessions to one of his courtiers. They became in later days the property of a family of the name of *White* (now extinct), who built here a good mansion. It of late became the property of lord Bulkeley. The church is turned into a barn, and the coffin of the princess Joan now serves for a watering-trough. A little farther is Castle Aber Llienawg, a small square fort, with the remains of a little round tower at each corner. In the middle one stood a square tower. A foss surrounds the whole. A hollow way is carried quite to the shore, and at its extremity is a large mound of earth, designed to cover the landing. This castle was founded by Hugh Lupus earl of Chester, and Hugh the Red earl of Shrewsbury, in 1098, when they made an invasion, and committed more savage barbarities on the natives, especially on one Kenred a priest, than ever stained the annals of any country. Providence sent Magnus king of Norway to revenge the cruelties. His coming was to all appearance casual. He offered to land, but was opposed by the earls. Magnus stood in the prow of his ship, and calling to him a most expert Bowman, they at once directed their arrows at the earl of Shrewsbury, who stood all armed on the shore. An arrow pierced his brain through one of his eyes, the only defenceless part. The victor, seeing him spring up in the agonies of death, insultingly cried out in his own language, *Leit loupe*, "Let him dance." This fort was garrisoned so lately as the time of Charles I. when it was kept for the parliament by Sir Thomas Cheadle; but was taken by colonel Robinson in 1645.

Above Llanddona is a high hill, called *Bardd Arthur*; the true name was probably *Din*, or *Dinas Sulwy*: for a church immediately beneath bears that of *Llanvihangle Din-Sulwy*. On the top of it is a great British post, surrounded by a double row of rude stones with their sharp points uppermost; and in some parts the ramparts are formed of small stones. In the area are vestiges of oval buildings: the largest is formed with two rows of flat stones set on end. There had been the temporary habitations of the possessors. It had been a place of vast strength: for, besides the artificial defence, the hill slopes steeply on all sides, and the brink next to the ramparts is mostly precipitous. It is worth the attention of the traveller to ascend this hill for the sake of the vast prospect; an intermixture of sea, rock, and alps, most elegantly great.

About two miles south of Plas Gwyn, the seat of Paul Panton, Esq. was situated Penmynydd, once the residence of the ancestors of Owen Tudor, second husband to Catherine of France, queen dowager of Henry V. "who, being (as honest Halle informs us) young and lusty, follow-

ing more her own appetite than friendly consail, and regarding more her private affection than her open honour, took to husband privily (in 1428) a goodly gentylman, and a beautiful person, garnished with manye godlye gyftes both of nature and of grace, called *Owen Teuther*, a man brought furth and come of the noble lignage and ancient lyne of Cadwaladar, the last kynge of the Britonnes." The match, important in its consequences, restored the British race of princes to this kingdom. These reigned long, under the title of the House of Tudor; the mixed race having ceased on the accession of Henry VII. grandson to our illustrious countryman. The remains of the residence of the Tudors are, the door of the gateway: part of the house, and the great chimney-piece of the hall, are to be seen in the present farm-house. The Tudors, for a considerable space before the extinction of their race, assumed the name of *Owen*. Richard was the last male of the family, and was sheriff of the county in 1657. Margaret, heiress of the house, married Coningsby Williams, Esq. of Glan y gors, in this island, who possessed it during his life. It was afterwards sold to lord Bulkeley, in whose descendant it still continues. In the church of Penmynydd is a most magnificent monument of white alabaster, removed at the dissolution from the abbey of Llanvaes to this place; probably erected in memory of one of the house of Tudor, who had been interred there.

On the western point of the bay is a small cape, flat at top, called *Castell mawr*, joined to the land by a low isthmus. It is composed of lime-stone, which is carried to distant parts in small vessels, which lie in a small channel near the rock, and by their numbers frequently enliven the view. Roman coins have been found in this neighbourhood; but there are no vestiges of there having been any station. Beyond Castell mawr, on the shore, are vast blocks of black marble filled with shells, coralloids, and fungites.

At Tryselwyn mountain is the most considerable body of copper-ore perhaps ever known. The part of Tryselwyn which contains it is called *Parys mountain*. Of this mountain, and the works there carried on, we have the following very curious and interesting account by Mr. Pennant: "The external aspect of the hill is extremely rude, and rises into enormous rocks of coarse white quartz. The ore is lodged in a basin, or hollow, and has on one side a small lake, on whose waters, distasteful as those of Avernus, no bird is known to alight. The whole aspect of this tract has, by the mineral operations, assumed a most savage appearance. Suffocating fumes of the burning heaps of copper arise in all parts, and extend their baneful influence for miles around. In the adjacent parts vegetation is nearly destroyed: even the mosses and lichens of the rocks have perished; and nothing seems capable of resisting the fumes but the purple melic grass, which flourishes in abundance. It is thought that the ore had been worked in a very distant period. Vestiges of the ancient operations appear in several parts, carried on by trenching, and by heating the rocks intensely, then suddenly pouring on water, to as to cause them to crack or scale; thus awkwardly supplying the use of gunpowder. Pieces of charcoal were also found, which proves that wood was made use of for that purpose. As the Britons imported all works in brass, it is certain that the Romans were the undertakers of these mines; and it is very probable that they sent the ore to Caerhên to be smelted, the place where the famous cake of copper was discovered. They might likewise have had a smelting hearth in this island; for a round cake of copper was discovered at Llanvaethlle, a few miles from this place. Its weight was fifty pounds, and it had on it a mark resembling an L.

"In the year 1762, Alexander Frazier came into Anglesey in search of mines. He visited Parys mountain; called on Sir Nicholas Bayley, and gave him so flattering an account of the prospect, as induced him to make a trial, and sink shafts. Ore was discovered; but, before any quantity could be gotten, the mines were overpowered with water. In about two years after, Messrs. Roe and

Co. of Macclesfield, applied to Sir Nicholas for a lease of Penrhyn ddu mine in Caernarvonshire; with which they were, much against their wills, compelled to take a lease of part of this mountain, and to carry on a level, and make a fair trial. The trial was accordingly made; ore was discovered; but the expences overbalanced the profits. They continued working to great loss; and at length determined to give the affair up. They gave their agent orders for that purpose; but he, as a final attempt, divided his men into ten several companies, of three or four in a partnership, and let them sink shafts in various places, about 800 yards eastward of a place called the *Golden Venture*, on a presumption that a spring, which issued from near the place, must come from a body of mineral. His conjecture was right; for in less than two days they met with, at the depth of seven feet from the surface, the solid mineral, which proved to be that vast body which has since been worked to such advantage. The day that this discovery was made was March 2, 1768: which has ever since been observed as a festival by the miners. Soon after this discovery, another adventure was begun by the Rev. Mr. Edward Hughes, owner of part of the mountain, in right of his wife Mary Lewis, of Llys Dulas; so that the whole of the treasure is the property of Sir Nicholas Bayley and himself. The body of copper-ore is of unknown extent. The thickness has been ascertained in some places by the driving of a level under it, several years ago, and it was found to be in some places twenty-four yards. The ore is mostly of the kind called by Cronstedt *Pyrites cupri flavo viridescens*, and contains vast quantities of sulphur. There are other species of copper-ore found here. Of late a vein of the *Pyrites cupri griseus* of Cronstedt, about seven yards wide, has been discovered near the west end of the mountain: some is of an iron grey, some quite black; the first contains 16lb. of copper per cwt. the last forty. An ore has been lately found, in form of loose earth, of a dark purplish colour; and the best of it has produced better than eight in twenty. Some years ago, above thirty pounds of native copper was found in driving a level through a turbery; some was in form of moss, some in very thin leaves.

"It is quarried out of the bed in vast masses; is broken into small pieces; and the most pure part is sold raw, at the rate of about 3l. to 6l. per ton, or sent to the smelting-houses of the respective companies to be melted into metal. The more impure ore is also broken to about the size of hens eggs; but, in order to clear it from the quantity of sulphur with which it abounds, as well as other adventitious matter, it must undergo the operation of burning. For that purpose it is placed between two parallel walls of vast length: some kilns are twenty, others forty and fifty, yards in length; some ten, others twenty, feet wide; and above four feet in height. The space between is not only filled, but the ore is piled many feet higher, in a convex form, from end to end. The whole is then covered with flat stones, closely luted with clay; and above is placed a general integument of clay, and small rubbish of the work, in order to prevent any of the fumes from evaporating. Of late, some kilns have been constructed with brick arches over the ore, which is found to be the best method of burning. Within these few years, attempts are made to preserve the sulphur from flying away; and that is done by flues made of brick, whose tops are in form of a Gothic arch, many scores of feet in length. One end of these opens into the beds of copper which are to be burnt. Those beds are set on fire by a very small quantity of coal, for all the rest is effected by its own phlogiston. The volatile part is confined, and directed to the flues; in its course the sulphureous particles strike against their roofs, and fall to the bottom in form of the finest brimstone; which is collected and carried to adjacent houses, where it is melted into what is called in the shops *stone brimstone*.

"The beds of copper, thus piled for burning, are of vast extent. Some contain 400 tons of ore, others 2000.

The first require four months to be completely burnt, the last near ten. Thus burnt, it is carried to proper places to be dressed, or washed, and made merchantable. By this process the ore is reduced to a fourth part in quantity, but considerably improved in quality: and by this means the water is strongly or richly impregnated with copper, which is dissolved by the acid quality of the sulphur; and is collected or precipitated again by iron in the above described pits. The iron is all dissolved.

"But a far richer produce of copper is discovered from the water lodged in the bottom of the bed of ore, which is highly saturated with the precious metal. This is drawn up, either by means of whimsies or windmills, to the surface, and then distributed into numbers of rectangular pits thirty-six feet long, some pits more some less, twelve to fifteen feet broad, and twenty inches deep. To speak in the language of the adept, Venus must make an assignation with Mars, or this solution will have no effect. In plain English, a quantity of iron must be immersed in the water. The kind of iron is of no moment; old pots, hoops, anchors, or any refuse, will suffice; but of late, for the convenience of management, the adventurers procure new plates, four feet long, one and a half broad, and three-quarters of an inch thick. These they immerse into the pits. The particles of copper instantly are precipitated by the iron, and the iron is gradually dissolved into a yellow ochre. Great part of it floats off by the water, and sinks to the bottom. The plates, or the old iron (as it happens), are frequently taken out, and the copper scraped off; and this is repeated till the whole of the iron is consumed. The copper thus procured differs little from native copper, and is prized accordingly, and sold for prices of 25l. to 45l. a ton. This discovery is far from new: it has been practised long in the Wicklow mines in Ireland; and above a century in those of Hern-grundt in Hungary, where it is called *ziment copper*. The waters of the Hungarian mines are much more strongly impregnated with copper than those of Parys mountain. The first effects its operation in twelve or about twenty days, the last requires two months. Horse-shoes, iron made in the shape of hearts, and other forms, are put into the foreign waters; and, when perfectly transmuted, are given as presents to curious strangers.

"Nature hath been profuse in bestowing her mineral favours on this spot: for above the copper-ore, and not more than three quarters of a yard beneath the common soil, is a bed of yellowish greasy clay, from one to four yards thick, containing lead-ore, and yielding from 600 to 1000 pounds weight of lead from one ton; and one ton of the metal yields not less than fifty-seven ounces of silver. This place has been worked for lead-ore in very distant times. In the bottom of the pool was found an ancient smelting-hearth of grit-stone, and several bits of smelted lead, of about four inches in length, two in breadth, and half an inch thick. These works have added greatly to the population of the island; for about 1500 persons are employed; who, with their families, are supposed to make near 8000 persons, getting their bread from these mines."

Near Kemlyn Bay is a quarry of marble, common to this place, some parts of Italy, and to Corsica, and known in the shops by the name of *Verde di Corsica*. Its colours are green, black, white, and dull purple, irregularly disposed. In different blocks one or other of the colours are frequently wanting; but among the green parts are often found narrow veins of a most elegant and silky white asbestos. It is a compound species of marble: part is calcareous, and may be acted upon by aqua-fortis. The green parts partake of the nature of jasper. It is apt to be intersected by small cracks, or by asbestos veins, therefore incapable of taking a high polish. This quarry lies on the lands of Monachty, in the parish of Llan-Fair-Ynghornwy; and it is found again in the isle of Skerries, off this parish. In Rhoscolyn parish, a green amianthus, or brittle asbestos, is met with in great plenty in a green marble

marble similar to the above; but by reason of the inflexible quality of its fibres not applicable to the same use.

AN'GLICISM, *f.* [from *Anglus*, Lat.] A form of speech peculiar to the English language; an English idiom.—They corrupt their stile with untutored *anglicisms*. *Milton*.

AN'GLING, *f.* the art of fishing with a rod, hook, and line; for which see FISHING.

AN'GLO-CALVINISTS, *f.* a name given by some writers to the members of the church of England, as agreeing with the other Calvinists in most points except church-government.

ANGLO-SAXON, *f.* an appellation given to the language spoken by the English Saxons; in contradistinction from the true Saxon, as well as from the modern English.

AN'GLUS (Thomas), an English priest, well known for the singularity of his opinions, and several little tracts which he wrote in the 17th century. He went by several names. Mr. Baillet says his true name was *White*; but that he used to disguise it under that of *Candidus*, *Albus*, *Bianchi*, and *Richworth*; but he was most known in France by the name of *Thomas Anglus*. Des Cartes generally called him Mr. *Vitus*. He passed some time in most countries of Europe; but his longest stay was at Rome and Paris. When he was in England, he lived a considerable time in the family of Sir Kenelm Digby; and seems to have had a great esteem for the opinions of this gentleman, as may be seen in his writings, particularly in the preface to his Latin work concerning the Institutions of the Peripatetic Philosophy, according to the hypothesis of Sir Kenelm. He was a great advocate for the peripatetic philosophy. He attempted even to make the principles of Aristotle subservient to the explaining the most impenetrable mysteries of religion; and with this view he engaged in the discussion of predestination, free-will, and grace. Mr. Baillet says, "What he wrote upon this subject resembles the ancient oracles for obscurity." He died some time after the restoration of Charles II. but in what year is uncertain.

AN'GOL, a pleasant well-watered city of Chili, situated on a fertile and beautiful plain, 125 miles north of Baldivia. Lat. 37. 56. S. lon. 72. 59. W.

ANGO'LA, a kingdom on the western coast of Africa, lying, according to the most probable accounts, between lat. 8. 30. and 16. 21. S. forming a coast of upwards of 480 miles; but how far it extends from west to east has never been exactly determined. Angola Proper is bounded on the north by the river Danda, which separates it from Congo; and on the south by the Coanza, by which it is separated from Benguela. This last, however, is now included in the kingdom of Angola, having been conquered by its monarchs, though it still retains the name of kingdom, and is included in the dimensions just now given. The air here is very hot and unwholesome, and the country mountainous: there being but few plains to be met with in it, except on the sea-coast, and between the huge ridges of mountains. That part of the kingdom distinguished by the name of Angola Proper, was subject to the kings of Congo in the year 1484, when the Portuguese first discovered the country: but how long it had been so before that time, is not known; the inhabitants being utterly destitute of chronology, and having no other way of distinguishing past events, but by saying they happened in such a king's reign. Neither, though Angola became a distinct kingdom since its discovery by the Portuguese, is it known with more certainty at what time that revolution happened; or whether the Portuguese were not concerned in assisting the viceroy of the king of Congo, who governed the province of Angola, to set up for himself.

All accounts agree, that this kingdom was founded by one *Ngola* or *Angola*, from whom it took its name. According to the tradition of the country, this Ngola was a smith, and the inventor of that trade, in which he had been instructed by the demons of the country. In consequence of this, he became exceedingly rich, not in gold, silver, or shell-money, which were not at that time in use, but in corn, cattle, and fruits, which were then exchanged in traf-

fic. The country being not long after visited by a grievous famine, Ngola generously relieved his distressed countrymen, and saved the lives of some thousands. In gratitude for this generosity, he was unanimously chosen king; and hence the smith's trade is reckoned among the royal arts of Angola.

According to other accounts which can be more depended upon, Ngola was the king of Congo's viceroy; who, having become powerful by the reduction of several of the neighbouring states, was induced to set up for himself. Dreading, nevertheless, the power of his old master, he chose to send him the usual tribute and presents annually, till he reckoned himself firmly seated on the throne, and had secured it to his descendants. His measures were greatly facilitated by the wars which the king of Congo was then engaged in with the *Giagas*, a barbarous nation in the neighbourhood. These made such a powerful inroad into his dominions, that he was glad to ask the assistance of Ngola; not as a subject, but as a friend and ally. This was readily granted; and the two monarchs continued ever after sending presents and assistance to each other, and encouraging a mutual commerce between all their subjects.

Ngola lived to a great age, highly respected by his subjects, and in alliance with the king of Congo and the Portuguese, whose numerous settlements on the coast had made them become very powerful. According to the custom of the country, he had many wives and concubines. By his chief favourite he had three daughters, *Zunda Ri-angola*, *Tumba Ri-angola*, and another whose name is unknown. Towards the latter part of his life, the king's chief care was to secure the crown to the eldest of these; for which purpose he consulted his queen, who encouraged him in the design with all the eloquence in her power. By her advice, he sent for his lieutenant-general, a favourite slave, whom he had created viceroy over the whole kingdom, to acquaint him with his resolution. The artful minister did not fail to applaud his design, though his intention was to defraud the princefs, and seize the throne for himself. He accordingly took the opportunity, one day, when that princefs and the whole court were employed in sowing their lands, to spread a report that the Angolic enemies had entered the kingdom, and were destroying every thing with fire and sword. In this confusion, the treacherous viceroy conducted the three princefses to the royal palace; and, acquainting Ngola with the pretended danger, urged him to betake himself to a speedy flight. The frightened monarch, unable to stir with age, desired his minister to take the most proper means for his safety: whereupon, being a stout young fellow, he took his majesty on his back, and carried him into a neighbouring wood, where he stabbed him with a dagger. This stratagem was too shallow to remain long concealed; the murderer was quickly discovered, and many of the nobles rose in arms against him; but, finding his party too strong to be opposed, they were at last obliged to submit, and suffer him quietly to ascend the throne, upon his publicly declaring that he had not seized it for himself, but with a view of securing it to the princefs Zunda Ri-angola.

To this princefs the usurper palliated his conduct in the best manner he could; and she had art enough to disguise her resentment so effectually, that he never discovered the smallest occasion for jealousy. At last, his sudden death gave Zunda an opportunity of ascending the throne peaceably; when she behaved with such moderation and justice, as to gain the love and affection of all her subjects. Her jealous temper prevented her from marrying; and, by giving too much way to it, she came at last to dread as rivals the two sons of her younger sister Tumba, and to form designs against their life. To accomplish her purposes, she ordered them to be brought to court, pretending to have them educated under her own eye. This was declined for some time; but at length the queen prevailed so far as to have the eldest sent to her; whom she no sooner got into her power, than she caused him to be massacred,

massacred, with all his attendants; only one escaping, all covered with wounds; to carry the dreadful news to the prince's and her husband.

On hearing of this bloody act, the afflicted parents immediately sallied forth at the head of all their vassals. They were waited for by queen Zunda at the head of a numerous army; but no sooner did her soldiers perceive the parents of the deceased prince, than they immediately abandoned the queen to their resentment. Tumba then rushed upon her sister, and stabbed her to the heart; after which, she commanded her entrails to be taken out, and thrown into the hole in which her son's body had been cast. Upon this Tumba was crowned queen of Angola, and invited her husband to participate with her in the management of public affairs. This offer he was too wise to accept; and Tumba, upon his refusal, resigned the crown into the hands of her surviving son, named *Angola Chilvagni*. He proved a great and wise prince, gaining the love of his subjects by the moderation and equity of his government. He was succeeded by one of his younger sons, named *Dambi Angola*; who no sooner ascended the throne, than he put all his brethren to death, lest they should unite in favour of the eldest. The rest of his reign proved conformable to such a beginning. He was a monster of cruelty, avarice, lewdness, and perfidy. Death, however, in a short time, happily delivered his subjects from this tyrant; who, notwithstanding his infamous life, was buried with the greatest magnificence; and a mount was erected over his grave, consisting, according to the custom of the country, of a prodigious number of human victims which had been sacrificed to his ghost. *Dambi Angola* was succeeded by *Ngola Chilivagni*, a warlike and cruel prince. He conquered many nations, and made the most dreadful inroads into the kingdom of Congo, along the rivers of Danda, Lucalla, Zanda, and Coanza; whose waters were often tinged with the blood of thousands whom he massacred in his excursions. Notwithstanding these butcheries, *Ngola Chilivagni* shewed such generosity to those who readily submitted to him, that he was sure to conquer, not only wherever he came, but wherever he seemed to direct his forces. At last, as if weary of conquest, he planted a tree on the banks of the Coanza, about eight leagues from Loanda San Paulo, as a boundary to his ravages. This tree the Portuguese called *Ifanda*, or *Ifandaura*; and afterwards erected a fortress near it.

The same folly and insolence which took place in the breast of Alexander the Great, on account of his rapid conquests, soon puffed up the mind of this petty African tyrant. Because he had conquered and ravaged some of the neighbouring countries, and brought under his subjection a few cowardly barbarians, he first fancied himself invincible, and then that he was a god. He demanded the same respect and adoration that was paid to their other deities; and with this demand his subjects were servile enough to comply. This pretended deity, however, was forced to submit to the fate of other mortals, and died without leaving a successor behind him.

On the decease of *Ngola Chilivagni*, the states elected *Ngingha-Angola-Chilombo-Kickafanda*, great-nephew to queen Tumba's husband, as his successor. He proved such a rapacious and cruel tyrant, that his subjects universally wished for his death; which, luckily for them, soon happened. He was interred with the usual pomp and solemnities, particularly that of having a whole hecatomb of human victims sacrificed upon his grave. His son *Bandi Angola*, who succeeded him, proved yet a greater tyrant than his father; so that he soon became intolerable to his subjects. A general revolt ensued, in which his subjects called in the cannibal *Glagas* to their assistance. These immediately poured in like a torrent, and, having defeated the forces of the tyrant, besieged him in an inaccessible mountain; where, not being able to come at him, they resolved to reduce him by famine. *Bandi Angola* applied to the king of Congo for assistance. As it was the interest of that prince to hinder the ravenous *Glagas* from en-

tering into the Angolic dominions, he did not hesitate at granting his request; and ordered a strong reinforcement of the Portuguese, of whose valour he had a high opinion, and of whom he entertained a great number at his court, to march to the assistance of the king of Angola. The command of the army was given to one of the most experienced Portuguese officers; who, depending more on the handful of Europeans he had under his command than on the Congoe, attacked the rebels, though greatly superior in number; and, having utterly defeated them, restored the king of Angola to the throne.

This essential service so endeared the Portuguese to *Bandi Angola*, that he took them into his service, and even into his council. Their general became a great favourite of the king, but much more so of his daughter, who conceived a violent passion for him. Unfortunately for them both, the amour was carried on with so little precaution on her part, that the king quickly discovered it; and immediately formed a resolution of exterminating the Portuguese all at once. Such violent measures, however, could not be concerted so privately but the prince's got intelligence of it; and, having apprised her lover of his danger, he immediately withdrew into Congo, taking with him as many of his countrymen as he conveniently could. The king of Congo expressed such strong resentment against *Bandi Angola* for his ingratitude, that the Portuguese general would have probably prevailed upon him to declare war against Angola, had he not been obliged to defend his own dominions against a neighbouring prince who then made an invasion. This afforded that general a fair pretence of asking leave to return home; promising to come with such reinforcements as would enable the king of Congo to revenge himself for the affront put upon him by the Angolic monarch. His real intention, however, was, to give the king of Portugal an opportunity of seizing upon the kingdom of Angola.

On his return to Lisbon, the Portuguese general having laid his plan before the king, it was so well relished, that an armament was ordered to be fitted out, well furnished with every necessary for building fortresses, &c. and a sufficient number of men. The wind proving favourable all the way back, the Portuguese soon arrived safe at Loanda San Paulo; whence the general dispatched a messenger to acquaint the king of Congo with his arrival, and to make him some rich presents. These were no sooner gone than the admiral sailed up the Coanza; and, landing without opposition in the kingdom of Angola, set about erecting a fortress in a convenient situation, which was completed in a few days. The king being informed of the return of the Portuguese, and of their fortifying themselves, gathered together a numerous army: but his forces, though upwards of 100,000 in number, were utterly defeated by the Portuguese; vast numbers were killed, and many more carried into slavery. The admiral now ravaged the whole country, putting all to fire and sword, and making himself master of every advantageous spot of ground. The king, however, had still the good luck to escape all the stratagems that were laid for him; and once more got safe to his inaccessible fortress.

All this time *Bandi Angola* had himself tyrannized, and allowed his favourites to tyrannize, in such a manner, that his subjects were become no less weary of his government than when they formerly revolted. Being now exasperated beyond measure at the calamitous war of which he had been the occasion, they formed a design of putting an end to his life; and, in order to draw him out of his retreat, where he wallowed in all manner of debauchery, they had recourse to the following stratagem: A deputation was sent, acquainting him with the revolt of one *Cuculo Cabazzo*; who, at the head of a numerous band, committed the most cruel ravages. They besought his majesty, either to levy a sufficient number of troops, and march in person against him, or to allow them to arm themselves against him. The credulous king complied with this last proposal; and granted them leave to raise what forces might be thought

thought necessary. Four days after, notice was sent to the king, that his subjects had attacked the rebels, and had been repulsed with loss; but that, if his majesty would but condescend to animate them with his presence, the sight of him would inspire them with such courage, that they would assuredly prove victorious. This had the desired effect; and the king set out a few days after, without any other precaution than his own guards, to head his army, which was encamped on the banks of the Lucalla. He no sooner appeared in view, than the chief officers came out to meet him; and having, under pretence of paying their respects, gradually separated him from his guards, they fell upon him and dispatched him at once.

Bandi Angola was succeeded by his son Ngola Bandi, whose mother had been a slave, and whose title to the crown was consequently disputable, according to the laws of the country. Of this the new king being well apprised, thought proper to begin his reign by murdering every person who had opposed his election. He began with the *ten-dula*, or commander of the king's rear-guard; who, by his office, is the chief of the electors, and the person who governs the kingdom during the interregnum. Him he ordered to be put to death, with all his family. These were followed by the principal officers of his father's court; all his concubines, together with their parents and near relations, whom he caused to be butchered; together with his half-brother, his father's son by a favourite concubine, and then but an infant. He did not spare even the son of his sister Zingha Bandi, whom she had by one of her paramours. The interest of his sister had contributed greatly to raise this tyrant to the throne; and his ingratitude, with the murder of her son, so exasperated her, that she swore to be revenged on him in the same way.

The Portuguese were the next objects of his resentment. These he so much dreaded on account of their valour and policy, that he immediately declared war, resolving not to lay down his arms till he had exterminated them to the last man, or driven them totally out of his dominions. His rashness, however, cost him dear. Myriads of the Angolic troops were overthrown by a handful of Portuguese; and the king himself was forced to fly, first into the island of Chiconda, in the river Coanza, and then into the deserts of Oacco. Here his conquerors, out of great clemency, allowed him to live among the wild beasts, without any other sustenance than what the deserts afforded. He had the misfortune also to lose his queen, and two sisters, Cambi and Fungi, who were taken prisoners by the Portuguese. The king, being informed of this, sent an embassy to treat of their ransom, and an exchange of prisoners. The proposal was readily agreed to; and the princesses were sent back laden with presents. The king, however, refused to perform his part of the agreement, and thereby plunged himself into still greater difficulties. A new Portuguese viceroy being arrived about this time, Ngola was quite at a loss how to excuse the non-performance of his part of the treaty. At last he had recourse to his exasperated sister Zingha; and having excused, as well as he could, the murder of her son, proposed to send her on a splendid embassy to the viceroy. Having consented, but without forgetting her resentment, she set out, as plenipotentiary for the king of Angola, with a magnificent retinue, was received with all the honour due to her rank, and lodged in a splendid palace prepared for her.

At the first audience Zingha had of Don John (the Portuguese viceroy), she was surprised to find a stately elbow-chair prepared for him to sit upon, and for herself only a rich tapestry spread on the floor, with a velvet cushion embroidered with gold, and placed over against the chair of state. Dissembling her displeasure, however, she beckoned to one of the ladies of her retinue, commanded her to lay herself down on her elbows and knees upon the carpet, and sat herself upon her back during the whole time of the audience. She behaved with such address and dignity, as to gain the admiration of the whole council. A proposal was made of entering into an alliance offensive and defensive

with the king of Angola, provided he acknowledged himself the vassal of the king of Portugal, and submitted to pay a yearly tribute. To this Zingha replied, that such conditions were indeed fit to be imposed upon those who had been conquered by the sword; but not upon a great and powerful monarch, who only sought their friendship and alliance: upon which the treaty was concluded on both sides, without any other conditions than the exchange of prisoners.

Zingha was so taken with the honours done her by the Portuguese, and so intent upon observing the order, dress, arms, &c. of their troops, that she staid at Loanda a considerable time; during which she was instructed in the Christian religion, and consented to be baptised. Don John and his spouse were the sponsors; who dismissed her soon after, with all possible honours, and highly satisfied with her reception and success. At her return, she took care to have the articles ratified by her brother, who expressed his approbation of them, and the highest obligations to her. He even went so far as to desire the viceroy to send him some proper persons to instruct him in the Christian religion, which he said he was very desirous of embracing. This request was immediately granted; and Don Denis de Faria, a negro priest, a native of Angola, was dispatched, with an officer of distinction, to stand godfather to the king. These met at first with a gracious reception; but, when they came to talk of baptism, Ngola altered his mind, and told them it was too much below his dignity to receive it from the son of one of his slaves, and sent them both back.

As no experience seems to have been a sufficient antidote against the innate folly of Ngola Bandi, he soon after took it into his head to make war on the Portuguese, and invaded some of their territories. This last action proved his ruin: his troops were all cut off, and himself forced to swim for his life to a small island in the Coanza, whither the Portuguese pursued and surrounded him; so that he had no other chance, but either to fall into their hands, or be devoured by wild beasts, with which the place swarmed. From both these dangers he was relieved by a dose of poison, given him, as was supposed, by his sister Zingha. Before this time, however, he had taken care to send his eldest son to the country of the Giagas, and put him under the care of one of their chiefs, called *Giaga Caza*, whom he besought to take care of him, and protect him from his aunt Zingha, as he rightly imagined she would not fail of attempting his life, in order to secure herself on the throne. Zingha Bandi was crowned queen of Angola in 1627. She was a very artful woman, endowed with great presence of mind, firm in her resolutions, of an intrepid courage, and a great mistress in the art of dissimulation. She inherited a jealous and cruel temper, to which she would not hesitate to sacrifice her nearest relations, if they gave her the least umbrage. To this jealousy, therefore, she resolved to sacrifice her nephew, because he had a better title to the crown than herself. She made use of the most solemn oaths to draw him out of the hands of his guardian, protesting that she had accepted of the throne with no other view than to preserve it for him. But Giaga, her brother, being well acquainted with her temper, was proof against all her oaths and fair speeches. Zingha, finding this method ineffectual, pretended a desire of resigning the crown to her nephew, to which she said she had no other objection, than that she was afraid he was yet incapable of assuming the reins of government. She therefore desired an interview with him, though ever so short, that she might satisfy herself in this particular, and promised to detain him no longer than Giaga should think necessary. Giaga thought there could be no danger in consenting to a short interview; and therefore sent the unfortunate prince to her, attended by a magnificent retinue. The cruel queen no sooner got him in her power, than she murdered him with her own hand, and caused his body to be thrown into the Coanza, ridding herself, by that inhuman act, of a dangerous rival, as well as revenging herself on her brother,

as she had sworn to do, for the murder of her son. Zingha's next scheme was to rid herself of the Portuguese, who had established themselves in such a manner as to be almost entire masters of Angola. They had built fortresses on every convenient spot that suited them, especially near her principal towns, which they could level with the ground with the greatest ease. They had engrossed all her commerce, were become very wealthy, and their numbers increased daily; so that they were dreaded not only by her subjects, but by all the neighbouring nations. As Zingha was of a martial temper, she did not long hesitate. She quickly made all necessary provisions, strengthened herself by alliances with the Giagas, and other idolatrous nations, and even with the Dutch, and the king of Congo. With this combined force she attacked the Portuguese so suddenly and unexpectedly, that she gained some advantages over them; and the Dutch made themselves masters of San Paulo de Loando, and soon after of some of the best provinces in the kingdom.

Zingha's successes, however, proved but short lived. Her allies, the Congoes, were so completely overthrown, that they were forced to sue for peace; which the Portuguese did not grant till they had obtained a sufficient number of hostages, and obliged the Congoes to deliver up to them some considerable posts, upon which they immediately erected fortresses. Zingha's troops were now defeated in every quarter; and these defeats followed one another so close, that she was soon abandoned, not only by her allies, but by her own troops. She was also constrained to abandon her dominions, and retire to some of the eastern deserts, whither the Portuguese did not think it worth while to follow her. Zingha being reduced to this distress, the Portuguese, after giving her some time to ruminate on her situation, sent her proposals of peace, upon condition that she should become tributary to the crown of Portugal. This proposal she rejected with scorn; and let them know, that, however her dastardly subjects might sullenly and shamefully behave towards them, their queen disdained subjection to any foreign power. On this haughty answer the Portuguese, to mortify her still more, set up a king in her place. The person they pitched upon was named *Angola Oarij*, or *Aaru*, who was of the royal family. Before he was crowned, the Portuguese obliged him to turn Christian; and he was accordingly baptised by the name of John. The new king, however, soon died of grief, at seeing himself so hardly treated by his masters the Portuguese. They quickly set up another, named Philip; who bore the yoke with more patience, and lived to the year 1660.

In the mean time Zingha, exasperated at seeing herself deprived of eleven of the best provinces in her dominions, and her authority in the remaining six greatly weakened, renounced the Christian religion, to which she had become a profelyte, and embraced all the horrid customs of the Giagas, whom she outdid even in their own barbarity. In eating human flesh, Zingha not only joined them, but took pleasure in devouring the raw flesh of human victims, and drinking the blood while warm, both at her sacrifices and at her public meals. She affected a martial and heroic spirit, together with an utter aversion to the male sex; but, according to the Portuguese, maintained a number of the strongest and lustiest youths, in whose embraces she sometimes indulged her inclinations, and managed matters with such secrecy that her intrigues could not easily be discovered. At the same time she ordered many of her own sex to be ripped up, when their incontinency was manifested by their pregnancy; and their bodies, with those of the infants, to be cast to wild beasts. But what made her most admired, as well as dreaded, by her subjects, was a notion that she had by various stratagems inculcated among them, of her being able to penetrate into the most secret thoughts. To keep up their apprehension, she ordered the bones of her deceased brother to be brought from the island where he was poisoned, locked up in a

chest covered with coarse plates of silver, and laid on a fine carpet upon a pedestal. A number of singhillos, or priests, were ordered to offer sacrifices to the bones, and to keep lamps continually burning before them. To this place she herself frequently repaired, to assist at those rites, which, as she gave out, and every body believed, engaged the spirit of the deceased to inform her of every thing that was done, said, or even designed, either in the kingdom or out of it. To procure, however, as much real intelligence as possible, she kept vast numbers of spies all over the kingdom, who constantly gave her notice of what happened in their respective circles; and this she so cunningly improved to her own ends, that her subjects looked upon her as a kind of deity from whom nothing could be concealed.

By these means, Zingha gained such authority over the Giagas, that they were ready, at the very first indication of her will, to follow her through the most dreadful dangers, and to engage in the most desperate enterprizes. She now made many strenuous and daring efforts to drive out the Portuguese; but though she had, in all probability, more valour and skill than her enemies, the fire-arms gave them such an advantage, that she was always defeated with great loss. Perceiving, therefore, the folly of attempts of this kind, she contented herself with making continual inroads into their country, carrying off or destroying every thing that fell in her way. Though she spared neither Europeans nor blacks, who were subjects of the mock-monarchs set up by the Portuguese, yet the case of the former was peculiarly dreadful when they happened to be taken prisoners. They were either roasted by a slow fire, or had their flesh cut off in pieces, and devoured before their faces, in the manner related by Dr. Bruce of the Abyssinian oxen. In this manner she infested the Portuguese territories for twenty-eight years, scarce ever allowing them a moment's cessation of arms. Their mock-kings were often obliged to shelter themselves from her fury in an inaccessible rock, called *Maopongo*; and they themselves could never hope to enjoy their dominions with any kind of peace so long as this furious queen continued alive. They in vain attempted either to reduce her by force, or to mollify her by presents. The one she rejected with disdain, and always found means to baffle the other. Nor would she hearken to any terms, unless they consented to resign all their conquests. The refusal of this demand was so commonly followed by some marks of her resentment, that it was with the utmost difficulty the Portuguese could prevail on any body to carry their proposals to her; and, as for Zingha, she disdained to make any to them, except those of the hostile kind. The terror of her arms procured her a free passage wherever she directed her course; all the inhabitants of a province making no less haste to abandon than she to invade it. Thus she continued to advance, till she reached the small island of Dangii, in the river Coanza. The Portuguese now found themselves under a necessity of raising an army of negroes to oppose her. Accordingly they surrounded the island, and intrenched themselves along the banks on both sides of the river; but, while they were busy at their work, Zingha attacked them with such advantage, that she killed and wounded several hundreds of the blacks, and some of the white men. Elated with this advantage, she was preparing for another attack; when she perceived, to her surprise, that the Portuguese had drawn their lines so close, and raised them to such a height, that they overlooked her whole camp, and could fire upon her at pleasure. Thus great numbers of her men were cut off, particularly her chief officers. The queen, perceiving the danger of her situation, amused the Portuguese with proposals of an accommodation; and, having obtained a truce for three days, crossed the river in the dead of the night, and led her forces to the province of Oacco. The next morning, the Portuguese, seeing no human creature upon the island, began to apprehend some new stratagem; but, upon land-

ing some of their troops, they perceived themselves overreached, and deprived of the fairest opportunity they ever had of forcing her to surrender at discretion.

Zingha staid no longer in the province whither she had retired than till she was assured that the Portuguese had quitted the Coanza; and then, crossing the river once more, she marched directly to the kingdom of Metamba, which had been invaded by some of the neighbouring princes. The speed with which she led her forces hither, and recruited her army with multitudes of Giagas, who were all emulous of fighting under her banner, quickly enabled her to recover some of her territories in that kingdom. Beginning now to think herself successful, she again attacked the Portuguese; but was defeated with great loss, so as to be obliged to send for fresh troops. To complete her misfortune, she received news that the Giaga Cassangi had taken the advantage of her absence, to enter her kingdom with a numerous army, had carried off the greatest part of the inhabitants, destroyed the fruits of the earth, plundered the towns of all that was valuable, and set fire to the rest, leaving that kingdom in a manner desolate. To add to all this, her troops, exasperated at the loss of their wives, children, and goods, which were carried to the farthest corner of Benguela, were all on the point of revolting.

Notwithstanding these disasters, Zingha behaved with such resolution and address, that the Portuguese, who, according to character, had probably instigated the Giaga against her, were so much afraid of her joining with him in alliance against them, that they dispatched Anthony Coglio, a learned priest and an excellent negotiator, with Don Gaspar Borgia, an eminent officer, under pretence of negotiating a peace between them, first to the Giaga, and afterwards to the queen. They met with a very civil reception from the first, who told them, that he was very willing to live at peace with that prince, and even to let her enjoy the kingdom of Metamba, though he was the rightful heir to it, provided she would lay down her arms. This answer encouraged the priest to try whether he could prevail on him to embrace the Christian religion; but this was declined by the Giaga in such strong terms, that the priest thought proper to desist, and set out for Zingha's camp. The ambassadors, at their first arrival, met with such a polite reception, as made them hope for success; but, after she had heard their proposals, she assumed a haughty tone, and told them, in the conclusion of her speech, "That it did not become her dignity to lay down her arms till she had brought the war to an honourable conclusion; that, as to the Giagas, whose sect she had embraced some years before, and who had furnished her with such a prodigious number of forces to fight in her defence, her honour and interest required that she should still keep them in her service, and under her protection; and lastly, that, as to herself, she remembered, indeed, that she had formerly embraced Christianity; but that it was not now a proper season to propose her returning to it; and they ought to remember, that they themselves were the cause of her abandoning it."

Borgia, perceiving that she was not to be wrought upon by religious motives, shifted his plan, and told her, that she had gained honour enough in war, and that it was now high time to think of granting peace and tranquillity to the subjects of two such powerful kingdoms, and accept of the favour and friendship of the king of Portugal, which was offered her by his viceroy. To this the queen made answer, that she was perfectly well acquainted with the valour and strength of the Portuguese, and should esteem it an honour to be allied to that monarch; but that she thought it just, that their respective claims to the dominions which she inherited from her ancestors, and of which he had unjustly deprived her, should first of all be decided, either by the sword, or by some equitable judges. Borgia, vainly imagining that he had now obtained enough, set off immediately for Loanda San Paulo; but left the priest, on some pretence or other, to see whether, in the time of sickness, he could make any impression on the inflexible

mind of Zingha, who now laboured under a lingering disease. Coglio, however, found all his arts to no purpose; and, upon the queen's recovery, she recommenced the war with more fury than ever. Hostilities were carried on with various success; Zingha being sometimes victorious, and sometimes defeated. In one attempt of the latter kind, before the fortrefs of Massangana, she not only lost a great number of men, but had her two sisters, Cambi and Fungi, taken prisoners, she herself escaping with the utmost difficulty. Exasperated by this loss, she led her troops into some of the best provinces of the Portuguese, and reduced them to a mere wilderness. Still, however, she had the mortification to find her losses vastly greater than what she gained; and she had also the additional misfortune of losing her sister Fungi, who was put to death by the Portuguese for treachery, and seeing her allies, the Dutch, totally expelled out of Angola.

Zingha, being thus oppressed with a complication of misfortunes, and conscious of the crimes she had committed, began seriously to consider whether such a continued series of disasters was not owing to the displeasure of the God of the Christians. To this opinion she seemed to have inclined; and therefore began to treat with more lenity such Christians as fell into her hands, especially if they were priests or monks. To these she now began to listen with some attention; and ordered them, under severe penalties, to be treated with all possible respect; yet without losing in the least that invincible hatred she had conceived against those who had stripped her of her dominions, or dropping her resolution never to make peace till she had recovered them. The viceroy, Don Salvador Correo, who had driven out the Dutch, being apprised of the regard shewn to the clergy by Zingha, thought proper to send some capuchins to her, in hopes that they might now find her more tractable. But Zingha was still proof against her utmost art; observing, however, that, if they would consent to restore what they had unjustly taken from her, she would not only return to the Christian religion, but encourage it to the utmost of her power.

The viceroy, afraid that Zingha might make an alliance against him with the king of Congo, first raised a powerful army, and then acquainted that monarch, that, if he designed to prevent the total ruin of his dominions, he must immediately make reparation for all the damage he had caused to the Portuguese by his alliance with the Dutch. The fame of the Portuguese valour so intimidated the king, that he submitted to a treaty almost on the viceroy's own terms; and, as soon as this treaty was concluded, Don Ruy Pegado, an old experienced officer, was dispatched to Zingha, offering a firm and lasting alliance with her, provided she renounced the Giagan sect, and returned to the bosom of the church. To this embassy she returned the old answer, namely, that the Portuguese themselves had been the occasion of all that had happened; as they had not only stripped her of her hereditary dominions, but dared to proclaim one of her vassals king of Angola; but, provided these dominions were restored, she would immediately embrace Christianity.

All this time the furious Zingha went on with her ravages, notwithstanding the viceroy importuned her with letters for near three years. At last he had recourse to the artifice of taking advantage of the remorse of her crimes with which Zingha was sometimes affected, in order to procure the peaceable enjoyment of his own ill-gotten conquests. It is easy to see, that had this viceroy, or the priests he employed, really intended to convert Zingha to Christianity, they ought to have so far set her an example, as at least to abandon part of the countries of which they had robbed her. But, instead of this, they impiously made use of the sacred name of religion, in order to deter a poor savage African from recovering what justly belonged to her. Zingha, however, at last became so much inclined to return to the Christian religion, that a general murmur ran through her army. But having, by various artifices, reconciled the minds of her subjects to this event, she ex-
plained

plained her design in an animated speech; offering at the same time liberty to those who chose to abandon her on this account to go where they would: and such was their attachment to her, that even in such a sudden and important change in her resolutions they expressed no uneasiness, but on the contrary applauded her to the highest degree.

The Portuguese, after having been harrassed in a terrible manner for twenty-eight years, began now freely to enjoy the fruits of their conquests. A treaty was set on foot between the viceroy and Zingha; which, however, was not easily concluded. She demanded the release of her sister Cambi, whose Christian name was Donna Barbara. This princess was received by Zingha in a very affectionate manner: and, some time after, the queen was not only thoroughly reconciled to the Portuguese, but looked upon them as her best friends. She encouraged the Christian religion; had a church built in her capital; made several laws against Paganism; and, to encourage marriage, she herself wedded a handsome young fellow in the seventy-fifth year of her age.

The Portuguese now proposed to her the following terms, as the basis of a lasting treaty between the two nations: 1. That they should yield to her, *as a present*, some of the countries of which they had already robbed her. 2. That in consideration of the said present, which should in no wise be interpreted as an investiture, the queen should pay yearly a certain acknowledgment to the king of Portugal, who should be at liberty to withdraw the said present whenever she failed of making the said acknowledgment. 3. That a free commerce should be opened between those two states, as well for slaves as for other merchandizes. 4. That the queen should molest none of the lords that were feudatory to the Portuguese, whatever damages and ravages they might have committed during the late wars between them. 5. That she should restore all the Portuguese slaves that had taken refuge in her dominions. 6. That she should deliver up the Giaga Colanda, who had revolted from the Portuguese, upon condition that his crime should go unpunished.

The queen, having now a thorough view of the avarice and ambition of those with whom she had to do, conceived such displeasure against the Portuguese, that she fell sick. During this sickness, father Anthony, her chief confidant, and a creature of the viceroy, never ceased from soliciting her to make her peace with God, and to accept the terms offered her by the Portuguese; but Zingha, though worn out with age and sickness, had still the good sense to perceive, that there was no connection between making her peace with God and complying with such infamous terms; and therefore gave the following answer, which under such circumstances, shews a magnanimity scarcely equalled in any age or in any country: 1. That, as to her conversion, as it was neither owing to any desire of obtaining a peace, or other worldly motives, but the Divine Grace by which she was recalled, she was resolved to persevere in it to her last breath. 2. That, as to her going over to the Giagan sect, she had in a great measure been forced to it by the Portuguese viceroy. 3. That the king of Portugal would do a generous act in restoring some of her Angolic dominions; but it would be more so, were he to restore them all. 4. That, as to her paying homage to him, neither her mind nor heart were base enough to consent to it; and that, as she had refused the proposal while she lived among the Giagas, much more did she think herself above it now she was a Christian queen, and owed neither tribute nor homage to any but to the Supreme Power, from whom she had received both her being and her kingdom. That, nevertheless, if she could be convinced that there was any thing in her dominions that would be acceptable to his Portuguese majesty, she would voluntarily make him a present of it; and, as to the rest of the articles, such was her desire of making a firm and lasting peace with them, that she should make no difficulty of consenting to them.

This answer was not altogether satisfactory to the viceroy; but the priest, finding it impossible to make any impression upon her mind, easily prevailed upon him to consent to the following terms: 1. That the river Lucalla should be the boundary between the dominions of the Portuguese and of queen Zingha. 2. That neither side should thenceforth give any reception to the fugitive slaves of the other, but send them back without delay, together with the prisoners which had been taken during the last war. 3. That the queen should remain wholly free and exempt from all tribute and homage whatever, provided she agreed to the other articles.

These terms were at last signed by the queen, and ratified by the king of Portugal. The only difficulty the queen had concerning this treaty was with regard to the Giaga Colanda: and the manner in which she extricated herself from it, with her subsequent behaviour, cannot fail to give us an high idea of the mental abilities of this African heroine.

This Giagan chief, weary of the Portuguese yoke, had retired at the head of 1000 soldiers, and a much greater number of slaves, some leagues beyond the river Lucalla, and put himself under the queen's protection. This she readily granted, as he was very able to be serviceable to her in case the perfidious conduct of the Portuguese should oblige her to renew the war. She could not therefore but look upon it as unjust and dishonourable, to deliver up a brave chief who had devoted himself to her service, and whom she had taken under her special protection, to a nation with whose perfidy she was so well acquainted. To save her honour, therefore, some time before the ratification of the treaty, she sent privately for the Giaga, and acquainted him with the demand of the Portuguese; telling him, at the same time, that though she doubted not of the viceroy's keeping his word, and forgiving his offence, yet she advised him to go out of her dominions, and settle in some distant country from the Portuguese frontiers; but forbade him, on pain of her highest displeasure, to commit the least outrage or hostility within their dominions. The Giaga thanked her, and seemed to acquiesce with her advice, but did not follow it. On the contrary, he had no sooner reached his fortrefs, than he set himself about fortifying it in such a manner as looked rather like defence than defence; and, having gathered a considerable army, soon spread a general terror around him. Of this the Portuguese failed not to complain to the queen; who immediately marched against him, surprised and defeated his army; and, he himself being killed in the action, his head was cut off and sent to the Portuguese.

This was among the last memorable actions performed by this famous queen; who, now finding herself unfit for the fatigues of war, contented herself (in 1658) with dispatching an old experienced general against a neighbouring prince who had invaded her territories. He proved no less successful than herself, and quickly forced the aggressor to submit to her terms. She now gave herself up to study the best method of propagating Christianity among her subjects; and for this purpose sent a solemn embassy to Rome, to pay homage to the pope in her name, and to request a fresh supply of missionaries. To this letter she received an answer from his holiness in 1662; and it was read in the church, that same year, in the most public and solemn manner. The day appointed was the 15th of July; on which she repaired to the church at the head of a numerous retinue, and having the letter hanging about her neck in a purse made of cloth of gold. The concourse was so great, that the church could not contain one half of the people. The father, having finished the mass, read the letter at the altar in the Portuguese language; and the secretary interpreted it in that of the country. The queen, who had stood all the while it was reading, went towards the altar, and on her knees received it from the father: and having kissed it, and sworn afresh upon the gospel to continue in obedience to the church of Rome, kissed the letter again, put it into the purse, and returned to the palace.

lace amidst the shouts and acclamations of many thousands of her subjects. On that day she gave a magnificent entertainment to the Portuguese resident, and to all her court, in two great porticos, and she herself vouchsafed to eat after the European manner; that is, sitting on a stately elbow chair, with a high table before her, covered with the finest linen, and with dishes, plates, knives, and forks, all of silver gilt. She bestowed some largesses upon her chief officers, released a number of slaves, and at night appeared at the head of her ladies of honour, dressed in the Amazonian manner. They performed a kind of combat, in which the queen, though upwards of eighty years of age, behaved with the great vigour and activity of a woman of thirty. Her life, however, was not lengthened in proportion to her vigour and activity: for in the month of September, she was seized with an inflammation in her throat; which, in December, having seized her breast and lungs, she expired on the 17th of that month, and was succeeded by her sister Barbara.

The deceased queen was buried with extraordinary pomp; and, out of regard to her, Barbara was inaugurated a second and third time, with the greatest pomp, and the most joyful acclamations. She was a very zealous Christian, but wanted her sister's abilities, and had the misfortune of being in the decline of life, lame, and almost blind. Besides this, she had been married to a proud ill-natured husband, named *Mona Zingha*; who, though to her he owed all his fortune and advancement, being himself no more than the son of a slave, used her with such cruelty, even in the late queen's life, that she was obliged to take refuge in the palace.

The queen's infirmities, augmented by his cruelty, and daily increasing, soon brought on her death, which happened on the 24th of March, 1666. Upon this, *Mona Zingha* made all possible haste to get himself elected king; and immediately renounced the Christian religion, raising a persecution at the same time against its professors. He even wrote to the Portuguese viceroy, acquainting him with his having renounced Christianity, and with his design to revive the *Giagan* rites. To shew that he meant to be as good as his word, he ordered all the children under six years of age, that could be found, to be sacrificed in honour of their infernal deities. He also recalled the *singhillos*, and heaped many favours upon them; so that they became entirely devoted to his purposes. He likewise caused many of his subjects to be privately poisoned; and then gave out, that their unaccountable deaths were owing to their having abandoned the religion of their ancestors, and embraced Christianity; which he styled the religion of a parcel of famished strangers, who, through their extreme misery, had been forced to leave their native country, and seek for a livelihood in the richest provinces of Africa.

By these and such-like stratagems he almost entirely extirpated Christianity, with every appearance of civilization which had been introduced among his subjects. His career, however, was stopped by Don John the prince's Barbara's first husband, from whom she had been divorced on account of his having another wife. He soon compelled the usurper to fly into an island in the *Coanza*; but, not having the precaution to reduce him entirely, *Mona Zingha* found means to retrieve his affairs, and at last defeated and killed Don John himself, by which he again became master of the throne without any farther opposition. He was no sooner re-established, than he began to pursue his ravages with more fury than ever: when, on a sudden, Don Francisco, the son of Don John, appeared at the head of an army in opposition to the usurper; and, in the first engagement *Mona Zingha* being defeated and killed, Don Francisco became sole master of the empire.

It is not known whether this prince kept to the terms of alliance made by *Zingha* with the Portuguese or not. These, however, have preserved their conquests, and for some time they allowed the natives to choose a king for themselves. These kings enjoy only a mere shadow of

royalty: their whole grandeur consisting in being allowed to breed peacocks, and adorn themselves with their feathers, which was forbidden to their subjects under pain of perpetual slavery. The last of these kings was named *Ngola Sedesio*, who, disliking an empty name of royalty, revolted from the Portuguese, and carried on a long war with them; but, being at last defeated and killed, his head was cut off, salted, and sent to Lisbon in pickle. After this the Portuguese seem not to have thought it safe to trust their Angolic subjects even with the name of a king of their own, but have vested the power entirely in their viceroy; but as to the extent of his dominions, and how matters stand between him and that race of Angolic princes who have preserved their liberty, we are in the dark.

When in its greatest splendour, the kingdom of Angola contained the seventeen following provinces: *Cheffama*, *Sumbi*, *Benguela*, *Rimba*, *Sietta*, *High and Low Bembea*, *Temba*, *Oacco*, *Cabezzo*, *Lubolo*, *Loanda*, *Bengo*, *Danda*, *Mofiche*, *Higher and Lower Ilamba*, *Oraij*, and *Embacca*. The provinces conquered by the Portuguese during the wars above-mentioned were, *Danda*, *Mofiche*, *Bengo*, the *Higher and Lower Ilamba*, *Oraij*, *Embacca*, *Benguela*, *Sietta*, *Cabezzo*, *Lubolo*, and *Oacco*. The principal rivers are the *Danda* and *Coanza*. The *Coanza* is large, deep, and rapid. It empties itself into the Atlantic ocean about lat. 9. 20. S. twelve leagues south of *Loando* the capital of the kingdom. It is navigable for 150 miles, and abounds with a variety of fish. It forms several islands, has some cataracts, and one in particular which bears its name. As for its source, and the length of ground it crosses from east to west before it comes to the Portuguese settlement, it is absolutely unknown, as well as the countries through which it runs. Its mouth, which runs between the capes *Palmerino* and *Lego*, is above a league wide; the northern shore is the deepest, and along which the vessels sail. The fall of this river into the ocean is so rapid, that the sea appears quite muddy for two or three leagues below it. Its mouth is not easily perceived from the open sea, by reason of an island quite covered with high trees which lies just before it. The two principal islands formed by this river are called *Maffander* and *Motchiamia*. The one is six leagues long, and about two miles broad: it is very fertile in maize, millet, and some other grains, which are reaped at three different seasons of the year. It produces likewise vast quantities of manioc, a root, of which they make a coarse kind of meal, which serves instead of bread. Here also grow great numbers of palm and other fruit trees of various kinds. The island of *Motchiamia* is four or five miles long, and one in breadth, mostly plain, and producing a variety of roots and herbs. It likewise abounds in cattle; and there were formerly five or six Portuguese families settled upon it, who carried on a considerable trade in these commodities, and likewise in slaves.

AN'GON, *f.* in the ancient military art, a kind of javelin used by the French. They darted it at a considerable distance. The iron head of this weapon resembled a flower-de-luce. It is the opinion of some writers, that the arms of France are not flowers-de-luce, but the iron point of the angon or javelin of the ancient French.

ANGO'NE, *f.* A nervous sort of quinsy. Vogel defines it to be an acute stopping up of the fauces, without inflammation. He says that the convulsive quinsy, and hyseric suffocation, are its species.

AN'GOR, *f.* A concentration of the natural heat of the body, causing a palpitation of the heart, and anxiety. In the beginning of a fever it is a bad prognostic.

AN'GOT, a province or kingdom of Abyssinia, formerly rich and fertile, but almost ruined by the Gallas, a wandering nation in the internal parts of Africa.

ANGOULE'SME, a town in the department of Charente. It stands on a mountain surrounded with rocks, the river Charente running at the foot of it. It is twenty miles west of Limoges, and 250 south-by-west of Paris. Lat. 45. 39. N. lon. 0. 14. E.

ANGOUMO'IS, late a province of France, now included in the department of Charente. It is hilly, but fertile, has good iron-mines, and excellent paper manufactures.

ANGOU'RA, or ANGORA, anciently ANCY'RA, a town of Naxos, in Asiatic Turkey, remarkable for its remains of antiquity, as inscriptions, pillars, ruins of temples, &c. of porphyry and old marble. The castle, which is as large as a small town, and well inhabited, both by the Christians and Turks, is built of white marble, and stone resembling porphyry, and, throughout the walls of the town, which are low, and those of the houses, which are generally built of unburnt brick, antique fragments are interspersed. The city of Angora is computed to have 100,000 inhabitants in it, 90,000 of whom are Turks; and about 1000 of these are janizaries. Greeks, Armenians, &c. compose the remaining 10,000. The country produces very good red wine, and they have excellent rice on some of the rivers. They have the finest breed of goats here in the world; their hair or wool is quite white, and almost as fine as silk; a great trade is carried on in this article, and the finest stuffs, especially camblets, are made of it. The exports of Angora to Holland, France, and England, are about 1600 camel-loads yearly. It is 212 miles south-east of Constantinople. Lat. 39. 30. N. lon. 32. 5. E.

ANGO'Y, a kingdom of Loango in Africa, bounded on the north by Cacongo, and on the south by Congo; from the former of which it is separated by the river Cabinda, and from the latter by the river Zaire. The country is full of woods and thickets; and has no towns of any note, except one called Bomangoy, situated on the north banks of the Zaire, and not far from its mouth. Its chief port is Cabinda, called also *Kabenda*, or *Cubenda*, situated on the mouth of a river of the same name, about five leagues north of cape Palmerino, on the north side of the Zaire's mouth. The bay is very commodious for trade, or wooding and watering along the shore. It is flat and marshy in some places; but ascends gradually about three miles inland, and then forms itself into a ridge of hills. The town stands on the round point of the bay looking to the westward; and the English have a factory on the south-west of the road. The country round the bay is mostly barren; owing chiefly to the indolence of the inhabitants, which often occasions a scarcity of provisions. The wild beasts swarm in the woods, and destroy all the tame kinds; so that there are no cattle bred here but hogs. The coasts abound so much with oysters, that the sailors quickly load their boats with them. The natives follow the occupation of fishing more than any other. The dress of the inhabitants is the same with that of the Congolese. They allow polygamy, and the best beloved wife hath the command of the rest; but is no less liable to be turned out, if she proves unfaithful.

AN'GRA, a city of Tercera, one of the Azores; the capital, not only of that island, but of all the rest, and the residence of the governor. It is seated on the south side, near the middle of the longest diameter of the island, on the edge of the sea. The harbour is the best in the whole island, being equally secured against storms and the efforts of an enemy. It is of the form of a crescent; the extremities of which are defended by two high rocks, that run so far into the sea as to render the entrance narrow, and easily covered by the batteries on each side. From this harbour the town is said to derive its name, the word *Angra* signifying a creek, bay, or station, for shipping; and this is the only convenient one among all the Azores.

The town is well built and populous, is the see of a bishop, under the jurisdiction of the archbishop of Lisbon. It hath five parishes, a cathedral, four monasteries, as many nunneries, besides an inquisition and bishop's court, which extends its jurisdiction over all the Azores, Flores, and Corvo. It is surrounded by a good wall, a dry ditch of great depth and breadth, and defended by a strong castle, rendered famous by the imprisonment of king Alphonso by his brother Peter in 1668. At Angra are kept

magazines for anchors, cables, sails, and other stores, for the royal navy, or occasionally for merchantmen in distress. All maritime affairs are under the inspection of an officer called *desembargador*, who hath subordinate officers and pilots for conducting ships into the harbour, or to proper watering-places. The English, French, and Dutch, have each a consul residing here, though the commerce of any of these nations with the Azores is very inconsiderable.

ANGRÆ'CUM, *f.* in botany. See EPIDENDRUM.

AN'GRILY, *adv.* In an angry manner; furiously; peevishly.

ANGRIVA'RII, anciently a people of Germany, situated between the Weser and the Ems, and eastward reaching beyond the Weser, as far as the Cherusci, on which side they raised a rampart; to the south, having the Tubantes on the Ems, and on the Weser where it bends to the forest Bacenis; to the west, the Ems and the confines of the Bructeri; and, to the north, the territory of the Angrivarii lay between the Chamavi and Anfibarii. Ptolemy places them between the Canchi and Suevi or Catti. Supposed now to contain a part of the county of Schaumburg, the half of the bishopric or principality of Minden: to the south, the greatest part of the bishopric of Osnabrug, the north part of the county of Teclenburg, and a part of the county of Ravensberg. A trace of the name of the people still remains in the appellation *Engern*; a small town in the county of Ravensberg.

ANGROG'NE, or ANGROG'NA, a mountainous, yet fruitful, community, parish, or township, of Piedmont, through which runs a little river of the same name. It is accessible only at two places from the south and east, and there are retreats among the rocks, where, during the most violent persecutions against the poor Vaudois, their old *bards* (bards), as they are called, or valley-ministers, preached without interruption. Sometimes the valleys of Piedmont are called by the name of Angrogne. The town of Angrogna is seven miles west of Pignerol. Lat. 45. 0. N. lon. 7. 15. E.

AN'GRY, *adj.* Touched with anger; provoked.—Oh let not the Lord be *angry*, and I will speak: peradventure there shall be thirty found there. *Gen.* xviii. 30.—It seems properly to require, when the object of anger is mentioned, the particle *at* before a thing, and *with* before a person; but this is not always observed.—Now, therefore, be not grieved, nor *angry with yourselves*, that ye told me hither: for God did send me before you to preserve life. *Gen.* xlv. 5.—I think it a vast pleasure, that, whenever two people of merit regard one another, so many scoundrels envy and are *angry at them*. *Swift*.—Having the appearance of anger; having the effect of anger.—The north wind driveth away rain: so doth an *angry* countenance a backbiting tongue. *Prov.* xxv. 23.—In chirurgery, painful; inflamed; smarting.—This serum, being accompanied by the thinner parts of the blood, grows red and *angry*; and, wanting its due regrefs into the mass, first gathers into a hard swelling, and, in a few days, ripens into matter, and so dischargeth. *Wiscman*.

ANGUED, a province of Algiers, or rather a desert of Tremecen. Hords or clans of Arabs, and others, live here mostly on plunder, obliging travellers to pay them money for their passports, which are a kind of snail flag at the end of a lance. They have but little corn, and they feed principally on dates, milk, and what wild game they kill. They all ramble or range about the country, without acknowledging any but their own chief, or paying any tribute to the Algerines.

ANGUIL'LA, one of the West-India or Caribbee islands, lying in about 15° N. lat. It has its name from its snake-like form; and is about ten leagues in length and three in breadth. It was first discovered by the English in 1650, when it was filled with alligators and other noxious animals; but they, finding the soil fruitful, and proper for raising tobacco and corn, settled a colony on it, and imported live cattle, which have since multiplied exceedingly. But, the colony not being settled under any public encouragement,

encouragement, each planter laboured for himself, and the island became a prey to every rapacious invader, which disheartened the inhabitants so much, that all industry was lost among them. Their chief suffering was from a party of wild Irish, who landed here after the revolution, and treated them worse than any of the French pirates who had attacked them before. The people of Barbadoes, and other English Caribbees, knowing the value of the soil, several of them removed to Anguilla, where they remained for many years, and even carried on a profitable trade, though without any government, either civil or ecclesiastical. In 1745, their militia, though not exceeding 100 men, defended a breast-work against 1000 French who came to attack them; and at last obliged them to retire with the loss of 150 men, besides carrying off some of their arms and colours as trophies of their victory. Since that time the inhabitants have subsisted mostly by farming; though they still plant sugar, and the island is said to be capable of great improvements.

ANGUILLA'RIA, *f.* in botany. See ARDISIA.

ANGUILIFORM, *f.* an appellation given by zoologists, not only to the different species of eels, but to other animals resembling them in shape.

ANGUINA, *f.* in botany. See CALLA and TRICHOSANTHES.

ANGUINUM OVUM, *f.* a fabulous kind of egg, said to be produced by the saliva of a cluster of serpents, and possessed of certain magical virtues. The superstition in respect to these was very prevalent among the ancient Britons; and there still remains a strong tradition of it in Wales. This wondrous egg seems to have been nothing more than a bead of glass, used by the druids as a charm to impose on the vulgar, whom they taught to believe, that the possessor would be fortunate in all his attempts, and that it would gain him the favour of the great. Our modern druidesses (says Mr. Pennant) give much the same account of the *ovum anguinum*, *glain neidr* as the Welsh call it, or the *adder gem*, as the Roman philosopher does; but seem not to have so exalted an opinion of its powers, using it only to assist children in cutting their teeth, or to cure the chin-cough, or to drive away an ague. These beads are of a very rich blue colour; some plain, others streaked.

AN'GUIS, or SNAKE, in zoology, a genus belonging to the order of amphibia serpentes. The characters of the anguis are these: they are squamous or scaly in the belly and under the tail; without any scuta. There are a number of different species of the anguis:

1. The eryx, a native of Britain and likewise of America, is about a span in length, and about the thickness of a man's finger. One from Scotland, described by Mr. Pennant, was fifteen inches long; tongue broad and forked; nostrils small, round, and placed near the tip of the nose; eyes lodged in oblong fissures above the angle of the mouth; belly of a bluish lead-colour, marked with small white spots irregularly disposed. The rest of the body is of a greyish brown, with three longitudinal dusky lines; one extending from the head along the back to the point of the tail; the others broader, and extending the whole length of the sides. It was entirely covered with small scales; largest on the upper part of the head.

2. The fragilis, blind-worm, or slow-worm: grows to about a foot in length, and to the thickness of a man's little finger; the irides are red, the head is small, and the neck still more slender; from that part the body grows suddenly, and continues of an equal bulk to the tail, which ends quite blunt. The colour of the back is cinerous, marked with very small lines composed of minute black specks: the sides are of a reddish cast; the belly dusky; both marked like the back. The tongue is broad and forked; the teeth are minute, but numerous; the scales small. The motion of this serpent is slow, from which, and from the smallness of the eyes, are derived its name. It resembles the viper in the manner of producing its young, which are put forth alive. It is frequent with us in gar-

dens and pastures, where it lives principally under ground, feeding on worms. Like others of the genus, they lie torpid during winter, and are sometimes found in vast quantities twisted together.

3. The ventralis, or glass-snake of Catesby: has 127 squamæ on the belly, and 223 on the tail. The head is very small, and the tongue of a singular form. The upper part of the body is of a colour blended brown and green, most regularly and elegantly spotted with yellow, the undermost part of which is brightest. The skin is very smooth and shining; with small scales, more closely connected, and of a different structure from those of other serpents. A small blow with a stick will cause the body to separate, not only at the place struck, but at two or three other places, the muscles being articulated in a singular manner quite through to the vertebra. They appear earlier in the spring than any other serpent, and are numerous in the sandy woods of Virginia and Carolina. They are generally said to be harmless.

4. The jaculus, or dart-snake: is about three hand-breadths long, and about the thickness of one's little finger. Its colour is a milky grey on the back, variegated with small black spots like so many eyes; and on the belly it is perfectly white. The neck is wholly black; and from that two milk-white streaks run all the way along the back to the tail: the black spots also are each surrounded with a small circle of white. It has its name from its vibrating its body in the manner of a dart. It is a native of Egypt, Libya, and the islands of the Mediterranean.

5. The quadrupes: the body of this species is cylindrical, with fourteen or fifteen longitudinal ash-coloured streaks; the teeth are extremely small; it has no ears: the feet are at a great distance from each other, very short, with five toes and small nails; but the toes are so minute, that they can hardly be numbered. Native of Java.

6. The meleagris: is a native of the Indies; it has small teeth, but no ears.

7. The colubrina: an inhabitant of Egypt, is beautifully variegated with pale and yellow colours.

8. The maculata: a native of America, is yellow, and interspersed with ash-coloured lines on the back; the head is small in proportion to the body.

9. The reticulata: a native of America, has brownish scales, with a white margin.

10. The cerasus: with 200 squamæ on the belly and fifteen on the tail, is a native of Egypt.

11. The lumbricalis: a native of America, has 250 squamæ on the belly and seven on the tail; its colour is a yellowish white.

12. The platyura: the head is oblong and without teeth; the body is about a foot and a half long, black above and white below; the tail is about one ninth of the length of the animal, much compressed or flattened, and variegated with black and white; the scales are roundish, small, not imbricated, but they cannot be numbered.

13. The laticauda: a native of Surinam; the tail is compressed, acute, pale, with brownish belts.

14. The scytale: a native of the Indies, with 220 squamæ on the belly and thirteen on the tail. The head is small and oval, and the eyes are little: the body is cylindrical, about a foot and a half long, covered with oval obtuse scales: the tail is thick and obtuse like the head; its colour is white, interspersed with brownish rings; the margins of the scales are of an iron colour; and the top of the head is blue. According to Linnæus, none of this genus are poisonous.

ANGUEL'LES, *f.* with falconers, small worms cast up by sick hawks.

ANGUISH, *f.* [*angoisse*, Fr. *angor*, Lat.] Excessive pain either of mind or body; applied to the mind, it means the pain of sorrow, and is seldom used to signify other passions:

Perpetual *anguish* fills his anxious breast,
Not slopt by business, nor compos'd by rest;

No mule cheers him, nor no feat can please. *Dryden.*

ANGUISHED,

AN'GUISHED, *adj.* Seized with anguish; tortured; excruciatingly pained. Not in use.

AN'GUILUM SENECTÆ, *f.* called also *exuvie*. The skins of serpents that are cast in spring; the slough or cast skin of a snake is as good. A decoction of it boiled in wine is said to cure deafness, pain in the ears, &c.

AN'GULAR, *adj.* Having angles or corners; cornered. Consisting of an angle.—As for the figure of crystal, it is for the most part hexagonal, or six-cornered, being built upon a confused matter, from whence, as it were from a root, *angular* figures arise, even as in the amethyst and baltates. *Brown*.

ANGULARITY, *f.* The quality of being angular, or having corners.

ANGULARLY, *adv.* With angles or corners.—Another part of the same solution afforded us an ice *angularly* figured. *Boyle*.

AN'GULARNESS, *f.* The quality of being angular.

AN'GULATED, *adj.* Formed with angles or corners.—Topazes, amethysts, or emeralds, which grow in fissures, are ordinarily crystallized, or shot into *angulated* figures; whereas, in the strata, they are found in rude lumps, like yellow, purple, and green, pebbles. *Woodward*.

ANGULO'SITY, *f.* Angularity; cornered form.

AN'GULOUS, *adj.* Hooked; angular.—Nor can it be a difference, that the parts of solid bodies are held together by hooks, and *angulus* involutions; since the coherence of the parts of these will be of as difficult a conception. *Glanville*.

ANGU'RIA, *f.* [*αγγύριον*, Gr. a vessel.] In botany, a genus of the monoeceia diandria class, and ranking in the natural order of cucurbitaceæ. The generic characters are—*I.* Male flowers. Calyx: monophyllous, quinquefid, swelling at the base; divisions lanceolate, short. Corolla: pentapetalous, spreading, growing to the border of the calyx. Stamina: filaments two, opposite, inserted into the calyx; anthera creeping up and down. *II.* Female flowers. Calyx and corolla: as in the male. Stamina: filaments as in the male, but no antheræ. Pistillum: germ inferior oblong; style semibifid; stigmas bifid, acute. Pericarpium: a pome oblong, quadrangular, bilocular. Seeds: very many, oval, compressed, nestling.—*Essential Character.* Male. Calyx, five-cleft; corolla five-petalled. Female. Calyx, five-cleft; corolla, five-petalled; pome inferior, two-celled, many-seeded.

Species. 1. *Anguria trilobata*: leaves three-lobed. This plant has a very shining appearance. The leaves are alternate, large, and three-lobed; the lobes oblong, acuminate, flat, entire, except that they have a few toothlets on the edge; the outer ones usually have a blunt appendicle with a terminating toothlet, resembling the rudiment of a fourth and fifth lobe. Tendrils the length of the leaves. Peduncles of the male flowers solitary from the axils, long, and bearing at the end about twenty subaggregate, sessile, inodorous, beautiful, vermilion-coloured, flowers, opening successively. They are perfectly those of the next species, except that the petals are more round. Jacquin had not an opportunity of observing the female flowers. Native of Carthage in South America, and flowers in June.

2. *Anguria pedata*: leaves pedate, serrate. This is a perennial plant, climbing trees by means of long tendrils to the height of twenty feet. Flowers inodorous, with orange-coloured petals. Fruits an inch in length, the thickness of the middle finger, green with longitudinal white streaks, and shining. Seeds white. Plumier's figure has male and female flowers on the same plant. Jacquin has always found them on different plants: and yet, from the analogy which this genus bears to cucumbers, he suspects that the *anguria* may sometimes be monoecious, as Plumier has represented it. Native of St. Domingo, and flowers in September. The fruit is ripe in December.

3. *Anguria trifoliata*: leaves ternate, quite entire. This differs, in having the leaves quite entire, and narrower; and several fruits collected together. Native of St. Domingo. See *CUCURBITA*.

AN'GUS, a shire of Scotland, sometimes called Forfar, from the name of the county-town, is bounded on the north by Aberdeenshire, on the north-east by Kincardineshire, on the east by the German ocean, on the south by the frith of Tay, and on the west by Perthshire. Its length and breadth are nearly equal, about thirty-five miles. It has many lakes and hills, with quarries of slate and freestone, mines of lead and iron ore; the lower grounds are fertile in corn and pasture; and, along the coast, the salmon-fishery is very extensively carried on. The principal rivers are the North and South Esk.

ANGU'ST, *adj.* [*angustus*, Lat.] Narrow; strait.

ANGUSTA'TION, *f.* The act of making narrow; straitening: the state of being narrowed.—The cause may be referred either to the grumousness of the blood, or to obstruction of the vein somewhere in its passage, by some *angustation* upon it by part of the tumour. *Wesman*.

ANGUSTICLA'VIA, *f.* in Roman antiquity, a tunica embroidered with little purple studs. It was worn by the Roman knights, as the *laticlavus* was by the senators.

AN'HALT, an island of Denmark, in North Jutland, lying in the Categat, eight miles from the coast of Jutland, ten from Zealand, and seven from Holland. It is dangerous for seamen, for which reason there is a light-house.

ANHALT, a principality of Germany, in the circle of Upper Saxony, is a long narrow tract, situated betwixt the rivers Elbe and Saal, about ninety miles in length from east to west, but of unequal breadth, the greatest being on the east side, which is but thirty-five miles. The house of Anhalt, from whence the electors of Saxony and Brandenburg are said to derive their original, is a very ancient and honourable family. The best genealogists deduce their origin from Berenthobaldus, who made war upon the Thuringians in the sixth century: it has produced many princes who make a great figure in the German history. Joachim Ernest, who died in 1586, left five sons, who divided the principality among them. All of them having children, and being of equal authority, they unanimously agreed to submit to the eldest of the family, who has the supreme government, which is *Anhalt-Deffau*. The others are, *Anhalt-Bernburg*, *Anhalt-Schaumburg*, *Anhalt-Coethen*, and *Anhalt-Zerbst*. The Saxons acknowledge that the inhabitants of these little independent sovereignties live in the land of milk and honey. These petty princes possess lands sufficient for their expences, the revenues being reckoned at about half a million of dollars. The tax on lands is four per cent. which, rating them at twenty years purchase, is not quite one shilling in the pound. Upon an emergency the subjects are able to raise half a million extraordinary. The towns in these little states are not so numerous in proportion to the extent of country as Saxony, but they are better peopled. It is bounded on the S. by the county of Mansfeld, on the W. by the duchy of Halberstadt, on the E. by the duchy of Saxony, and on the N. by the duchy of Magdeburg. It abounds in corn, and is watered by the Salde and Mulda; its principal trade is in beer.

ANHALT-WATER. It is in the Brandenburg Dispensatory, and is the *sp. vini rect.* distilled from turpentine, and twelve or thirteen other ingredients of the aromatic kind; but a more elegant spirit of this kind may be obtained by mixing a proper quantity of the essential oils of rosemary, lavender, sage, or other such like, with the common oil of turpentine, and then distilling them. This water is an excellent cordial.

ANHELA'TION, *f.* [*anhele*, Lat.] The act of panting; the state of being out of breath. A shortness of breath, or a difficult and small, but quick, respiration, which happens to sound persons, especially fat people, and valetudinarians, after strong exercise. In fevers, dropsies, asthmas, pleurifies, &c. there is always an *anhelitus*. To express this, Hippocrates often uses the word *pneuma*. But this amongst the chemists signifies smoke, and also horse-dung; this last is termed also, when hot, *cancinpericon*.

ANHELO'SE, *adj.* [*anhelus*, Lat.] Out of breath; panting; labouring of being out of breath.

A'NIAN, the name of a strait formerly supposed to lie between the north-east of Asia and the north-west of America; but now found to exist only in imagination.

ANIAN is also the name of a barren sandy desert lying on the east coast of Africa. It is so excessively hot and otherwise inhospitable, that it contains but very few inhabitants, except some wandering Arabs who live in camps.

ANIBA, *f.* in botany. See CEDROTA.

ANICE'TON, *f.* An epithet for a plaster ascribed to Crito, and so called because it was an infallible remedy for the acores.

ANIEN'TED, *adj.* [*ancantir*, Fr.] Frustrated; brought to nothing.

ANIGRI'DES, nymphs, who inhabited the banks of the river Anigrus. They had a cave where those afflicted with a leprosy, or any other cutaneous disease, entered, and sacrificed to those nymphs; after which they swam over the river, and left all their impurities behind them.

ANI'GRUS, a river of Thessaly, where the Centaurs washed the wounds they had received from Hercules, and made the waters unwholesome.

ANJEN'GO, a small town and factory, with a fort, on the coast of Malabar, in the peninsula on this side the Ganges, belonging to the East-India company. The fort is small, but neat and strong: it is a square with four bastions, having eight guns mounted on each, carrying a ball of 18 pounds. Two of these bastions face the sea, the other two the country. Besides these, there is a line of eighteen or twenty guns pointing towards the sea, of 18 and 24 pounders. About pistol-shot from the back of the fort runs a river, which, besides being a security to the factory, adds much to the agreeable situation of the place. This river has its source in some distant mountains; and, descending in a course from the north and east, it afterwards turns in several pleasing meanders so far to the west as to wash the bottom of our factory's garden, and at last, winding to the south, it empties itself into the sea. This settlement supplies our East-India company with pepper: and its situation is also very convenient for giving proper intelligence to our ships touching here from Europe, or from any part of India. Lat. 7. o. N. lon. 76. 1. E.

ANIL, *f.* in botany. See INDIGOFERA.

ANILENESS, or AN'ILITY, *f.* [*anilitas*, Lat.] The state of being an old woman; the old age of women.

ANIMA, *f.* among divines and naturalists, denotes the soul, or principle of life, in animals. See SOUL.

ANIMA, among the old chemists, denoted the volatile or spirituous parts of bodies.

ANIMA HEPATIS, is an obsolete name for the *ferrum vitriolatum*, or salt of iron, on account of its supposed efficacy in diseases of the liver.

ANIMA MUNDI, i. e. the *soul of the world*; a certain pure ethereal substance or spirit, diffused, according to many of the ancient philosophers, through the mass of the world, informing, actuating, and uniting, the divers parts thereof into one great, perfect, organical, and vital, body or animal. They add, that this anima mundi, which more immediately resides in the celestial regions as its proper seat, moves and governs the heavens in such manner, as that the heavens themselves first received their existence from the fecundity of the same spirit; for that this anima, being the primary source of life, every where breathed a spirit like itself, by virtue whereof various kinds of things were framed conformable to the divine ideas.

ANIMA SATURNI, a white powder obtained by pouring distilled vinegar on litharge, of considerable use in enamelling. See ENAMEL.

ANIMABLE, *adj.* That which may be put into life, or receive animation.

ANIMADVER'SION, [*animadversio*, Lat.] Reproof; severe censure, blame.—He dismissed their commissioners

with severe and sharp *animadversions*, Clarendon. Punishment. When the object of *animadversion* is mentioned, it has the particle *on* or *upon* before it.—When a bill is debating in parliament, it is usual to have the controversy handled by pamphlets on both sides; without the least *animadversion upon* the authors. Swift. In law, An ecclesiastical censure, and an ecclesiastical *animadversion*, are different things; for a censure has a relation to a spiritual punishment, but an *animadversion* has only a respect to a temporal one; as, degradation, and the delivering the person over to the secular court. Ayliffe. Perception; power of notice: not in use.—The soul is the sole percipient which hath *animadversion* and sense, properly so called. Glanville.

ANIMADVER'SIVE, *adj.* That has the power of perceiving; percipient: not in use.—The representation of objects to the soul, the only *animadversive* principle, is conveyed by motions made on the immediate organs of sense. Glanville.

ANIMADVER'SIVENESS, *f.* The power of animadverting, or making judgment.

TO ANIMADVERT', *v. n.* [*animadverto*, Lat.] To pass censures upon.—I should not *animadvert* on him, who was a painful observer of the decorum of the stage, if he had not used extreme severity in his judgment of the incomparable Shakespeare. Dryden. To inflict punishments. In both senses with the particle *upon*.—If the Author of the universe *animadverts upon* men here below, how much more will it become him to do it upon their entrance into a higher state of being? Grew.

ANIMADVERTER, *f.* He that passes censures, or inflicts punishments.—God is a strict observer of, and a severe *animadverter upon*, such as presume to partake of those mysteries, without such a preparation. South.

ANIMAL, *f.* [*animal*, Lat.] A living creature corporeal, distinct, on the one side, from pure spirit; on the other, from mere matter. Animals are such beings, which, besides the power of growing, and producing their like, as plants and vegetables have, are endowed also with sensation and spontaneous motion.

ANIMAL, *f.* in natural history, an organized and living body, which is also endowed with sensation: thus, minerals are said to grow or increase, plants to grow and live, but animals alone to have sensation. It is this property of sensation that is deemed the essential characteristic of an animal; and by which the animal and vegetable kingdoms seem to be so materially separated. Those naturalists, who have supposed the distinction between animals and vegetables to consist in any thing else, have found themselves greatly embarrassed; and have generally agreed, that it was extremely difficult, if not impossible, to settle the boundaries between the animal and vegetable kingdoms. But this difficulty will be easily seen to arise from their taking the characteristic marks of the animal kingdom, from something that was evidently common to both. Thus Boerhaave attempted to distinguish an animal from a vegetable, by the former having a mouth, which the latter has not: but here, as the mouth of an animal is only the instrument by which nourishment is conveyed to its body, it is evident that this can be no essential distinction, because vegetables also require nourishment, and have instruments proper for conveying it into their bodies; and, where the end is the same, a difference in the means can never be essential. The fixing the difference in an animal's having a gula, stomach, and intestines, as is done by Dr. Tyson, is as little to the purpose.

The power of moving from one place to another, hath by many been thought to constitute their principal difference; and indeed, in most cases, it is the obvious mark by which we distinguish an animal from a vegetable; but Lord Kames hath given several very curious instances of the locomotive power of plants; some of which, as he says, would do honour to an animal. Upon the slightest touch, the sensitive plant shrinks back, and folds up its leaves, similar to a snail; which, on the slightest touch,

retires within its shell. If a fly perch upon one of its flower-leaves, it closes instantly, and crushes the insect to death!

Plants in general, when forced from their natural position, are endowed with a power to restore themselves. A hop-plant, twisting round a stick, directs its course from south to west, as the sun does. Untwist it, and tie it in the opposite direction, it dies. Leave it loose in the wrong direction, it recovers its natural direction in a single night. Twist a branch of a tree, so as to invert its leaves; if left in any degree loose, it untwists itself gradually, till the leaves be restored to their natural position. What better can an animal do for its welfare? A root of a tree, meeting with a ditch in its progress, is laid open to the air. What follows? It alters its course like a rational being, dips into the ground, undermines the ditch, rises on the opposite side to its wonted distance from the surface, and then proceeds in its original direction. Place a wet sponge near a root laid open to the air, the root will direct its course to the sponge. Change the place of the sponge, the root varies its direction. Thrust a pole into the ground at a moderate distance from a scandent plant, the plant directs its course to the pole, lays hold of it, and rises on to its natural height. A honeysuckle proceeds in its course till it be too long for supporting its weight, and then strengthens itself by shooting into a spiral. If it meets with another plant of the same kind, they coalesce for mutual support; the one screwing to the right, the other to the left. If a honeysuckle twig meets with a dead branch, it screws from the right to the left. The claspers of briony shoot into a spiral, and lay hold of whatever comes in their way for support. If, after completing a spiral of three rounds, they meet with nothing, they try again for further support by altering their course.

M. Buffon, who appears almost to confound the animal and vegetable kingdoms, denies sensation to be any essential distinction. "Sensation," says he, "more essentially distinguishes animals from vegetables: but sensation is a complex idea, and requires some explication. For, if sensation implied no more than motion consequent upon a stroke or an impulse, the sensitive-plant enjoys this power. But if, by sensation, we mean the faculty of perceiving and comparing ideas, it is uncertain whether brute animals are endowed with it. If it should be allowed to dogs, elephants, &c. whose actions seem to proceed from motives similar to those by which men are actuated, it must be denied to many species of animals, particularly to those which appear not to possess the faculty of progressive motion. If the sensation of an oyster, for example, differed only in degree from that of a dog, why do we not ascribe the same sensation to vegetables, though in a degree still inferior? This distinction, therefore, between the animal and vegetable, is neither sufficiently general nor determined. From this investigation, we are led to conclude, that there is no absolute and essential distinction between the animal and vegetable kingdoms; but that nature proceeds, by imperceptible degrees, from the most perfect to the most imperfect animal, and from that to the vegetables; and the fresh-water polypus may be regarded as the last of animals and the first of plants.

It were to be wished, that philosophers would on some occasions consider, that a subject may be dark as well on account of their inability to see, as when it really affords no light. This great author boldly concludes, that there is no essential difference between a plant and an animal; because we ascribe sensation to an oyster, and none to the sensitive-plant: but we ought to remember, that, though we cannot perceive a distinction, it may nevertheless exist. Before M. Buffon, therefore, had concluded in this manner, he ought to have proved that some vegetables were endowed with *sensation*.

It is no doubt, however, as much incumbent on those who take the contrary side of the question, to prove that vegetables are not endowed with sensation, as it was incumbent on M. Buffon to have proved that they are. But

a little attention will shew us, that the difficulty here proceeds entirely from our inability to see the principle of sensation. We perceive this principle in ourselves, but no man can perceive it in another. Why then does every individual of mankind conclude, that his neighbour has the same sensations with himself? It can only be from analogy. Every man perceives his neighbour formed in a manner similar to himself; he acts in a similar manner on similar occasions, &c. Just so it is with brute animals. It is no more doubtful that they have sensations, than that we have them ourselves. If a man is wounded with a knife, for instance, he expresses a sense of pain, and endeavours to avoid a repetition of the injury. Wound a dog in the same manner, he will also express a sense of pain; and, if you offer to strike him again, will endeavour to escape, before he feels the stroke. To conclude here, that the action of the dog proceeded from a principle different from that of the man, would be absurd and unphilosophical to the last degree.

We must farther take notice, that there are sensations essentially distinct from one another; and, in proportion as an animal is endowed with more or fewer of these different species, it is more or less perfect as an animal; but, as long as only one of them remains, it makes not the least approach to the vegetable kingdom; and, when they are all taken away, is so far from becoming a vegetable, that it is only a mass of dead matter. The senses of a perfect animal, for instance, are five in number. Take away one of them, suppose sight, he becomes then a less perfect animal; but is as unlike a vegetable as before. Suppose him next deprived of hearing, his resemblance to a vegetable would be as little as before; because a vegetable can neither feel, taste, nor smell; and we suppose him still to enjoy those three senses. Let us, lastly, suppose him endowed only with the sense of feeling, which, however, seems to include that of taste, and he is no more a vegetable than formerly, but only an imperfect animal. If this sense is then taken away, we connect him not with the vegetable kingdom, but with what M. Buffon calls *brute-matter*. It is to this kingdom, and not to the vegetable, that animals plainly approximate as they descend. Indeed, to suppose an approximation between the vegetable and animal kingdoms, is very absurd; for, at that rate, the most imperfect animal ought to be the most perfect plant; but we observe no such thing. All animals, from the highest to the lowest, are possessed of vegetable life; and that, as far as we can perceive, in an equal degree, whether the animal life is perfect or imperfect: nor doth there seem to be the smallest connection between the highest degree of vegetation and the lowest degree of sensation. Though all animals are possessed of vegetable life, these two seem to be as perfectly distinct and incommensurate to one another, as any two things we can possibly imagine.

The power of vegetation, for instance, is as perfect in an onion or leek, as in a dog, an elephant, or a man; and yet, though you threaten a leek or an onion ever so much, it pays no regard to your words, as a dog would do; nor, though you wound it, does it avoid a second stroke. It is this principle of self-preservation in all animals, which, being the most powerful one in their nature, is generally taken, and with very good reason, as the true characteristic of animal life. This principle is undoubtedly a consequence of sensation; and, as it is never observed to take place in vegetables, we have a right to say that the foundation of it, namely, *sensation*, belongs not to them. There is no animal, which makes any motion in consequence of external impulse where danger is threatened, but what puts itself in a posture of defence; but no vegetable whatever does so. A muscle, when it is touched, immediately shuts its shell; and, as this action puts it in a state of defence, we conclude that it proceeded from the principle of self-preservation. When the sensitive-plant contracts from a touch, it is no more in a state of defence than before; for whatever would have destroyed it in its expanded state will also do it in its contracted state. The motion

tion of the sensitive-plant proceeds only from a certain property called *irritability*; and which, though our bodies possess it in an eminent degree, is a characteristic neither of animal nor vegetable life, but belongs to us in common with brute-matter. It is certain, that an electrified silk-thread shews a much greater variety of motions than any sensitive-plant. If a bit of silk-thread is dropped on an electrified metal-plate, it immediately erects itself, spreads out the small fibres like arms, and, if not detained, will fly off. If a finger is brought near it, the thread seems greedily to catch at it. If a candle approaches, it clasps close to the plate, as if afraid of it. Why do we not conclude that the thread, in this case, is really afraid of the candle? For this plain reason, That its seeming flight is not to get away from the candle, but to get towards the electrified metal; and, if allowed to remain there, will suffer itself to be burnt without offering to stir. The sensitive-plant, in like manner, after it has contracted, will suffer itself to be cut in pieces, without making the least effort to escape. The case is not so with the meanest animal. An hedge-hog, when alarmed, draws its body together, and expands its prickles, thereby putting itself in a posture of defence. Throw it into water, and the same principle of self-preservation prompts it to expand its body and swim. A snail, when touched, withdraws itself into its shell; but, if a little quick-lime be sprinkled upon it, so that its shell is no longer a place of safety, it is thrown into agonies, and endeavours to avail itself of its locomotive power in order to escape the danger. In muscles and oysters, indeed, we cannot observe this principle of self-preservation so strongly as in more perfect animals: but, as we observe them constantly to use the means which nature has given them for self-preservation, we can have no reason to think they are destitute of that principle upon which it is founded.

But there is no need of arguments drawn from the inferior creation. We ourselves are possessed both of the animal and vegetable life, and certainly must know whether there is any connection between vegetation and sensation or not. We are conscious that we exist; that we hear, see, &c. but of our vegetation we are absolutely unconscious. We feel a pleasure, for instance, in gratifying the calls of hunger and thirst; but of the process by which our aliment improves our growth and vigour, we are altogether ignorant. If we, then, who are more perfect than other vegetables, are utterly insensible of our own vegetable life, why should we imagine that the less perfect vegetables are sensible of it?

Thus we may easily give M. Buffon a reason why we ascribe sensation to an oyster, and none to a vegetable, namely, because we perceive the vegetable do nothing but what is also performed in our own bodies, without our having the least sensation of it; whereas an oyster puts itself in a defensive posture on the approach of danger; and, this being an action similar to our own upon a like occasion, we conclude that it proceeds from the same principle of sensation. Here it may also be observed, that, though the inferior animals are deficient in the number, they are by no means so in the acuteness, of their sensations; on the contrary, though a muscle or an oyster is probably endowed with no other sense than that of feeling, yet this sense is so exquisite, that it will contract upon the slightest touch, such as we should be altogether insensible of ourselves.

ANIMAL-FLOWER, in zoology, a name given to several species of animals belonging to the genus *actinia*. The grand argument for animal life in vegetables, was originally inferred from the curious construction of the *actinia* genus; viz. the *sea-anemone*, *sea-sun-flower*, *fresh-water polypus*, &c. which having indeed the external form and figure of vegetables, with scarcely any progressive motion, might easily deceive superficial observers; but, when more minutely examined, the polypus, and all the *actinia* class, turn out to be absolute animals; the heads or mouths of which, when open, resemble a full-blown flower, whence

they are called *flower-fish*. There is one species of them, which the purest white, carmine, and ultramarine, are scarce sufficient to express their brilliancy. The bodies of some of them are hemispherical, of others cylindrical, and of others shaped like a fig. Their substance likewise differs: some are stiff and gelatinous, others fleshy and muscular; but all of them are capable of altering their figure when they extend their bodies and claws in search of food. They are found on many of the rocky coasts of the West-India islands, and on some parts of the coast of England. They have only one opening, which is in the centre of the uppermost part of the animal; round this are placed rows of fleshy claws: this opening is the mouth of the animal, and is capable of great extension. The animals themselves, though exceedingly voracious, will bear long fasting. They may be preserved alive a whole year, or perhaps longer, in a vessel of sea-water, without any visible food; but, when food is presented, one of them will successively devour two muscles in their shells, or even swallow a whole crab as large as a hen's egg. In a day or two the crab-shell is voided at the mouth, perfectly cleared of all the meat. The muscle-shells are likewise discharged whole, with the shells joined together, but entirely empty, so that not the least particle of fish is to be perceived on opening them. An anemone of one species will even swallow an individual of another species; but, after retaining it ten or twelve hours, will throw it up alive and uninjured. Through this opening also it produces its young ones alive, already furnished with little claws, which, as soon as they fix themselves, they begin to extend in search of food. One of the extremities of the sea-anemone exactly resembles the outward leaves of that flower; while its limbs are not unlike the flag or inner part of it. By the other extremity it fixes itself, as by a sucker, to the rocks or stones lying in the sand; but it is not totally deprived of the power of progressive motion, as it can shift its situation, though very slowly.

A peculiar species of animal-flowers, called the *clustered animal-flower*, has been found in some of the West-India islands, an account of which was published in the Philosophical Transactions, vol. 57, by Mr. Ellis, in a letter to Lord Hillsborough. This compound animal, which is of a tender fleshy substance, consists of many tubular bodies, swelling gently towards the upper part, and ending like a bulb or very small onion. On the-top of each is its mouth, surrounded by one or two rows of tentacles, or claws, which when contracted look like circles of beads. The lower part of all these bodies has a communication with a firm fleshy wrinkled tube, which sticks fast to the rocks, and sends forth other fleshy tubes, which creep along them in various directions. These are full of different sizes of these remarkable animals, which rise up irregularly in groups near to one another. This adhering tube, that secures them fast to the rock, or shelly bottom, is worthy of our notice. The knobs are formed into several parts of it by its insinuating itself into the inequalities of the coral rock, or by grasping pieces of shells, part of which still remain in it, with the fleshy substance grown over them. This shews us the instinct of nature, that directs these animals to preserve themselves from the violence of the waves, not unlike the anchoring of muscles, by their fine silken filaments that end in suckers; or rather like the shelly basis of the serpula, or worm-shell, the tree-oyster, and the slipper-barnacle, &c. whose bases conform to the shape of whatever substance they fix themselves to, grasping it fast with their testaceous claws, to withstand the fury of a storm. When we view the inside of this animal dissected lengthwise, we find a little tube leading from the mouth to the stomach, from whence there rise eight wrinkled small guts in a circular order, with a yellowish soft substance in them; these bend over in the form of arches towards the lower part of the bulb, from whence they may be traced downwards, to the narrow part of the upright tube, till they come to the fleshy adhering tube, where some of them may be perceived entering into the papilla,

papilla, or the beginning of an animal of the like kind, most probably to convey it nourishment until it is provided with claws; the remaining parts of these slender guts are continued on in the fleshy tube, without doubt for the same purpose of producing and supporting more young from the same common parent.

The abbé Dicquemarre, by many curious, though cruel, experiments, related in the Philosophical Transactions for 1773, has shewn that these animals possess, in a most extraordinary degree, the power of reproduction; so that scarcely any thing more is necessary to produce as many sea-anemones as we please, than to cut a single one into as many pieces. A sea-anemone being cut in two by a section through the body, that part, where the limbs and mouth are placed, ate a piece of a muscle offered to it soon after the operation, and continued to feed and grow daily for three months after. The food sometimes passed thro' the animal; but was generally thrown up again, considerably changed, as in the perfect sea-anemone. In about two months, two rows of limbs and a mouth were perceived growing out of the part where the incision was made. On offering food to this new mouth, it was laid hold of and eaten; and, the limbs continually increasing, the animal gradually became as perfect as those which had never been cut. In some instances, however, when one of these creatures was cut through, new limbs would be produced from the cut place, those at the mouth remaining as before; so that a monstrous animal was the consequence, having two mouths, and feeding at both ends.

Under a large hollow cliff, in the island of Barbadoes, where the sea flows up, and forms a basin, there is a fixed stone or piece of rock in the middle, which is always under water. Round its sides, at different depths, seldom exceeding eighteen inches, are seen, at all times of the year, issuing out of little holes, certain substances that have the appearance of fine radiated flowers, of a pale yellow, or bright straw colour, slightly tinged with green, having a circular border of thick-set petals, about the size of, and much resembling, those of a single garden-marigold, except that the whole of this seeming flower is narrower at the discus, or setting on of the leaves, than any flower of that kind. Mr. Hughes, in his History of Barbadoes, gives the following curious account of them: "I have attempted to pluck one of these animal-flowers from the rock, to which they are fixed; but never could effect it: for, as soon as my fingers came within two or three inches of it, it would immediately contract its yellow border, and shrink back into the hole of the rock; but, if left undisturbed for about four minutes, it would come gradually in sight, expanding, though at first very cautiously, its seeming leaves, till at last it appeared in its former bloom. However, it would again recoil, with a surprising quickness, when my hand came within a small distance of it. Having tried the same experiment by attempting to touch it with my cane, and a small slender rod, the effect was the same. But, though I could not by any means contrive to take or pluck one of these animals entire, yet I cut off (with a knife which I had held for a long time out of sight, near the mouth of a hole out of which one of these animals appeared) two of these seeming leaves. These, when out of the water, retain their shape and colour; but, being composed of a membrane-like substance, surprisingly thin, they soon shrivelled up, and decayed." The reproductive power of the Barbadoes animal-flower is prodigious. Many people coming to see these strange creatures, and occasioning some inconvenience to a person through whose grounds they were obliged to pass, he resolved to destroy the objects of their curiosity; and, that he might do so more effectually, he caused all the holes out of which they appeared, to be carefully bored and drilled with an iron instrument, so that we cannot suppose but their bodies must have been entirely crushed to a pulp; nevertheless, they again appeared in a few weeks in still greater abundance, from the very same places.

The sea-carnation, or animal-flower, found among the rocks at Hastings in Sussex, is very similar to the animal-flower of Barbadoes. This animal adheres by its tail, or sucker, to the under-part of the projecting rocks opposite the town; and, when the tide is out, has the appearance of a long white fig; which is also the form of it when put into a glass of sea-water.

The *fresh-water polypus* is also of a similar species, and of a cylindrical figure, but variable, with very long tentacula, or claws. There is scarcely an animal in the world more difficult to describe; it varies its whole form at pleasure, and is frequently found beset with young in such a manner, as to appear ramose and divaricated; these young ones adhering to it in such a manner as to appear parts of its body. When simple, and in a moderate state as to contraction or dilatation, it is oblong, slender, pellucid, and of a pale-reddish colour; its body is somewhat smaller towards the tail, by which it affixes itself to some solid body; and larger towards the other extremity, where it has a large opening, called its mouth, around which are the tentacula, or claws, which are eight in number, and are usually extended to about half the length of its body. By means of these tentacula, or arms, as they are commonly called, expanded into a circle of more than half a foot diameter, the creature feels every thing that can serve it for food; and, seizing the prey with one of them, calls in the assistance of the others, if necessary, to conduct it to its mouth. The production of its young is different from the common course of nature in other animals; for the young one issues from the side of its parent in the form of a small pimple, which, lengthening every hour, becomes, in about two days, a perfect animal, and drops from off its parent to shift for itself; but what is still more surprising, is the reproduction of its several parts when cut off; for, when cut into a number of separate pieces, it becomes in a day or two so many distinct and separate animals; each piece having the property of producing a head and tail, and the other organs necessary for life, and all the animal functions.

There is no distinguished place in the body of the polypus, from whence the young are brought forth; for they spring out like shoots or branches of a tree, from all the exterior parts of their bodies. They are always to be found in clear slowly-running waters, adhering by the tail to sticks, stones, and water-plants, and live on small insects. What were originally taken for feet, have since been called its horns, and of late more properly its arms, their office being to catch its prey. With these little arms, which are capable of great extension, it seizes minute worms, and various kinds of water-insects, and brings them to its mouth; and, like the sea-anemone, often swallows bodies larger than itself; having a surprising property of extending its mouth wider, in proportion, than any other animal. After its food is digested in its stomach, it returns the remains of the animals upon which it feeds through its mouth again, having no other observable excretory. In a few days there appear small knobs or papillæ on its sides: as these increase in length, little fibres are seen rising out of the circumference of their heads, as in the parent animal; which fibres they soon begin to use, for the purpose of procuring nourishment, &c. When these are arrived at mature size, they send out other young ones on their sides in the same manner; so that the animal branches out into a numerous offspring, growing out of one common parent. Each of these provides nourishment not only for itself, but for the whole society; an increase of the bulk of one polype by its feeding, tending to an increase in the rest. Thus a polype of the fresh-water kind becomes like a plant branched out, or composed of many bodies, each of which has this singular characteristic, that, if one of them be cut in two in the middle, the separated part becomes a complete animal, and soon adhering to some fixed base, like the parent from which it was separated, produces a circle of arms; a mouth is formed in the centre; it increases in bulk, emits a numerous

merous progeny, and is soon, in every respect, as perfect an animal as that from which it was severed.

In the annexed plate we have given an exact representation of these curious animals. Fig. 1, represents the fresh-water polype, with its tentacula or arms extended upwards. Fig. 2, shews the same animal, with its young branching from it, and putting out their claws for food. Fig. 3, represents the animal carnation-flower of the rocks near Hastings in Suffex, with its tentacles extended in search of food. Fig. 4, is an exact view of the sea-anemone. Fig. 5, shews the head of the animal-flower of Barbadoes. Fig. 6, is a brilliant display of the sea-flower animal, with its innumerable tentacles expanded to catch its prey, which being allured to it by its elegant appearance, they close instantly upon it, and convey it to the interior concavity or mouth. Fig. 7, represents a cluster of the animal-flower described by Mr. Ellis, in the West-India islands, in which *a* shews one of the animals stretching out its tentacles in quest of food. Fig. 8, is a perpendicular dissection of one of the same animals, in order to shew the gullet, intestines, stomach, and fibres or tendons, that move the claws.

ANIMAL-LIFE. See LIFE.

ANIMAL-MAGNETISM. See MAGNETISM.

ANIMAL-OECONOMY. See PHYSIOLOGY.

ANIMAL-SYSTEM, denotes the whole class of beings endowed with animal life, otherwise called ANIMAL-KINGDOMS.

ANIMALS, the preparations of, for collections or museums. See BIRDS, and ZOOLOGY.

Pairing of ANIMALS. See PAIRING.

ANIMAL, *adj.* That which belongs or relates to animals. *Animal-functions*, distinguished from *natural* and *vital*, are the lower powers of the mind, as the will, memory, and imagination. *Animal-life* is opposed, on one side, to *intellectual*, and, on the other, to *vegetable*. *Animal* is used in opposition to *spiritual* or *rational*; as, The *animal* nature.

ANIMALCULE, *f.* A diminutive of the word *animal*; that is, they are such little creatures as require to be viewed through glasses, to discern them distinctly. Rain, as soon as it falls, contains many animalcules, but snow still more; the dew on glass windows is full of them. In boiled water they retain their shape, and sometimes revive. The animalcules get in shoals in the fluid they swim in, and, if disturbed, they separate as fish in a pond, and will be many hours before they are collected together. They follow their liquor in which they swim to the last drop, and then, for want of it, they seem to struggle and die; after their apparent death, put water to them, and they revive. When seemingly dead they are very flat, but, if not past regain, they soon recover their plumpness. Animalcules chuse the surface of liquors, probably for the want of air. Dip a needle-point into the oil of vitriol, then into a drop of liquor in which these animalcules are, and they instantly spread about to evade the acid, and soon drop down dead. If the needle is dipped in a solution of common salt, or in the tincture of salt of tartar, the same is observed to follow. Sugar, urine, and blood, speedily destroy them. Default, and some others, endeavour to prove that all diseases are owing to animalcules; but it does not appear, that any animal substance contains animalcules until it becomes putrid, and then these are the effect rather than the cause of diseases.

These little animals are so different from those of the larger kinds, that scarce any sort of analogy seems to exist between them; and one would almost be tempted to think that they lived in consequence of laws directly opposite to those which preserve ourselves and other visible animals in existence. They have been systematically arranged by O. F. Muller; though it is by no means probable that all the different classes have yet been discovered. Such as have been observed, however, are by this author divided in the following manner; and a few of the most curious of them are represented in the annexed plate, exactly as they appear through the microscope.

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I. Such as have no external organs.

1. Monas: Punctiforma. A mere point.
2. Proteus: Mutabilis. Mutable.
3. Volvox: Sphæricum. Spherical.
4. Enchylis: Cylindracea. Cylindrical.
5. Vibrio: Elongatum. Long.
- * Membranaceous.
6. Cyclidium: Ovale. Oval.
7. Paramecium: Oblongum. Oblong.
8. Kolpoda: Sinuatum. Sinuous.
9. Gonium: Angulatum. With angles.
10. Burfaria. Hollow like a purse.

II. Those that have external organs.

* Naked, or not inclosed in a shell.

1. Cercaria: Caudatum. With a tail.
2. Trichoda: Crinitum. Hairy.
3. Kerona: Corniculatum. With horns.
4. Himantopus: Cirratum. Cirrated.
5. Leucopha: Ciliatum undique. Every part ciliated.
6. Vorticella: Ciliatum apice. The apex ciliated.
- * Covered with a shell.
7. Brachionus: Ciliatum apice. The apex ciliated.

I. MONAS. This is defined to be "an invisible (to the naked eye), pellucid, simple, punctiform, worm;" but of which, small as it is, there are several species. 1. The *monas termo*, or *gelatinosa*, is a small jelly-like point, which can be but imperfectly seen by the single microscope, and not at all by the compound one. In a full light they totally disappear, by reason of their transparency. Some infusions are so full of them, that scarce the least empty space can be perceived; the water itself appearing composed of innumerable globular points, in which a motion may be perceived somewhat similar to that which is observed when the sun's rays shine on the water; the whole multitude of animals appearing in commotion like a hive of bees. This animal is very common in ditch-water, and in almost all infusions of animal or vegetable substances. 2. *Monas atomus*, or *albida*; white monas with a variable point: this appears like a white point, which through a high magnifier appears somewhat egg-shaped. The smaller end is generally marked with a black point, the situation of which is variable; sometimes it appears on the large end, and sometimes there are two black spots in the middle. This species was found in sea-water, which had been kept through the whole winter, but was not very fetid. 3. *Monas punctum*, or *nigra*, black monas: this was found in a fetid infusion of pears, and appears in form of a very minute, opaque, and black point, moving with a slow and wavering motion. 4. *Monas ocellus*, transparent like talc, with a point in the middle: this is found in ditches covered with conserva, and sometimes with the cyclidium milium; the margin of it is black, with a black point in the middle. 5. *Monas lens*, or *hyalina*; of a talcy appearance: this is found in all kinds of water; sometimes even in that which is pure, but always in the summer-time in ditch-water. It is found also in all infusions of animal or vegetable substances, whether in fresh or salt water; myriads being contained in a single drop. It is found likewise in the filth of the teeth. It is nearly of a round figure, and so transparent, that it is impossible to discover the least vestige of intestines. They generally appear in clusters, but sometimes singly. These and the animalcules of the first species are so numerous, that they exceed all calculation even in a very small space. 6. *Monas mica*, marked with a circle: this is found in the purest waters, and may be discovered with the third lens of the single microscope when the magnifying power is increased. It appears like a small lucid point, but can assume an oval or spherical shape at pleasure; sometimes the appearance of two kidneys may be perceived in its body. It seems encompassed with a beautiful halo, which is thought to be occasioned by the vibration of fine invisible hairs. It has a variety of motions, and

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often turns round for a long time in the same place. 7. The *tranquilla*, or egg-shaped transparent monas with a black margin: is found in urine which has been kept for some time. Urine in this state acquires a scum in which the animalcules reside; but, though kept for several months, no other species was found in it. A drop of urine is usually fatal to other animalcules, though this species is to be met with in no other substance. 8. The *lamellula*, or flat transparent monas, is most usually found in salt-water: is of a whitish colour and transparent, more than twice as long as it is broad, with a dark margin, having a vacillatory motion, and frequently appearing as double. 9. The *pulvisculus*, or monas with a green margin: these are generally found in marshy grounds, in the month of March. They appear like small spherical grains of a green colour, sometimes in clusters, from three to seven or more in number, having a wavering kind of motion. 10. The *uva*, or transparent gregarious mona, is found in a variety of infusions, and is of that kind which multiplies by dividing itself. They appear in clusters of four, five, or sometimes many more; the corpuscles being of various sizes, according to the number collected into one group. The smaller particles, when separated from the larger, move about with incredible swiftness.

II. The PROTEUS: an invisible, very simple, pellucid worm, of a variable form. 1. The *diffusus*, branching out in a variety of directions: it is very rare, and only met with in fens; appearing like a grey mucous mass, filled with a number of black globules, and continually changing its figure, pushing out branches of different lengths and breadths. The internal globules divide immediately, and pass into the new-formed parts, always following the various changes of the animalcule; which changes seem to proceed entirely from the internal mechanism of its body, without the aid of any external power. 2. The *tenax*, running out into a point: this is a pellucid gelatinous body, stored with black molecules, and likewise changing its figure, but in a more regular order than the former. It first extends itself in a straight line, the lower part terminating in a bright acute point. It appears to have no intestines; and, when the globules are all collected in the upper part, it next draws the pointed end up towards the middle of the body, which assumes a round form. It is found in river-water, and goes through a vast number of different shapes. When it is alarmed, it suddenly draws in its neck, represented in the plate, fig. 1. and 2. transforming itself into the shape represented at fig. 3. when it becomes more opaque, and moves about very slowly, with the large end foremost. When it has continued some time in this posture, it will often, instead of the head and neck it had formerly, put forth a new one, with a kind of wheel-machinery, represented at fig. 4. the motions of which draw a current of water to it from a considerable distance. Having often pulled in and thrust out this short head, sometimes with and sometimes without the wheel-work, the creature, as if weary, will remain motionless for a while; then its head and long neck will be very slowly protruded, as in fig. 5. and it soon resumes its former agility. Sometimes it disposes of its neck and head, as represented in the plate at fig. 6.

III. VOLVOX: an invisible, very simple, pellucid, spherical, worm. 1. The *punctum*, of a black colour, with a lucid point: this is a small globule, with one hemisphere opaque and black, the other having a crystalline appearance, and a vehement motion is observed in the black part. Many are often seen joined together in their passage thro' the water; sometimes moving as in a little whirlpool, and then separating. They are found in great numbers on the surface of fetid sea-water. 2. The *granulum*, is of a spherical figure and green colour, the circumference being bright and transparent: it is found in marshy places about the month of June, and moves but slowly. It seems to have a green opaque nucleus. 3. The *globulus*, with the hinder part somewhat obscure, sometimes verges a little towards the oval in its shape, having a slow fluttering kind

of motion, but more quick when disturbed: the intestines are but just visible; is found in most vegetable infusions, and is ten times larger than the mona lens. 4. The *pilula*, small and round, with green intestines: this is found in water where the lemna minor grows, in the month of December, and has a kind of rotatory motion, sometimes slow and at others quick. There is a small incision on one of the edges of the sphere, which may possibly be the mouth of the creature. 5. The *grandinella*, with immoveable intestines, is much smaller than the last, and marked with several circular lines. Sometimes it moves about in straight line, at others irregularly, and sometimes keeps in the same spot, with a tremulous motion. 6. The *socialis*, with crystalline molecules placed at equal distances from one another: this is found in water where the chara vulgaris has been kept; and has its molecules disposed in a sphere, filling up the whole body of the animalcule; and its motion is sometimes rotatory and sometimes not. 7. The *sphericula*, with round molecules, appears to consist of pellucid homogeneous points of different sizes. It moves slowly from right to left and back again, about a quarter of a circle each time. 8. The *lunula*, with lunular molecules, is a small roundish transparent body, consisting of an innumerable multitude of homogeneous molecules of the shape of a crescent, without any common margin: it moves continually in a twofold manner, viz. of the molecules among one another, and the whole mass turning slowly round. It is found in marshy places in the beginning of spring. 9. The *globator*, or spherical membranaceous volvox, is found in great numbers in the infusions of hemp and tremella, and in stagnant waters in spring and summer; it was first observed and depicted by Leuwenhoeck, but the descriptions of it given by authors differ considerably from each other. The following is that of Mr. Baker: "There is no appearance of either head, tail, or fins: it moves in every direction, backwards, forwards; up or down, rolling over and over like a bowl, spinning horizontally like a top, or gliding along smoothly without turning itself at all; sometimes its motions are very slow, at other times very swift; and when it pleases can turn round as upon an axis very nimbly, without moving out of its place. The body is transparent, except where the circular spots are placed, which are probably its young." 10. The *morum*, with spherical green globules in the centre: this is found amongst the lemna in the months of October and December, and has a slow rotatory motion. The globules seldom move, though a slow quivering motion may sometimes be perceived among them in the centre. 11. The *alva*, composed of green globules not inclosed in any membrane, is found in the month of August, in water where the lemna polyrrhiza grows. It consists of a congeries of greenish-coloured globules, apparently of an equal size, with a bright spot in the middle; the whole mass is sometimes of a spherical form, sometimes oval, without any common membrane: a kind of halo may be perceived round it, and the mass generally moves from right to left. 12. The *vegetans*, terminating in a little bunch of globules: this is found in river-water, in the month of November. It consists of a number of floccose opaque branches invisible to the naked eye; and at the apex of these is a small congeries of very minute oval pellucid corpuscles.

IV. ENCHELIS: A simple, invisible, cylindric, worm. 1. The *viridis*, or green enchelis, has an obtuse tail, the fore-part terminating in an acute truncated angle; the intestines are more obscure and indistinct; it continually varies its motion, turning from right to left. 2. The *punctifera*, having the fore part obtuse, the hinder part pointed. It is opaque, and of a green colour, with a small pellucid spot on the fore part, in which two black points may be seen; and a kind of double band crosses the middle of the body. The hinder part is pellucid and pointed, with an incision, supposed to be the mouth, at the apex of the fore-part. It is found in marshes. 3. The *deses*, or gelatinous enchelis, is found, though rarely, in an infusion of leince,

lemnae, and moves very slowly. The body is round, of a very dark-green, the fore-part bluntly rounded off, and the hinder-part somewhat tapering, but finished with a round end. 4. The *similis*, with moveable intestines, is found in water that has been kept for several months: it is of an egg-shape, and generally moves very quick, either to the right or left. 5. The *ferotina*, with immoveable intestines, is of an oval figure, partly cylindrical, the fore-part smaller than the hind, with a black margin, full of grey vesicular molecules: it moves very slowly. 6. The *nebulosa*, with visible moveable intestines, is found in the same water with the cyclidium glaucoma, but is much more scarce. The body is egg-shaped, the fore-part narrow, and frequently filled with opaque confused intestines. 7. The *feminitum* is found in water that has been kept for some days, and moves by ascending and descending alternately. It is of a cylindrical figure, twice as long as broad. Sometimes it is observed swimming about with the extremities joined together. 8. The *intermedia*, with a blackish margin, is one of the smallest animalcules: it has a transparent body, without any visible intestines. 9. The *ovulum*, is transparent, round, and egg-shaped. A very strong magnifier discovers some long foldings on the surface, with bright molecules. 10. The *pirum*, with the hinder part transparent, has the fore-part protuberant and filled with molecules. The hinder-part is smaller and empty, with moveable molecular intestines. 11. The *tremula* was found in an infusion with the paramæcia aurelia, and many other animalcules. It is among the least of these minute creatures, and is of a cylindrical figure and gelatinous texture. Two of these creatures may at times be seen to adhere together. 12. The *constricta*, with a stricture in the middle, is found in salt-water, and is of a very small size, and of an oval shape. 13. The *elliptica*, with a congeries of green-intestines, is found among the green matter on the sides of vessels in which water has been kept for some time. They are generated in such numbers, that myriads may sometimes be found in one drop. 14. The *fusus*, with both ends truncated, was found in water called pure, and had a languid motion. The body is round and transparent, with the fore and hind parts somewhat smaller than the rest. 15. The *fritillus*, with the fore-part truncated, is found in an infusion of grafs and hay, and runs backward and forward through the drop with a wavering motion. 16. The *caudata*, with a kind of tail, is but seldom met with. The body is grey and transparent, with globular molecules. 17. The *epistomium*, with the fore-part slender and roundish, is among the smaller animalcules. 18. The *gemmata* is found in ditch-water where the lemna thrives. It moves slowly, and generally in a straight line. 19. The *retrograda* moves commonly sideways, and sometimes in a retrograde manner. It has a gelatinous transparent body, thicker in the middle than at the ends. 20. The *festinans*, with obtuse ends, is found in sea-water, and has a quick vacillatory motion from one side to the other. The body is round, and the fore-part transparent. 21. The *farcimen* was found by Joblot in an infusion of blue bottles, moving very slowly in an undulatory manner. The body is cylindrical, about four times as long as broad, and truncated at both ends. 22. The *index* is found in water with the lemna minor; the body opaque, of a grey colour, and long conical shape: the lower end is obtuse, one side projecting like a finger, with two very small projections from the lower end. 23. The *truncus*, with a kind of head, is the largest of this kind of animalcules. The body is grey, long, and mucous; the fore-part globular, the hinder part obtuse; but it can alter its shape considerably. 24. The *larva* is long, round, and filled with molecules. The fore-part is obtuse and transparent, with a kind of neck or small contraction formed near the end. 25. The *spatula*, with the fore-part transparent, and of the shape of a spatula. It is perfectly cylindrical, and crystalline. It moves in a wavering kind of manner, retaining its general form, but moving the spatula in various ways. 26. The *pupula*, with the

fore-part papillary, is found in dunghill water in November and December: it has a rotatory motion on a longitudinal axis, and moves in an oblique direction through the water. 27. The *pupa*, with a small nipple proceeding from the apex, has a very slow motion, and resembles the former.

V. VIBRIO: A very simple, invisible, round, and rather long, worm. 1. The *lineola* is found in most vegetable infusions in such numbers, that it seems to fill up almost the whole of their substance. It is so small, that with the best magnifiers we can discern little more than an obscure tremulous motion among them. 2. The *rugula* is like a bent line; and sometimes draws itself up in an undulated shape, at others moves without bending the body at all. 3. The *bacillus*, equally truncated at both ends, is found in an infusion of hay. It is from six to ten times longer than the monas lens, but much more slender. 4. The *undula*, is a round, gelatinous, undulating line. This is the animal which Leewenhoeck says is less than the tail of one of the feminal animalcules. It never appears straight; but when at rest it resembles the letter V. and when in motion the letter M. It commonly rests on the top of the water. 5. The *serpens*, with obtuse windings or flexures, is found in river-water, but seldom. It is slender, and resembles a serpentine line. 6. The *spirillum* is exceedingly minute, and twisted in the form of a spiral, which seems to be its natural shape, as it never untwists itself. It was found, in 1782, in an infusion of the sonchus arvensis. 7. The *vermiculus* has a milky appearance, with an obtuse apex, and a languid undulatory motion, like that of the common worm. It is found in marshy water in November. It is thought to be the animal mentioned by Leewenhoeck as found in the dung of the frog and spawn of the male libellula. 8. The *intestinum* is found in marshy waters, and has a slow progressive motion. 9. The *bipunctatus* is found in fetid salt-water, and moves slowly, in a straight line. 10. The *tripunctatus* is also transparent and talsey, with both ends tapering. It moves in a straight line, backwards and forwards. 11. The *pavilifer*, or straw-like vibrio, called the hair-like insect by Mr. Baker, consists of a transparent membrane, with yellow intestines, and two or three visible points. The body or middle part, which is nearly straight, appears in some composed of such rings as the windpipe of land-animals, but in others, seems rather scaled, or made up of rings that obliquely cross one another. Its two ends are hooked, or bent, pretty nearly in the same degree, but in a direction opposite to one another; and, as no eyes can be discerned, it is difficult to judge which is the head or tail. Its progressive motion is very singular, being performed by turning upon one end as a centre, and describing almost a quarter of a circle with the other; its shape and form may be seen in the plate, at fig. 7. Its motions are very slow, and require much patience and attention in the observer. These creatures are found in parcels or clusters, as described in the circle, at fig. 8. They arrange themselves in a variety of forms, but generally assume a quadrangular figure. 12. The *lunula*, or bow-shaped vibrio, resembles the moon at its first quarter; it is of a green colour, and has from seven to ten globules disposed in a longitudinal direction. 13. The *verminus* is found in salt-water kept for some days till it becomes fetid. It moves quickly, and with an undulatory motion, backwards and forwards. These animalcules seem to be joined together in a very singular manner. 14. The *malleus* is found in great plenty in spring-water, and is alternately at rest and in motion every moment. 15. The *acus* is in the shape of a sewing needle; the neck round and partly transparent, and marked in the middle with a red point; the tail resembling a fine bristle. 16. The *flagitta*, with a seraceous tail, and a long and flexible body, is found in salt-water, and seems to move by contracting and extending its neck. 17. The *gordius*, with a tail terminated by a small tubercle, was found in an infusion made with salt water. 18. The *serpentulus*, somewhat pointed at both ends. This is

found in the infusions of vegetables which have been kept for some weeks. Its body is of a whitish colour, frequently convoluted, and drawn into different figures. 19. The *coluber*, is found in river-water; the tail is extremely small; and the mouth, œsophagus, intestines, and the twistings of them, are easily discerned. 20. The *anguillula* is divided into four varieties: 1. The vinegar eel; 2. That in paste; 3. That of fresh water; and, 4. That of salt. Fig. 9, in the annexed plate, represents one of the eels in paste, very considerably magnified. 21. The *linter*, or ventricose oval vibrio, with a short neck, is found among the *lemna*, but not very frequently. It is among the larger kinds of animalcules, egg-shaped, pellucid, and somewhat depressed at top. 22. The *utriculus* resembles a bottle; the belly is full of molecular intestines, the neck bright and clear, the top truncated, and some have a pellucid point at the bottom of the belly. 23. The *fasciola* is found in water just freed from the frost, and not often in any other fluid. It is pellucid, with intestines like points in the middle. Its motion is very quick. 24. The *colymbus* is larger than many of the other species of vibrio, and resembles a bird in shape. 25. The *strichus*, has a linear body, being a bright membranaceous thread; the hinder part somewhat thicker, round, and filled with molecules, excepting at the end, where there is a small, empty, pellucid space. 26. The *anas*, with both ends attenuated, and the neck longer than the tail, is found in salt water; though a kind is likewise found in fresh water with a neck longer than the other. 27. The *cygnus* is a very pellucid line, crooked at top, swelling in the middle, and sharp at the end; the middle full of dark coloured molecules and pellucid intestines. 28. The *anser* is found in water where duckweed grows. The trunk is elliptic, round, and without any inequality on the sides. It is full of molecules: the hind part sharp and bright; the fore part produced into a bending neck, longer than the body. It moves the body slowly, but the neck more briskly. 29. The *olor* is found in water that has been kept for a long time, and is full of vegetable green matter. The body is elliptical and ventricose; the neck is three or four times longer than the body, of an equal size throughout, and is moved very quickly. 30. The *falx*, with a crooked neck, and obtuse hinder part, is pellucid and elliptical; the fore part lessening into a little, round, bright, neck, nearly as long as the trunk. 31. The *intermedius*, appears to be an intermediate species betwixt the *falx* and the *fasciola*: it seems to be a thin membrane, constantly folded, and has all round a distinct bright margin.

VI. CYCLIDIUM: a simple, invisible, flat, pellucid, orbicular or oval, worm. 1. The *bulia*, or orbicular bright cyclidium: this is found occasionally in an infusion of hay; it is very pellucid and white, moves slowly, and in a femicircular direction. 2. The *millium* is very pellucid, and splendid like crystal; of an elliptical figure: and its motion is swift, interrupted, and fluttering. 3. The *fluitans*, is one of the smallest animalcules; the body somewhat of an oval shape, with two small blue spaces at the sides. 4. The *glaucoma* has an oval pellucid body, with both ends plain: the intestines are so transparent, that they can scarcely be discerned when empty; when full they are of a green colour, and, when it seems to be taking in water, the intestines are in a violent commotion: it generates by division. 5. The *nigricans* is very small, pellucid, and flat, with a black margin. 6. The *rostratum* is oval, smooth, and very pellucid, with the fore part running out into an obtuse point, with which it seems to feel and examine the bodies to which it comes. 7. The *nucleus*, resembles a grape-seed, the body being pellucid and depressed, the fore part obtusely convex, and the hind part acute. 8. The *hyalinum*, has a tremulous kind of motion; the body oval, flat, and bright, without any visible intestines. 9. The *pediculus*, is scarcely ever seen but on the hydra pallida, upon which it runs as if it had feet; it is gelatinous and white, and the bottom gibbous over the back. 10. The *dubium*, is of an oval shape, with one side convex, the

other concave; the margin pellucid, and the inner part containing a great number of molecules.

VII. PARAMÆCIUM: an invisible, membranaceous, flat, and pellucid, worm. 1. The *aurelia*, is membranaceous, pellucid, and four times longer than it is broad; the fore part obtuse and transparent; the hind part filled with molecules: it is found in ditches where there is plenty of duckweed. 2. The *chrysalis*, is found in salt water, and differs very little from the former, only the ends are more obtuse, and the margins are filled with black globules. 3. The *versutum*, is found in ditches, and has an oblong, green, and gelatinous, body, filled with molecules: it propagates by division. 4. The *oviferum*, is membranaceous, oval, grey, and pellucid, with many oval corpuscles dispersed through the body. 5. The *marginatum*, is flat, elliptical, and every where filled with molecules; it is surrounded by a broad double margin, and a bright spiral intestine is observable.

VIII. KOLPODA: an invisible, pellucid, flat, and crooked, worm. 1. The *lamella*, is very seldom met with: it resembles a long, narrow, and pellucid, membrane, with the hind part obtuse, narrower, and curved towards the top. 2. The *gallinula*, is found in fetid salt water; and has the apex somewhat bent, the belly oval, convex, and striated. 3. The *rostrum*, is found, though seldom, in water where the *lemna* grows, and has a slow and horizontal motion; the fore part is bent into a kind of hook; the hind part obtuse, and quite filled with black molecules. 4. The *ochrea*, is depressed, membranaceous, and flexible; one edge nearly straight; the other somewhat bent. 5. The *mucronata*, is a dilated bright membrane; the apex an obtuse point, with a broad marked border running quite round it; it is filled with grey molecules, and has a truncated appearance. 6. The *triquetra*, was found in salt water, and appears to consist of two membranes; the upper side flattened, the lower convex, with the apex bent into a kind of shoulder. 7. The *striata*, is likewise found in salt water, and is very pellucid and white, with the upper part rather bent, and terminating in a point. 8. The *nucleus*, is of an oval shape, with the vertex pointed, and of a brilliant transparency, by which the viscera are rendered visible; these consist of a number of round diaphanous vesicles. 9. The *melagris*, has a dilated membrane, with very fine folds, which it varies in a moment; the fore part of the body to the middle is clear and bright; the hind part variously folded in transverse and elevated plaits, and full of molecules. 10. The *affinis*, is found on the sea-coast, and has an elliptic mass in the middle, but is not folded like the former. 11. The *cucullus*, is found in vegetable infusions, and in fetid hay; moving in all directions, and commonly with great vivacity: it is very pellucid, and has a well-defined margin, filled with little bright vesicles differing in size, and of no certain number: from some circumstances it would seem probable that this animalcule casts its skin, as is the case with some insects. 12. The *cucullulus*, is found in an infusion of the *sonchus arvensis*: it is very pellucid and crystalline, and has an oblique incision a little below the apex. 13. The *cuculio*, is elliptical, flat on the upper side, and convex on the under; the fore part is clear, and from the middle to the hinder part is full of silver-like globules. 14. The *ren*, or *crassa*, is found in an infusion of hay, commonly about thirteen hours after the infusion is made, and has a quick and vacillatory motion: its body is yellow, thick, and somewhat opaque; curved a little in the middle, so that it resembles a kidney; and full of molecules. 15. The *pirum*, has an uniform and transparent body, and is of a pale colour, with obscure little globules: it propagates by division. 16. The *cuneus*, is white, gelatinous, and without any distinct viscera; the apex has three or four teeth; and it can bend the hinder part into a spiral form.

IX. GONIUM: an invisible, simple, smooth, and angular, worm. 1. The *pelliculare*, is found in pure water, and moves alternately towards the right and left. It is quadrangular and pellucid, with sixteen sperical molecules

of a greenish colour, "set in a quadrangular membrane, like the jewels in the breast-plate of the high-priest, reflecting light on both sides." 2. The *pulvinatum*, is found in dung-hills; and appears like a little quadrangular membrane, plain on both sides. 3. The *corrugatum*, is found in various kinds of infusions; and is somewhat of a square shape, very small, and in some positions appears as streaked. 4. The *rellangulum*, differs but little from the former: the angle at the base is a right one; the larger vesicle is transparent, the rest green. 5. The *truncatum*, is found chiefly in pure water, and then but seldom: it has a languid motion, and is much larger than the foregoing.

X. BURSARIA: a very simple, hollow, membranaceous, worm. 1. The *truncatella*, is visible to the naked eye; white, oval, and truncated at top, where there is a large aperture descending towards the base: most of them have four or five yellow eggs at the bottom. 2. The *bullina*, is pellucid and crystalline, having splendid globules of different sizes swimming about with it: the under side is convex, the upper hollow, with the fore-part forming a kind of lip. 3. The *hirundinella*, has two small projecting wings, which give it somewhat of the appearance of a bird; and it moves something like a swallow. 4. The *dupletta*, was found among duckweed, and appears like a crystalline membrane folded up, without any visible intestines except a small congeries of points under one of the folds. 5. The *globina*, has a roundish shape, and is hollow; the lower end being furnished with black molecules of different sizes. It moves slowly about from right to left.

XI. CERCARIA: an invisible transparent worm with a tail. 1. The *gyrinus*, greatly resembles the spermatic animalcules: it has a white gelatinous body; the fore part somewhat globular; the hind part round, long, and pointed: when swimming, it keeps its tail in continual vibration like a tadpole. 2. The *gibba*, is found in the infusions of hay and other vegetables; and is small, opaque, gelatinous, white, and without any visible intestines. 3. The *inquieta*, is found in salt water, and is remarkable for changing the shape of its body: sometimes it appears spherical, sometimes like a long cylinder, and sometimes oval. 4. The *lemna*, also varies its form, sometimes appearing of an oblong, sometimes of a triangular, and sometimes of a kidney, shape: the tail is generally short, thick, and annulated; but sometimes long, flexible, cylindrical, and without rings; vibrating, when stretched out, with so much velocity, that it appears double: a small pellucid globule, which Muller supposes to be its mouth, is observable at the apex; and two black points not easily discovered, he thinks, are its eyes. 5. The *turbo*, with a tail like a bristle, is found among duckweed: it is of a tawny appearance, partly oval and partly spherical; and seems to be composed of two globular bodies. 6. The *poduria*, is found in November and December, in marshy places covered with lemna: it is pellucid; and seems to consist of a head, trunk, and tail; the head resembles that of a herring; the trunk is ventricose and full of intestines, of a spiral form and black colour. 7. The *viridis*, is found in the spring in ditches of standing water; and in some of its states has a considerable resemblance to the last, but has a much greater power of changing its shape. 8. The *setifera*, is found in salt water, but seldom: it is small, the body rather opaque, of a round figure, and has a slow rotatory motion. 9. The *hirta*, was likewise found in salt water: it is opaque and cylindrical; and, when in motion, the body appears to be furrowed with rows of small hairs separated from each other. 10. The *crumena*, has a ventricose, cylindrical, thick, and wrinkled, body; the lower part small; the upper part terminating in a small straight neck like that of a pitcher. 11. The *catellus*, has a moveable head fixed to the body by a point: the abdomen is twice as long as the head, full of intestines, and has a tail still narrower, and terminating in two bristles which it can unite and separate at pleasure. 12. The *catelina*, was found in a ditch where there was plenty of duckweed: it is larger than the preceding, and has a thicker and more cylin-

drical body. 13. The *lupus*, is found in water among duckweed, and is larger than most of the genus: the head is larger than the body; the apex turned down into a little hook; sometimes it contracts into one half its common size, and again extends itself as before. 14. The *vermicularis*, is long, cylindrical, fleshy, and capable of changing its shape: it is divided into eight or nine rings or folding plaits; the apex either obtuse, or notched into two points; and it is found in water where there is duckweed. 15. The *forcipata*, is found in marshy places, is cylindrical and wrinkled, with a forked proboscis which it can thrust out or pull in. 16. The *pleuronectes*, is found in water which has been kept for several months: it is membranaceous, roundish, and white, with two blackish points in the fore part, the hinder part being furnished with a slender sharp tail. 17. The *tripos*, is flat, pellucid, triangular, having each angle of the base or fore part bent down into two linear arms: it is found in salt water. 18. The *cyclidium*, is frequently found in pure water, and has an oval, smooth, membranaceous, pellucid, body, with a black margin. 19. The *tenax*, appears like an oval pellucid membrane, something larger than the *monas lens*; the fore edge is thick and truncated; the hinder part acute, and terminating in a short tail: it whirls about in various directions with great velocity. 20. The *discus*, is a small orbicular animalcule, with a bent tail. 21. The *orbis*, is round, and has a tail consisting of two long bristles. 22. The *luna*, is likewise round, and has the fore part hollowed into the form of a crescent.

XII. LEUCOPHRA: an invisible, pellucid, and ciliated, worm. 1. The *conflictor*, with moveable intestines, is perfectly spherical and semitransparent, of a yellow colour, the edges dark: it rolls from right to left, but seldom removes from the spot where it is first found, and is filled with a number of the most minute molecules, which move as if they were in a violent conflict; and in proportion to the number of these little combatants which are accumulated either on one side or other, the whole mass rolls either to the right or left; it then remains for a little time at rest, and the conflict ceases; but it soon becomes more violent, and the sphere moves the contrary way in a spiral line: when the water begins to fail, they assume an oblong, oval, or cylindric, figure; and the molecules shoot into a shapeless mass, which also soon vanishes, and the whole assumes the appearance of crystals of sal ammoniac. 2. The *mamilla*, is of a dark colour, and filled with globular molecules; short hairs are curved inwards: it is found in marshy water. 3. The *virescens*, is a large, pear-shaped, greenish-coloured, animalcule, filled with opaque molecules, and covered with short hairs; generally moving in a straight line: it is found in salt water. 4. The *viridis*, is much smaller than the former; sometimes it appears contracted in the middle, as if it were to be divided in two. 5. The *burstata*, is found in salt water, and is similar in many respects to the former: it is of a long oval shape, bulging in the middle, and filled with green molecules. 6. The *posthuma*, is globular, and covered as it were with a pellucid net; is found in fetid salt water. 7. The *aurea*, is yellow, oval; has both ends equally obtuse; little hairs discovered with difficulty; and has in general a vehement rotatory motion. 8. The *pertusa*, is found in salt water; and is gelatinous and small, without any molecules. 9. The *fracta*, is long, with sinuated angles, white, gelatinous, and granulated, changing its form considerably. 10. The *dilatata*, appears like a gelatinous membrane, with a few grey molecules in the fore-part, and a great number in the hinder part. 11. The *scintillans*, was found in December, among the smaller lemna: it is of a green colour, oval, round, and opaque; and is supposed to be ciliated, from its bright twinkling appearance, which probably arises from the motion it gives the water. 12. The *vesiculifera*, is oval, very pellucid, with a defined dark edge and inside, containing some very bright bladders or vesicles; the middle frequently appears blue, and the vesicles appear as if set in a ground of that colour. 13. The

globulifera,

globulifera, was found in a ditch where the *lemna minor* grew: the body is round, very pellucid, without molecules, and every where set with short hairs. 14. The *pustulata*, is found in marthy waters; and is white, gelatinous, and somewhat granulated; the lower part truncated as if an oblique section were made in an egg near the bottom. 15. The *turbinata*, is found in stinking salt water; and is round, pellucid, somewhat of the shape of an acorn, with a pellucid globule at the lower end. 16. The *acuta*, is found in salt water, and is gelatinous, thick, capable of assuming different shapes; having the apex bright, and the rest of the body filled with little spherules. 17. The *notata*, is oval, round, and has a black point at the edge. 18. The *candida*, is found in salt water; and is membranaceous, flat, very white, with no visible intestines. 19. The *nodulata*, is oblong and oval, with a double row of little nodules. 20. The *signata*, is common in salt water in the months of November and December: it is oblong and subdepressed, with a black margin filled with little molecules. 21. The *trigona*, is found in marshes, but not commonly: it is a yellow triangular mass filled with unequal pellucid vesicles. 22. The *fluida*, is somewhat of a kidney-shape, but ventricose. 23. The *fluxa*, is reniform and sinuated. 24. The *armilla*, is round and annular. 25. The *cornuta*, is of the shape of an inverted cone, opaque, and of a green colour; the body is composed of molecular vesicles; the fore part is wide and truncated, with a little prominent horn or hook on both sides: at one time this animalcule will appear reniform and ciliated on the fore part; but at another time the hairs are concealed: it dissolves into molecular vesicles when the water evaporates. 26. The *heteroclitia*, appears to the naked eye like a white point; in the microscope as a cylindrical body; and wholly ciliated through a large magnifier.

XIII. TRICHODA: an invisible, pellucid, hairy worm. 1. The *grandinella*, is a very small pellucid globule, with the intestines scarcely visible, the top of the surface furnished with several small bristles not easily discoverable. It is found in pure water, as well as in infusions of vegetables. 2. The *cometa*, is a pellucid globule filled with bright intestines, the fore part furnished with hairs. 3. The *granata*, resembles the two former, and has a darkish nucleus in the centre, with short hairs on the edge. 4. The *trochus*, is somewhat of a pear-shape, and pellucid; each side being distinguished by a little bunch of hairs. 5. The *gyrinus*, is one of the smallest of this genus, and is found in salt-water: it is smooth and free from hairs, except at the fore part, where there are a few. 6. The *sol*, is small, globular, and crystalline; beset every where with diverging rays longer than the diameter of the body: it was found with other animalcules in water which had been kept three weeks. 7. The *solaris*, is orbicular, bright, and filled with globular intestines, frequently having in it a moveable substance of the shape of the letter S. 8. The *bomba*, is of a yellow colour, and full of clay-like molecules: it moves with such velocity as to elude the sight, and appears of various shapes, sometimes spherical, sometimes kidney-shaped, &c. 9. The *orbis*, is composed of vesicular molecules; is of a spherical figure, smooth, pellucid, and a little notched in the fore part. 10. The *urnula*, is membranaceous, pellucid, somewhat in the form of a water-pitcher, with the fore part hairy: it moves but slowly. 11. The *diota*, is of a clay-colour, and filled with molecules; the upper part cylindrical and truncated, the lower part spherical, the upper part of the mouth hairy at the edges. 12. The *horrida*, is of a conical shape, the fore part broad and truncated, the lower part obtuse, and the whole covered with radiating bristles. 13. The *urinarium*, is egg-shaped, with a short hairy beak. 14. The *femiluna*, is smooth, pellucid, and shaped like a crescent. 15. The *trigona*, is of a triangular shape, a little convex on both sides, the fore part acute and ciliated, the hind part broader. 16. The *tinea*, is round, not very pellucid, narrow in the fore part, and resembling an inverted club. 17. The *nigra*, was found in salt water, and has an opaque

body; but when at rest one side appears pellucid: when in violent motion, it seems entirely black. 18. The *pubes*, is found in water where duckweed grows, chiefly in December: the apex is furnished with hairs, but they are seldom visible till the creature is in the agonies of death, when it extends and moves them vehemently, attempting as it were to draw in the very last drop of water. 19. The *flocus*, is membranaceous, the fore part rather conical, with three small hairy papillæ projecting from the base. 20. The *sinuata*, is found in river water: it is oblong and depressed, with one margin hollow and hairy, and the lower end obtuse; it is of a yellow colour. 21. The *præceps*, is pellucid, the fore part formed into a kind of neck; one edge rising into a protuberance like a hump-back, the other edge convex. 22. The *proteus*, is found in the slimy matter adhering to the sides of vessels in which vegetables have been infused, or animal substances preserved: the body of this animalcule resembles that of a snail. 23. The *versatilis*, lives in the sea, and has some resemblance to the *proteus*; but the neck is shorter, the apex less spherical, and the hinder part of the trunk acute. 24. The *gibba*, is pellucid; the upper part swelled out, with numerous molecules, and three large globules on the inside. When the water begins to fail, a few minute hairs may be discovered about the head, and at the abdomen. 25. The *foeta*, somewhat resembles a rolling-pin in shape; has both ends obtuse, and one shorter than the other: it can draw in the ends, and swell out so as to appear almost spherical. 26. The *patens*, is found in salt water; and is of a long cylindrical shape, filled with molecules, the fore part bright and clear, and is beset with hairs. 27. The *patula*, is ventricose, rather inclining to an oval figure, with a small tube at the fore part, the upper part of which is hairy. 28. The *foveata*, is oblong, and broad, with three little horns on the fore part. 29. The *striata*, is found in December, in river water: it is a beautiful animalcule, of a fox colour. 30. The *uvula*, is found in the infusion of hay and other vegetables. It is six times longer than broad, with an alimentary canal and lucid globules near the middle; the margin of the fore part is covered with short hairs. 31. The *aurantia*, is of a gold colour, pellucid, and filled with vesicles. 32. The *igniti*, is of a fine purple colour, with something of a reddish cast, pellucid, splendid, with a number of globules of different sizes. 33. The *prisma*, is very small, and so transparent that it cannot easily be delineated: it is of a singular shape; the under part being convex, and the upper compressed into a kind of keel. 34. The *forceps*, is found about the winter solstice in water covered with *lemna*: it is of a yellow colour, large, somewhat transparent, and filled with molecules, with a large opaque globule in the lower part. 35. The *forfex*, is found in river water: it has the fore part formed into a kind of forceps, one of which is twice as long as the other, hooked and ciliated. 36. The *index*, is found in salt water, and has the under part of the front of the margin hairy; the apex is formed by the fore part projecting like a finger on a direction post. 37. The *trichoda*, is of a yellow colour, formed of two pellucid membranes striated longitudinally; the lower end obliquely truncated, and the two extremities bent in opposite directions. 38. The *navicula*, has three corners; the fore part truncated and ciliated, and a kind of longitudinal keel runs down the middle. 39. The *succisa*, is of a flattened oval shape, the edge hairy, and hollowed out in such a manner as to form two unequal legs. 40. The *fulcata*, is ovated and ventricose, the apex acute, with a furrow at the abdomen, and both sides of it ciliated. 41. The *anas*, is found in pure water, and is smooth, five times broader than it is long, filled with darkish molecules. 42. The *barbata*, is round, somewhat linear, with both ends obtuse; the fore part narrower, forming as it were a kind of neck, under which is a row of fluctuating hairs. 43. The *faricimen*, is long, round, pellucid, and covered with very minute hairs, and has a great number of mucous vesicles about the body. 44. The *crinita*, is long, round, every

every where ciliated on the upper part, and the under part likewise hairy. 45. The *angulus*, is long, more convex than most of the genus, and divided by a kind of articulation in the middle; the apex has short waving hair. 46. The *linter*, is found in an infusion of old grafts: it is egg-shaped or oblong; but it is of different shapes at different ages, and sometimes has a rotatory motion. 47. The *paxillus*, is found in salt water, and is long, full of grey molecules; the fore part truncated and hairy. 48. The *vermicularis*, is found in river water; and is pellucid in the fore part, with the hind part filled with molecules. 49. The *melitæa*, is found in salt water, but very rarely: it is oblong, ciliated with a globular apex, and a kind of peristaltic motion perceivable within it. 50. The *fimbriata*, is subovated, the apex hairy, the hinder part obliquely truncated and serrated. 51. The *camelus*, is found but rarely in vegetable infusions, and moves in a languid manner: the back is divided by an incision in the middle into two tubercles. 52. The *augur*, is oblong, depressed, pellucid, and filled with molecules: the vertex is truncated, the fore part forming a small beak, with three-feet underneath. 53. The *pupa*, is roundish, pellucid, and consists of three parts: the head is broad, and appears to be hooded, the top being furnished with very small hairs. 54. The *lunaris*, is round and crystalline; the hinder part smaller than the other: the edge of the back and the part near the tail are bright and clear. 55. The *bilunis*, is arched and flattened with an hairy apex, and two little bristles proceeding from the tail. 56. The *rattus*, is oblong, with a kind of keel; the fore part hairy, and a very long bristle proceeding from the hinder part. 57. The *tigris*, resembles the former, but differs in the form of the tail, which consists of two bristles, and likewise in having a kind of incision in the body a little below the apex. 58. The *perillum*, is frequently found in marshes; it is cylindrical, pellucid, muscular, and capable of being folded up: it appears double; the interior part full of molecules, with an orbicular muscular appendage, which it can open and shut, and which forms the mouth. 59. The *clavus*, has a considerable resemblance to a common nail; the fore part is round and hairy, the hinder part terminating in a sharp tail. 60. The *cornuta*, is membranaceous, elliptical, full of molecules; the fore part lunated, the other round, and terminating in a tail as long as the body. 61. The *gallina*, is found in river water: it is of a grey colour, flat, with seven large molecules and globules within it. 62. The *musculus*, is found in the infusions of hay, which have been kept for some months. It is smooth, egg-shaped, moves slowly, and is furnished with molecular intestines. 63. The *delphis*, is found in river water: it is smooth, pellucid, having the fore part dilated into a semicircle, gradually decreasing in breadth towards the tail; the front is hairy. 64. The *delphinus*, is found in hay that has been infused for some months: it is pellucid, smooth, and egg-shaped; it moves sometimes on its belly and sometimes on its side. 65. The *clava*, or club trichoda, has the fore part thick, but the hinder part narrow; both extremities obtuse, pellucid, and replete with molecules. 66. The *cuniculus*, is oblong, the fore part hairy, the hinder part rather acute, and filled with molecules and black vesicles. 67. The *felis*, is large and curved; the fore part small, the hinder part gradually diminishing into a tail, the under part beset with hairs longitudinally. 68. The *piscis*, is oblong, the fore part hairy, the hinder part terminating in a very slender tail: it is smooth, pellucid, much longer than broad, and filled with yellow molecules. 69. The *larus*, is long, round, beset with hairs, and has the tail divided into two points. 70. The *longicauda*, is cylindrical; the fore part truncated, and beset with hairs; the tail long, furnished with two bristles, and having two joints. 71. The *fixa*, has the circumference set with hairs, and a little solitary pedicle projecting from the body. 72. The *inquilinus*, is sheathed within a cylindrical transparent bag, having a little pedicle bent back within. 73. The *ingenita*, is sheathed in a depressed

bag, broadest at the base. This animalcule is funnel-shaped, and can extend or contract itself within the bag, fixing its tail to the base, without touching the sides: it is found in salt water. 74. The *innata*, is sheathed in a cylindrical bag, with a pedicle passing through and projecting beyond it. 75. The *transfuga*, is broad, the fore part hairy, the hinder part full of bristles; one side sinuated, and the other pointed. 76. The *ciliata*, is ventricose, the hinder part covered with hair. 77. The *bulia*, is membranaceous, the sides bent inwards; the fore and hind parts both covered with hairs. 78. The *pellionella*, is thick in the middle, and pellucid, with a few molecules here and there; the sides obtuse, the fore part ciliated with very fine hairs. 79. The *cyllidium*, has the hinder extremity filled with globules of various sizes: it vacillates upon the edge, commonly advancing on its flat side, and continually drawing in water. 80. The *cursor*, is oval, the fore part hairy; the body is flat, and filled with molecules. 81. The *pulex*, is egg-shaped, with an incision in the fore part; the front and base hairy. 82. The *lynceus*, is nearly square, with a crooked beak and hairy mouth: the intestines are beautiful, and a small bent tube goes from the mouth to them in the middle of the body; there is also another tube between the fore and hind edge, filled with blue liquor. 83. The *erofa*, is orbicular, the fore part notched; one side furnished with hairs, the hinder part with bristles. 84. The *rostrata*, is found in water where duckweed has been kept: it is capable of changing its shape, yellow, with long ciliated hairs; it has four feet tapering to a point, one of them longer than the rest. 85. The *lagena*, is round, ventricose, with a long neck, and the lower end set with bristles. 86. The *charon*, was found in salt water; it is oval, and resembles a boat as well in its motion as shape; the upper part is hollowed, the under part furrowed, and convex; the stern round, with several hairs proceeding from it. 87. The *cimex*, has an oval body, with a convex back: when this animalcule meets with any obstacles in swimming, it makes use of four bristles which appear on the under side as feet. 88. The *cicada*, differs but little from the cimex: it is oval, the fore part covered with hairs, the hinder parts beardless.

XIV. KERONA: an invisible worm with horns. 1. The *rajiellum*, is found in river-water; it has three rows of horns on the back, which occupy almost the whole of it. 2. The *hyncaster*, is square, and its disk furnished with shining horns. 3. The *hystrio*, appears an oblong membrane, pellucid, with four or five black points in the fore part, which are continually changing their situation, thick set with small globules in the middle. 4. The *cypris*, is found in water covered with lemna; it is pear-shaped, compressed, with a broad and blunt fore part, the front furnished with hairs or little vibrating points inserted under the edge, having a retrograde motion. 5. The *haustorium*, is orbicular, with the horns in the middle, the fore part membranaceous and ciliated. 6. The *haustallum*, differs from the preceding only in having the hinder part without any bristles. 7. The *patella*, has an univalve shell, orbicular and crystalline; with horns or hairs of different lengths jutting out beyond the shell, and acting instead of feet and oars. 8. The *vannus*, is oval and rather flat, with one edge bent, the opposite one ciliated; the front furnished with horns, and the hind part with bristles. 9. The *pullaster*, agrees in many respects with the trichoda pulex; the upper part is pellucid, without any black molecules; the whole surface of the head covered with hair, and the fore part sinuous. 10. The *mytilus*, is a large animalcule, very pellucid and white, with black intestines intermixed with a few pellucid vesicles; it has two small horns, with which it agitates the water so as to form a little whirlpool. 11. The *lepus*, is egg-shaped, pellucid, and covered with short waving hairs; the base terminated with bristles. 12. The *stirus*, is oval, with a fascicle of vibrating hair on the fore part; it has a sharp tail furnished with unequal rows of moveable hairs, the back being also ciliated; the hairs produce a rotatory

rotatory motion. 13. The *calvitium*, is found in the infusion of vegetables: the body is broad and flat, filled with black molecules, and a few short bristles. 14. The *pustulata*, is found in salt water: it is convex; one edge of the hinder part sinuated, both ends set with hairs, and horns on the fore part.

XV. HIMANTOPUS: a pellucid, invisible, and ciliated, worm. 1. The *acarus*, is lively, conical, ventricose, full of black molecules, with a bright and transparent fore part. The lower part of the apex has rows of long hairs on the under part set like rays; and it is continually moving these and other hairs in various directions. 2. The *ludio*, is a lively diverting animalcule, full of small points, the fore part clubbed and a little bent, the hinder part narrow. The top of the head and middle of the back are furnished with long and vibrating hairs; and three flexible curls hang down from the side of the head at a distance from each other. 3. The *fannio*, is found in water where the lemna grows. The cilia are longer than the hairs, and are continually vibrating. 4. The *volutor*, is shaped like a crescent; the convex part has a row of hairs longest towards the tail, and underneath are four feet: it is very lively, and often turns round with a swift circular motion. 5. The *lava*, is long and ciliated in the middle; the body is long; the hinder parts acute, and curved, pellucid, and filled with granular molecules. 6. The *charon*, is found in sea-water, but rarely. It is oval, with longitudinal furrows, and several rows of hair below the middle, but none on the hinder part. 7. The *corona*, is a membranous lamina, very thin, pellucid, and semilunar: the edge of the base thick set with molecular intestines; the fore part furnished with a kind of mane; towards the hind part are three equal curved hairs or spines.

XVI. VORTICELLA: a naked worm with rotatory cilia, capable of contracting and extending itself. 1. The *viridis*, is visible to the naked eye, appearing like a small green point: it appears to be destitute of limbs, notwithstanding which it keeps the water in continual motion; so that it probably has some invisible rotatory instrument. 2. The *spheroida*, appears also like a point: it occasions a vehement motion in the water, probably by means of some short hairs with which it is furnished. 3. The *cincla*, is of an irregular shape, sometimes assuming an oval figure, and appearing as if girt round with a transverse keel. 4. The *lunifera*, is found in salt water; has the fore part obtuse, the base broad, and hollowed away like a crescent, with a short protuberance in the middle of the concave part. 5. The *busfata*, is found in salt water, and is ventricose, crammed with molecules; the fore part truncated, and both sides of it pellucid. 6. The *varia* is cylindrical, truncated, opaque, and blackish coloured; the fore part ciliated. 7. The *sputarium*, is found in October, with the smaller lemna, and is one of the most singular of the animalcules. When viewed sideways, it is sometimes nearly cylindrical, only tapering a little towards the hinder part, and having a broad pellucid edge. Viewed from the top, it has a broad face or disk, furnished with radiated hairs, of a dark green colour. 8. The *polymorpha*, is visible to the naked eye, and appears like a green point moving with great agility; but, when viewed through a microscope, it assumes such a variety of forms, that it is impossible to describe them. 9. The *multiformis* is found in salt water, and very much resembles the former. 10. The *nigra*, is found in August in meadows covered with water: it may be seen with the naked eye, appearing like a black point swimming on the surface. Through the microscope it appears as a small conical body, obtuse and ventricose at one end and acute at the other. It moves continually in a vacillating manner on the top of the water. 11. The *cucullus*, is likewise visible to the naked eye: it is of a dirty red colour, of a shape somewhat conical, and resembling a grenadier's cap. 12. The *utriculata*, is green and ventricose; the belly capable of being lengthened or shortened; the fore part truncated, much in the shape of a common water-bottle. 13. The *ocrea*, is met

with in rivers, and in shape somewhat resembles the lower part of a boot. The apex of the upper part is truncated and ciliated, the heel pointed, and the foot round. 14. The *valga*, is as broad as long, and the apex truncated and ciliated: it is found in marshy waters. 15. The *pipillaris*, is likewise found in marshes where the *conserva nitida* grows: it is ventricose; the fore part truncated, with a beautiful papillary excrescence on the side. 16. The *facculus*, is thick, of an equal diameter every where, and full of molecules. The edge of the mouth is bent back, with cilia on both sides. 17. The *cirrata*, is found in ditch water: it is ventricose, the aperture sinuated, and two tufts of hair on each side of the belly. 18. The *nasuta*, is furnished with a rotatory organ encompassing the middle: it is pellucid, cylindrical, of an unequal size; the fore part truncated and ciliated, with a triangular prominence in the middle of the aperture; the hinder part is obtuse, with a point on each side the middle of the body. When the water is nearly exhaled, two rotatory organs are observable; and the quick and various motions of this apparatus are very surprising. 19. The *stellina*, is of an orbicular shape, with a molecular disk and ciliated margin. 20. The *discina*, is likewise orbicular, the edge ciliated, with a kind of handle on the under side. 21. The *scyphina*, is bowl-shaped, crystalline, with an opaque spherule in the middle. 22. The *albina*, is cylindrical in the fore part, the hinder part tapering, and almost ending in a point. 23. The *fritillina*, is empty and cylindrical, with a truncated apex. 24. The *truncatella*, is of a larger kind of animalcules, with a crystalline body, full of black molecules, the skin perfectly smooth and colourless, the hinder extremity rounded, and the anterior part truncated. 25. The *limacina*, is cylindrical, truncated, and has two pair of cilia. 26. The *fraxinina*, is cylindrical, the hinder part tapering, and full of opaque molecules; transparent towards the upper end. 27. The *cratægaria*, is found in April, both in the mud and on the tail of the monocular quadricornis: they are generally heaped together in a spherical form, and united to one common stalk: it has two small arms; and with a powerful magnifier a violent rotatory motion may be observed. 28. The *hamata*, with the body granulated, the fore part broad and truncated, the hinder part obtuse, and capable of being contracted or extended. 29. The *crateriformis*, is a lively animalcule, approaching somewhat to a square figure, with convex sides: the head is situated at the large end, the skin smooth, and some traces of intestines may be discovered with difficulty. 30. The *canaliculata*, appears to the naked eye as a number of white points adhering to the sides of the glass: it excites a continual whirling motion in the water, by means of a rotatory organ with which it is furnished. 31. The *versatilis*, is a pellucid gelatinous animalcule, of a greenish colour, and furnished with small radii about the circumference; so that it appears like a very small water hedge-hog. 32. The *ampulla*, is contained in a transparent bottle-shaped bag; the head divided into two lobes. 33. The *folliculata*, is gelatinous and cylindrical; and when most extended, the base appears attenuated, and the apex truncated. 34. The *larva*, is of a clay colour, the aperture ciliated, with a globular projection at times appearing to proceed from it. 35. The *faculata*, has the shape of an inverted cone, with an aperture in the figure of a crescent; the lower part of the trunk notched, forming as it were two teeth; the tail biphyllous. 36. The *aurita*, is cylindrical and ventricose, the aperture destitute of hairs; both sides of it are furnished with rotatory cilia, and the tail is biphyllous. 37. The *tremula*, has something of a conical shape; the mouth being divided into parts which are set with small spines; and a point projects from the tail. 38. The *serita*, is muscular, the fore part truncated: round the margin are rows of hairs; but it has also stiffer hairs or spines continually vibrating, with which it draws in all substances which it is able to manage. 39. The *lacinulata*, is shaped like an inverted cone, the aperture lobated, the tail small and furnished with two bristles. When swimming, the

rotatory organ may be discovered: it moves swiftly in an oblique direction. 40. The *conflicta*, is of two kinds; viz. of a pale yellow, and of a white colour: they move by fixing their tail to the place where they are, and then extending their body as much as possible: sometimes they turn round upon one of the points of their tail; at other times they spring forward with a jerk: when at rest they open their mouths very wide. 41. The *togata*, has a convex body, filled with molecules, and of a dark colour; the hinder part somewhat longer than the fore part; the latter ciliated. 42. The *rotatoria*, or *wheel animal*, is sometimes of a globular, and sometimes of a conic, shape: it puts out its wheels, swimming vigorously through the water in search of food; or else, fixing itself by the tail, works the wheels in such a manner as to bring its food to it. It is found in rain-water that has stood for some time. The most remarkable part of this animalcule is its wheel-work: this consists of a couple of semicircular instruments, round the edges of which many little fibrillæ move themselves very briskly, sometimes with a kind of rotation, and sometimes in a trembling or vibrating manner. When in this state, it swims along with a great deal of swiftness, seemingly in pursuit of its prey. Sometimes the wheels seem to be entire circles, armed with small teeth, like those of the balance-wheel of a watch, appearing projected forwards beyond the head, and extending sideways somewhat wider than its diameter. The teeth or cogs of these wheels seem to stand very regularly at equal distances; but the figure of them varies according to their position, the degree of their protrusion, and perhaps the will of the animal itself. The different appearances of its wheels are represented in the plate, at fig. 10, 11, 12, and 13; and fig. 14 and 15 shew this animalcule in its globular state. 43. The *furcata*, is commonly found in water, and has a cylindric body with a rotatory organ, consisting of a row of hairs at the apex: the tail is divided into two parts, turning a little inwards. 44. The *catulus*, is commonly found in marshy waters: the anterior part is connected to the body by a little neck; and it occasionally shews a small rotatory organ: its motion is rotatory, but in various directions. 45. The *canicula*, is cylindrical, the aperture plain, with a short articulated tail divided into two parts. 46. The *felis*, has a large body, the apex of an equal thickness, obtuse, with rotatory filaments. 47. The *stentorea*. See the article POLYPUS. 48. The *socialis*, when considerably magnified, appears like a circle surrounded with crowns or ciliated heads, tied by small thin tails to a common centre, from whence they advance towards the circumference, where they turn very briskly, occasioning a kind of whirlpool, which brings its food. When one of them has been in motion for a time, it stops and another begins; sometimes two or three may be perceived in motion at once: they are frequently to be met with separate, with the tail sticking in the mud. 49. The *sterculosa*, appears to the naked eye like a yellow globule adhering to the ceratophyllon like a little flower or a heap of yellow eggs. When magnified, they are seen to consist of a congeries of animalcula constituting a sphere from a mouldy centre. They contract and extend their bodies either alone or in society, and excite a vortex in the water by means of a disk. When they quit the society and act singly, they may be observed to consist of a head, abdomen, and tail. 50. The *citrina*, is found in stagnant water; the head full of molecules, round, every where of an equal size, and very transparent: both sides of the orifice are ciliated, and each has a rotatory motion. 51. The *piriformis*, is somewhat oval, with a very small retractile foot, which it can draw within itself. 52. The *tuberosa*, has a broad upper part, with two projections at the anterior end, furnished with a number of fibrillæ, which produce a current of water by their vibration, and thus collect food for the animal. 53. The *ringens*, is pear-shaped, pellucid, the middle of the aperture convex, both sides ciliated, the pedicle four times shorter than the body. 54. The *inclinans*, has a pendulous head; the anterior part truncated,

and occasionally contracting itself twice as short as the pedicle. It is shaped like a tobacco-pipe, and is represented in fig. 16 of the plate. 55. The *vaginata*, is erect, of the shape of a truncated egg; the pedicle is contained in a sheath. 56. The *globularia*, is frequent among the cyclopa quadricorni. It has a small spherical head, with the aperture of the mouth ciliated. 57. The *lunaris*, has a small goblet-shaped head, the margin of the orifice protuberant, ciliated on both sides, with undulating hairs, and the pedicle eight or ten times the length of the body. 58. The *convallaria*, or *bell-animal*, dwell in colonies together in a slimy kind of mucilaginous case; which, out of the water, has no determinate form, but, when expanded therein, has some resemblance to the figure of a bell with its mouth upwards. These bells, or colonies, are to be found adhering to the large leaves of duck-weed, and other aquatic plants. The whole colony together has a power of altering the position of the bell, or even of removing it from one place to another; and hence this bell is sometimes found standing perfectly upright, as represented at fig. 17 in the plate, with the little animals attached to it. Though no eyes can be discovered, yet these animalcules have a perception of the light: for, when kept in the dark, they always remain contracted; but on being exposed to the light of the sun, or of a candle, they constantly extend their arms, and shew evident signs of being pleased. 59. The *nutans*, has a simple pedicle; twists itself spirally; is extremely slender, with a kind of cap on its head. 60. The *nebulifera* is narrow at the base; open and truncated at top; the margin seemingly surrounded with a ring: but, when the aperture is shut, the animalcule is of the shape of an egg. 61. The *annularis*, is visible to the naked eye; the head an inverted cone, convex when the mouth is shut, but truncated when it is open; with a protuberant edge. 62. The *acinosa* inhabits that whitish substance which often entirely covers plants, wood, shells, &c. When this substance is examined by the microscope, it appears to be wholly composed of living animals of the polype kind. 63. The *fasciculata*, has a rotatory organ, which may sometimes be seen projecting beyond the aperture. A congealed green mass which is often found swimming about in ditches is composed of myriads of these animals, which are not visible to the naked eye, and when magnified appear like a bundle of green flowers. 64. The *hians*, resembles a citron; the apex is truncated, the base narrow, and a gaping cleft is observable, descending from the apex to one third of the body. 65. The *bellis*, is of a yellow colour, and much resembles the flower of a daisy; is ciliated round the margin of the head, and moves in a rotatory manner. 66. The *gamella*, has a long pedicle, constantly furnished with two small heads. 67. The *anastasia*. See the article POLYPUS. 68. The *polipina*, when viewed through a small magnifier, appear like so many little trees: the upper part, or heads, are egg-shaped, the top truncated, the lower part filled with intestines; the branches thick set with little knobs. 69. The *racemosa*, is only distinguished from the vorticella socialis by always adhering to the sides of the vessel in which it is placed. By the microscope, we discover a long pedicle sticking to the sides of the vessels, from which proceed an innumerable quantity of crystalline pellucid pearls; which, together with the stalk, are variously agitated in the water. Sometimes they move separately; sometimes they are drawn down to the root, and in a moment expanded again.

XVII. BRACHIONUS: a contractile worm, covered with a shell, and furnished with rotatory cilia. 1. The *striatus*, has an oblong pellucid shell, capable of altering its figure. The apex is truncated, with six small teeth on the edge of it, twelve longitudinal streaks down the back, the base obtuse and smooth. The animal itself is of a yellow colour, crystalline, and muscular; now and then putting out from the apex two or three little bundles of playing hairs, the two lateral ones shorter than that in the middle: it is found in sea-water. 2. The *squamula*, has an univalve

orbicular shell, a truncated apex, four teeth, smooth base, and no tail. 3. The *pala*, is of a yellow colour; univalved, with an oblong excavated shell; with four long teeth at the apex; with a smooth base. 4. The *pipalum*, is univalved, the shell oblong, and inflected, ten teeth at the apex, the base smooth, and a spurious tail. 5. The *patina*, is extremely bright and splendid, has a large body, a crystalline and nearly circular shell, without either ineision or teeth, only towards the apex it falls in so as to form a smooth notch. A double glittering organ, with ciliated edges, projects from the apex; both of them of a conical figure, and standing as it were upon a pellucid substance, which is divided into two lobes, between which and the rotatory organ there is a silver-coloured crenulated membrane. 6. The *chypeatus*, is univalved; the shell oblong, apex notched, the tail naked, and base smooth. 7. The *lamellaris*, is univalved; the shell extending considerably beyond the body; the base divided into three small horns, with two hairs at the end of the tail. 8. The *patella*, is found in marshy water in the winter time: it is univalve, the shell oval, plain, crystalline, with the anterior part terminating in two acute points on both sides: by these points it fastens itself, and whirls about the body erect: the rotatory cilia are perceived with great difficulty. 9. The *bradlea* is univalved, the shell somewhat orbicular, apex lunated, base smooth, and the tail furnished with two spines. 10. The *plicatilis*, is univalved, with an oblong shell, the apex hairy, and base notched. 11. The *ovalis* is bivalved; the shell flattened, apex notched, a hollow part at the base, the tail formed of two tufts of hair. 12. The *tripos* is bivalved, the apex of the shell beardless, three horns at the base, and double tail: it fixes itself to objects by the filaments of the tail. 13. The *dentatus*, is bivalved, with an arched shell; the apex and base are both toothed, and the tail formed of two spines. 14. The *mucronatus*, is bivalved, somewhat of a square form; the base and apex pointed; the tail consisting of two spines. 15. The *uncinatus*, is one of the smallest bivalved animalcules; the apex and anterior part round, the hinder part straight, terminating in a point, furnished with a hook on the fore part, a small rotatory organ, a long tail composed of joints, and divided at the end into two bristles. 16. The *cirratus*, is larger than the preceding; ventricose, somewhat transparent, the head conical, with a bundle of hairs on both sides; it has likewise a rotatory organ. 17. The *passus*, has a cylindric shell, with two long pendulous locks of hair proceeding from the front, the tail consisting of a single bristle. 18. The *quadratus*, has a quadrangular shell, with two small teeth at the apex, two horns proceeding from the base, and no tail. 19. The *impressus* has a quadrangular shell, a smooth undivided apex; obtuse base; notched margin; and flexuous tail. 20. The *brachionus Bakeri*, has a ventricose shell, four teeth at the apex, two horns at the base, and a long tail terminating in two short points. Mr. Muller has also discovered in this creature two small feelers, and a tongue. 21. The *patulus*, has a ventricose shell, with eight teeth at the apex; the base lunated, or hollowed into the form of a crescent, and furnished with four horns; the tail short, with two small points at the end.

These are the different kinds of animalcules which have yet been discovered, and to which we shall add the following observations by Mr. Adams.—“How many kinds of these invisibles there may be (says he) is yet unknown; as they are discerned of all sizes, from those which are barely invisible to the naked eye, to such as resist the force of the microscope as the fixed stars do that of the telescope, and with the greatest powers hitherto invented appear only as so many moving points. The smallest living creatures our instruments can shew, are those which inhabit the waters; for though animalcula equally minute may fly in the air, or creep upon the earth, it is scarcely possible to get a view of them; but, as water is transparent, by confining the creatures within it we can easily observe them by applying a drop of it to the glasses.

“Animalcules in general are observed to move in all directions with equal ease and rapidity, sometimes obliquely, some times straight forward; sometimes moving in a circular direction, or rolling upon one another, running backwards and forwards through the whole extent of the drop, as if diverting themselves; at other times greedily attacking the little parcels of matter they meet with. Notwithstanding their extreme minuteness, they know how to avoid obstacles, or to prevent any interference with one another in their motions: sometimes they will suddenly change the direction in which they move, and take an opposite one; and, by inclining the glass on which the drop of water is, as it can be made to move in any direction, so the animalcules appear to move as easily against the stream as with it. When the water begins to evaporate, they flock towards the place where the fluid is, and shew a great anxiety and uncommon agitation of the organs with which they draw in the water. These motions grow languid as the water fails, and at last cease altogether, without a possibility of renewal if they be left dry for a short time. They sustain a great degree of cold as well as insects, and will perish in much the same degree of heat that destroys insects. Some animalcules are produced in water at the freezing point, and some insects live in snow. By mixing the least drop of urine with the water in which they swim, they instantly fall into convulsions and die. The same rule seems to hold good in those minute creatures which is observable in the larger animals, viz. that the larger kinds are less numerous than such as are smaller, whilst the smallest of all are found in such multitudes, that there seems to be myriads for one of the others. They increase in size, like other animals, from their birth until they have attained their full growth; and, when deprived of proper nourishment, they in like manner grow thin and perish.”

The modes of propagation among these animalcules are various, and the observation of them is extremely curious. Some multiply by a transverse division; and it is remarkable, that, though in general they avoid one another, it is not uncommon, when one is nearly divided, to see another push itself upon the small neck which joins the two bodies in order to accelerate the separation.—Others, when about to multiply, fix themselves to the bottom of the water; then becoming first oblong, and afterwards round, turn rapidly as on a centre, but perpetually varying the direction of their rotatory motion. In a little time, two lines forming a cross are perceived; after which the spherule divides into four, which grow, and are again divided as before. A third kind multiply by a longitudinal division, which in some begins in the fore-part, in others in the hind-part; and from others a small fragment detaches itself, which in a short time assumes the shape of the parent animalcule. Lastly, others propagate in the same manner as the more perfect animals.

Many doubts have been suggested, whether all those minute bodies which go under the name of *animalcules*, really do enjoy animal life; or whether they are not in many cases to be accounted only inanimate and exceedingly minute points of matter actuated by the internal motion of the fluid. But to all hypotheses of this kind Mr. Adams makes the following reply: “From what has been said, it clearly appears, that their motions are not purely mechanical, but are produced by an internal spontaneous principle; and that they must therefore be placed among the class of living animals, for they possess the strongest marks and the most decided characters of animation; and, consequently, that there is no foundation for the supposition of a chaotic and neutral kingdom, which can only have derived its origin from a very transient and superficial view of these animalcules. It may also be further observed, that as we see that the motions of the limbs, &c. of the larger animals, are produced by the mechanical construction of the body, and the action of the soul thereon, and are forced by the ocular demonstration which arises from anatomical dissection to acknowledge this mechanism which is adapted to produce the various motions

motions necessary to the animal; and as, when we have recourse to the microscope, we find those pieces which had appeared to the naked eye as the primary mechanical causes of particular motions, to consist themselves of smaller parts, which are the causes of motion, extension, &c. in the larger; when the structure therefore can be traced no further by the eye, or by the glasses, we have no right to conclude that the parts which are invisible are not equally the subject of mechanism: for this would be only to assert, in other words, that a thing may exist because we see and feel it, and have no existence when it is not the object of our senses. The same train of reasoning may be applied to animalcules; we see them move; but, because the muscles and members which occasion these motions are invisible, shall we infer that they have no muscles, with organs appropriated to the motion of the whole and its parts? To say that they exist not because we cannot perceive them, would not be a rational conclusion. Our senses are indeed given us that we may comprehend some effects; but then we have also a mind, with reason, bestowed upon us, that, from the things which we do perceive with our senses, we may deduce the nature of those causes and effects which are imperceptible to the corporeal eye."

Besides the above systematic arrangement of animalcules, there has been another, and very singular species, suggested by Leeuwenhoek and Hartsoeker, as pervading the *semen masculinum* of every kind of animal; an opinion, which has also been warmly supported by Andry, Valisnieri, Bourguet, and other observers. The bodies of these animalcules, says Leeuwenhoek, are of an oblong oval form, with long tapering slender tails issuing from them; and, as by this shape they resemble tadpoles, they have been frequently called by that name; though the tails of them, in proportion to their bodies, are much longer than the tails of tadpoles are: and it is observable, that the animalcules in the semen of fishes have tails much longer and more slender than the tails of those in other animals; inasmuch, that the extremity of them is not to be discerned without the best glasses, and the utmost attention. The number of these animalcules, he says, is inconceivable. On viewing with a microscope the milt or semen of a living cod-fish, innumerable multitudes of animalcules were found therein, of such a diminutive size, that he supposed at least 10,000 of them capable of being contained in the bulk of a grain of sand; whence he concludes, that the milt of this single fish contained more living animalcules than there are to be found people living in the whole world. To find the comparative size of these animalcules, Leeuwenhoek placed an hair of his head near them; which hair, through his microscope, appeared an inch in breadth; and he was satisfied, that at least 60 such animalcules could easily lie within that diameter; whence, their bodies being spherical, it follows, that 216,000 of them are about equal to a globe whose diameter is the breadth of a hair. He observed, that when the water wherewith he had diluted the semen of a cod-fish was exhaled, the little bodies of the animalcules burst in pieces; which did not happen to those in the semen of a ram: and this he imputes to the greater firmness and consistency of the latter; as the flesh of a land-animal is more compact than fish. These animalcules appear to be very vigorous, and tenacious of life; for they may be observed to move long after the animal from which they are taken is dead. They have this peculiarity also, that they are continually in motion, without the least rest or intermission, provided there is fluid sufficient for them to swim about in. Leeuwenhoek farther says, that, having examined the semen of a cock, he perceived a number of animals similar to river eels; but they were so minute, that 50,000 of them were not equal in bulk to a grain of sand. Of those in the semen of a rat, it required many millions to make the thickness of a hair, &c. This curious observer was persuaded, that the whole substance of the semen was only a mass of animalcules. He saw these animalcules indiscriminately in the seed of men, of quadrupeds, of birds,

of fishes, and of insects. In the seed of a grass-hopper, the animalcules were long, and extremely thin. They appeared, he says, to be attached by their superior end; and the other end, which he calls their tail, had a brisk motion, like that of the tail of a serpent when its head is fixed. In the semen of young animals, when examined before they have any sexual appetite, he alleges that he saw the same minute animals, and that they had no motion: but, when the season of love arrived, the animalcules moved with great vivacity. In the semen of a male frog, he saw animalcules; but, at first, they were imperfect, and had no motion: some time after he found them alive. They were so minute, he observes, than 10,000 of them were only equal in bulk to a single egg of the female.

In the semen of a man and that of a dog, he pretended to see two species of animalcules, resembling males and females. Having shut up the semen of the dog in a small vial, he says, that a great number of animalcules died the first day; that, on the second and third day, still more of them died; and that few of them were alive on the fourth day. But, having repeated this experiment on the semen of the same dog, he found, at the end of seven days the animalcules as brisk and lively as if they had been newly extracted from the animal: and having opened a bitch, that, some time before the experiment, had been three times covered by the same dog, he could not perceive, with the naked eye, any male semen in the uterus or its appendages; but, by the assistance of the microscope, he found the spermatic animals of the dog in both horns of the uterus: in that part of the uterus which is nearest the vagina, he discovered great numbers, which evidently proves, says he, that the male semen enters the uterus, or, at least, that the spermatic animals of the dog had arrived there by their own motion, which enables them to pass over four or five inches in half an hour. In the uterus of a female rabbit, which had just received the male, he observed an infinite number of spermatic animals. He remarks, that the bodies of these animals are round; that they have long tails; and that they often change their figure, especially when the fluid in which they swim begins to dry up. In the preceding plate they are correctly delineated. Fig. 18 represents the animalcules in the seed of the rabbit; 19, shews the form of those in the seed of a dog; 20, shews the spermatic animals in the seed of a ram; and 21, are those found in the seed of a cock. The whole are exhibited of the largest size they could possibly be magnified.

These experiments of Leeuwenhoek were repeated by several people, who pretended to have found them exactly as above described. Mr. Andry says, that he could find no animals in the human semen previous to the age of puberty; that they exist not in the semen of very old men; that there are few of them in those who are affected with the venereal disease, and that these few are in a languishing state; that none of them appear alive in impotent persons; and that the animalcules in the semen of men have a larger head than those of other animals, which corresponds, he observes, with the figure of the foetus and infant; and he adds, that those who use women too frequently have generally few or no animalcules in their semen.

The discovery of these spermatic animalcules was thought to throw some light on the mysterious affair of generation, and these minute creatures were imagined to be each of them individuals of the same species with the parent. But here the infinite number of these animalcules was an objection, and the difficulty remained as great as before; for, as every one of these animalcules behaved to be produced from a male and female, to explain their origin by animalcular generation in the same manner was only explaining generation by itself.

The act of conception is thus described by the learned Boerhaave: The male seed, which abounds with living animalcules, animated with great strength, extreme heat, and perhaps with a great quantity of animal spirits, is ejected with a violent impetuosity through the uterine orifice,

ficc, which is then open, by its neck, the valvules of which are then more limber, into the matrix of the woman, which is then swelled by motion, by heat, and becomes turgid by a sort of slight inflammation which seems to take place; moistened also by its lymph and the spirits which are excited; the excitation produced in the nervous papillæ of the wrinkles of the vagina, causes the womb to close immediately and spasmodically. The male semen being then retained, heated, agitated, meeting with the ovum of the woman, its vivifying portion, which is of inconceivable smallness, insinuates itself through the pores, already dilated, of the little glandulous membrane of the egg, where it is retained, fixed, cherished by a gentle heat, nourished, takes root by the umbilical membrane, and soon suffocates or destroys all the other animalcules which have less strength. Thus is conception completed; but, as it sometimes happens that more than one of these animalcules is preserved, hence plural conceptions; hence two children, by this internal struggle, are sometimes born joined together. *Boerh. Inst. Med.* 673.

This hypothesis, however, not proving satisfactory, another hath been suggested by M. Buffon, by which, indeed, he at once annihilates the whole animalcular world; yet in this he hath been followed by several very ingenious philosophers. His system being founded upon a vast number of experiments, we shall give the particulars of them in his own words:

“Having procured the feminal vessels of a man who died a violent death, and whose body was still warm, I extracted all the liquor from them, and put it in a vial. I examined, by the microscope, a drop of this liquor, without any dilution. As soon as the vapours which arose from the liquor, and obscured the glass, were dissipated, I observed pretty large filaments, as represented in *fig. 22* of the preceding plate, which, in some places, spread out into branches, and, in others, intermingled with each other. These filaments clearly appeared to be agitated with an internal undulatory motion, like hollow tubes, which contained some moving substance. I saw distinctly two of these filaments, which were joined longitudinally, separate from each other in the middle, and alternately approach and recede, like two stretched cords, fixed by the ends, and drawn asunder at the middle. These filaments were composed of globules which touched one another, and resembled a chaplet of beads, as represented in *fig. 23* of the same plate. I then observed filaments which were blown up, and swelled in certain places, as shewn in *fig. 24*; and perceived small oval globules issue from these swelled parts, which had a vibratory motion, like that of a pendulum, as represented in *fig. 25*. These small bodies were attached to the filaments by little threads, which gradually lengthened as the bodies moved: and, lastly, I observed these small bodies detach themselves entirely from the large filament, and draw after them the little thread, which resembled a tail. As the liquor was too thick, and the filaments too near each other, I diluted another drop with pure rain water, after satisfying myself that it contained no animalcules. I then perceived that the filaments were more distant from each other, and saw distinctly the motion of the small bodies above taken notice of, which was more free, and they appeared to swim with greater agility, and trailed their threads after them with greater ease; and, if I had not seen them separate from the filaments, and draw the threads out of them, I should have believed, from this second observation, the moving bodies to be real animals, and their threads to be tails. This appearance is faithfully delineated in *fig. 26* of the same plate. After examining with great attention one of the filaments, which was three times thicker than the small bodies, I perceived two of these bodies detach themselves with much difficulty, and drag after them long slender threads, which impeded their motion. When the feminal liquor became more fluid, the filaments disappeared; but the small bodies were exceedingly numerous, as shewn in *fig. 27*. Their motion, for

the most part, resembled that of a pendulum; each of them had a long thread, from which they evidently endeavoured to disengage themselves; their progressive motion was extremely slow, during which they vibrated to the right and left. At each vibration, they had a rolling unsteady motion; so that, besides their horizontal vibrations, they roll or vibrate in a vertical direction; which proves these bodies to be of a globular figure, or at least that their inferior part is not a flat base sufficiently extensive to keep them in one position. At the end of two or three hours, when the liquor was more fluid, a still greater number of these moving bodies appeared, as represented in *fig. 28*. They were more free of incumbrances; their threads were shorter; their progressive motion was more direct; and their horizontal vibration was greatly diminished; for the longer the threads were, their vibratory motion was increased, and their progress forward was diminished. The vertical vibration was still apparent. In five or six hours, the liquor had almost all the fluidity it could acquire, without being decomposed. We then discovered that most of these small moving bodies were entirely disengaged from their threads, as shewn in *fig. 29*. Their figure was oval; they moved forward with considerable quickness; and, by their motion backward and forward, and to every side, they had now more than ever the appearance of real animals. Those which had tails or threads sticking to them, seemed to have less vivacity than the others. Of those which had no threads, some appeared to change both their figure and their size. Some were round; but the greatest part of them were oval, and a few were thicker at the extremities than in the middle. The rolling and vibratory motions were still perceptible. In twelve hours, the liquor had deposited, at the bottom of the vial, a kind of gelatinous, bluish, or rather ashy-coloured, substance; and the fluid that swam on the top was nearly as clear as water, only it had a tincture of blue, like water in which a small quantity of soap had been dissolved. It still, however, retained its viscosity. The little bodies, which were now entirely freed from their threads, moved with great activity on all sides, and some of them turned round their centres. Most of them were oval, though some of them were round. I have seen them change figures, and from oval become round: I have seen them divide, and, from a single oval or globule, separate into two. Their activity always increased as their size diminished. At the end of twenty-four hours, the liquor had deposited a greater quantity of gelatinous matter, which I diluted, with some difficulty, in water. It appeared to consist of a multitude of opaque tubes resembling lace, but without any regularity or the smallest motion. In the clear semen itself, there were a few small bodies still moving; next day their number was still farther diminished. After this nothing was to be seen but globules without the least appearance of motion. These experiments were often repeated with great exactness; and they convinced me that the threads which adhere to the moving bodies are not tails, nor any part proper to these bodies; for the tails or threads have no proportion to the rest of the body; they are of different dimensions, though the bodies are always nearly of the same size at the same time. The motion of the globule is embarrassed in proportion to the length of the tail. When the tail is too long, it sometimes prevents the progressive motion altogether, leaving nothing but the vibrations from right to left; and the globules make evident efforts to disentangle themselves from this incumbrance.

“Having procured the feminal fluid of another man recently dead, I put a pretty large drop of it on the glass of the microscope, and it soon liquefied without any mixture. It had the appearance of a close net-work, the filaments of which were of a considerable length and thickness, and they seemed to proceed from the thickest part of the liquor, as shewn in *fig. 30*. These filaments separated in proportion as the liquor became more fluid; and at last they divided into globules, which seemed at first to have

have too little force to put them in motion: but their power of moving increased as they receded from the filaments, and they appeared to make considerable efforts to disengage themselves. In this manner each of them gradually drew tails of different lengths out of the filaments. Some of these tails were so long and so thin, that they had no proportion to the bodies, which were always more or less embarrassed, according to the length of the threads or tails. When the tail was long, the angle of the vibratory motion was increased; and, when the tail was short, the progressive motion was more conspicuous. I continued my observations, almost without interruption, for fourteen hours; and I discovered, that the length of the tails or threads gradually diminished, and became so thin and delicate, that their extremities successively ceased to be visible; and at last the whole disappeared. The horizontal vibrations of the globules then ceased, and their progressive motion was then direct, though they still had vertical oscillations, or, rather, they rolled like a vessel at sea. The small bodies, when deprived of their tails, were oval and transparent, and resembled those pretended animals which are seen in oyster-water on the sixth or seventh day, or those found in the jelly of roasted veal at the end of the fourth day.

"Between the tenth and twelfth hour, the liquor was become very fluid, and all the globules appeared to proceed in troops from one side of the drop, as represented in *fig. 31*. They passed over the field of the microscope in less than four seconds; they marched in lines of seven or eight in front; and succeeded each other without interruption, like the defiling of soldiers. I observed this singular phenomenon for more than five minutes; and, as the current of animals did not then cease, I was desirous of discovering the cause. I therefore gently shifted the glass, and perceived that all these moving globules proceeded from a kind of mucilage or net-work of filaments, as shewn in *fig. 32*, which continually produced them, and with more rapidity and copiousness than the filaments had done ten hours before. There was still a difference more remarkable between the globules produced by the liquor, when thick, and those produced when it was more fluid; for, in the latter case, they drew no threads or tails after them, their motion was quicker, and they went in flocks like sheep. I examined the mucilage from which they proceeded for a long time, and perceived that it gradually diminished, and was converted into moving globules, till more than one half of it was destroyed. After which, the liquor being too dry, this mucilage became obscure in the middle, and it was surrounded with small threads, forming square intervals, as shewn in *fig. 33*. These small threads seemed to be composed of the bodies of the moving globules which had been killed by the drying of the liquor, and the whole resembled the web of a spider besprinkled with drops of dew. By the first experiments, I perceived that these small moving bodies changed their figures; and I imagined, that, in general, they diminished in bulk, though I was not then altogether certain of the fact. But my subsequent observations removed every doubt. At the twelfth and thirteenth hour, the bodies were visibly smaller; but, as they diminished in bulk, their specific gravity increased, especially when they ceased to move, which they generally did all at once, and fell down to the bottom in form of an ash-coloured sediment, which was perceptible by the naked eye; and, by the assistance of the microscope, it appeared to be composed of globules attached to one another, sometimes by threads, and at other times by groups, but always in a regular manner."

From these experiments, M. Buffon concludes, that what Leeuwenhoek, Hartsoecker, and others, have called spermatic animals, are not creatures really endowed with life, but something proper to compose a living creature; and he distinguishes them by the name of *organic particles*. The same individual kinds of animals he declares he has found in the fluids separated from the ovaria of females:

and for the truth of this appeals to the testimony of Mr. Needham, who was an eye-witness of his experiments. He also brings an additional proof of his doctrine from Mr. Needham's observations on the milt of the *calmar*, a species of cuttle-fish, which, he says, contains no animalcules; and therefore we may from analogy conclude, that the small moving bodies which are to be seen in the semen of other animals, are not really creatures endowed with life. M. Buffon extends the analogy still further; and concludes, that all the moving bodies which are to be found in the infusions either of animal or vegetable substances are of a similar nature. "To discover (says he) whether all the parts of animals, and all the seeds of plants, contained moving organic particles, I made infusions of the flesh of different animals, and of the seeds of more than twenty different species of vegetables; and after remaining some days in close glasses, I had the pleasure of seeing organic moving particles in all of them."

These systems, however, both of *spermatic animalcules*, and of *organic particles*, notwithstanding the specious mode in which they were introduced, and the credit given them by men of the first philosophical ability, are now fallen into disrepute, and totally rejected by later physiologists, for reasons which may be seen under the article *IMPREGNATION*, and by consulting other observations in *ANATOMY*, p. 642, 643, &c.

ANIMALITY, *f.* The state of animal existence.

To ANIMATE, *v. a.* [*animo*, Lat.] To quicken; to make alive; to give life to: as, The soul *animates* the body; Man must have been *animated* by a higher power. To give powers to; to heighten the powers or effect of any thing. To encourage; to incite:

But none, ah! none can *animate* the lyre,
And the mute strings with vocal souls inspire:
Whether the learn'd Minerva be her theme,
Or chaste Diana bathing in the stream;
None can record their heav'nly praise so well
As Helen, in whose eyes ten thousand Cupids dwell.

Dryden.

ANIMATE, *adj.* Alive; possessing animal life.—All bodies have spirits and pneumatical parts within them; but the main differences between *animate* and *inanimate*, are two: the first is, that the spirits of things *animate* are all contained within themselves, and are branched in veins and secret canals, as blood is; and, in living creatures, the spirits have not only branches, but certain cells or seats, where the principal spirits reside, and whereunto the rest do resort: but the spirits in things *inanimate* are shut in, and cut off by the tangible parts, and are not pervious one to another, as air is in snow. *Bacon.*

Nobler birth

Of creatures *animate* with gradual life,
Of growth, sense, reason, all summ'd up in man. *Milton.*
There are several topics used against atheism and idolatry; such as the visible marks of divine wisdom and goodness in the works of the creation, the vital union of souls with matter, and the admirable structure of *animate* bodies. *Bentley.*

ANIMATED, *part. adj.* Lively; vigorous:

Warriors the fires with *animated* sounds;
Pours balm into the bleeding lovers wounds. *Pope.*

ANIMATED-NEEDLE, a needle touched with a magnet or loadstone.

ANIMATENESS, *f.* The state of being animated.

ANIMATION, *f.* The act of animating or enlivening. The state of being enlivened.—Two general motions in all *animation* are its beginning and encrease; and two more to run through its state and declination. *Brown.*

Animation is therefore, in a physical sense, the particular effect produced by the *vis vitalis*, in all animated bodies, by which life is begun and supported. The different hypotheses of physicians and philosophers, concerning the time of animation, have had their influence on the

penal

penal laws made against artificial abortions: it having been made capital to procure miscarriage in the one state, while in the other it was only deemed a venial crime. The emperor Charles V. by a constitution published in 1532, put the matter on another footing; instead of the distinction of an animated and unanimated fœtus, he introduced that of a vital and non-vital fœtus, as a thing of more obvious and easy decision, and not depending on any system either of creation, transduction, or infusion. Accordingly a fœtus is said, in a legal sense, to be animated, when it is perceived to stir in the womb; which usually happens about the middle of the term of gestation.

ANIMATION, is an ænigmatical word used by alchemists in their employ of transmuting metals. Quicksilver is said to be animated, when, by conjunction with a perfect metal, it is reduced to a certain species.

ANIMATIVE, *adj.* That which has the power of giving life, or animating.

ANIMATOR, *f.* That which gives life; or any thing analogous to life, as motion.

ANIME, *f.* [the Portuguese corrupted the word *anima* into *anime*.] It is improperly called *gum anime*, being a resinous substance imported from New Spain and the Brazils. It is also called *courbaril rezina*, *aminaca*, *animum*. Piso calls the tree from whence it is obtained *jetaiba*, and the Indians call it *courbaril*. It is the *hymenæa courbaril* of Linnæus.

The *gum anime* is a transparent, yellowish-white, resinous, gum, obtained from a large tree in Brazil and New Spain, and also in the eastern parts of the world. That from the east, Dioscorides calls by the names *myrrha* and *minaca*; but, in our shops, we have no other than the American forts. The small tears are the purest. It hath but little taste, though to the smell it is very agreeable. It easily breaks between the teeth; but, if chewed for some time, it softens and becomes adhesive. If it is laid on a red-hot iron, it immediately melts, catches flame, and burns quickly away, leaving only very little white ashes. It dissolves in *sp. vini R.* but is very little affected by water, except in distillation, by which it gives a part of its flavour, and a small quantity of oil.

The Brazilians are said to use it in fumigations for pains and aches from a cold cause. With us it is esteemed diuretic. The dose is $\mathfrak{z}$ i. The *gum copal* is often sold for it.

ANIME, in heraldry, a term used when the eyes of a rapacious creature are borne of a different tincture from the creature itself.

ANIMET'TA, *f.* among ecclesiastical writers, denotes the cloth wherewith the cup of the eucharist is covered.

ANIMO'SE, *adj.* [*animosus*, Lat.] Full of spirit; hot; vehement.

ANIMO'SENESS, *f.* Spirit; heat; vehemence of temper.

ANIMO'SITY, *f.* [*animositas*, Lat.] Vehemence of hatred; passionate malignity. It implies rather a disposition to break out into outrages, than the outrage itself.—No religious sect ever carried their aversions for each other to greater heights than our state parties have done; who, the more to inflame their passions, have mixed religious and civil *animosities* together; borrowing one of their appellations from the church. *Swift*.

ANIN'GA, *f.* a root which grows in the Antilles islands, much resembling the China plant. It is used by sugar-bakers for refining sugar.

ANJOU', a ci-devant province of France, forms, with the late provinces of Maine and Touraine, the four departments of Maine and Loire, Indre and Loire, Maine and Sarte. The air is temperate, and the country agreeably diversified with hills and meadows. There are thirty-three forests of oak-trees mixed with beech. The country produces white-wine, wheat, barley, rye, oats, pease, beans, flax, hemp, walnuts, and chestnuts. In Lower Anjou they make cider. There are fruit-trees of all kinds, and good pasture. The greatest riches of the province consist in cows, oxen, and sheep. There are several coal and iron mines; and quarries of marble and of slate; as

well as quarries of white stone, proper for building, on the side of the river Loire. Here are also several salt-petre-works and some glass-houses. The remarkable towns, besides Angers the capital, are Saumur, Brissac, Pons de Cea, La Fleche, and Beaufort.

ANIO, or A'NIEN, now *il Teverone*; a river of Italy, which falls into the Tiber, three miles to the north of Rome. It rises in a mountain near Treba; and, running through the country of the *Æquiculi*, or *Æqui*, it afterwards separated the Latins from the Sabines; but, nearer its mouth, or confluence, it had the Sabines on each side. It forms three beautiful lakes in its course. In the territories of Tibur it falls from a great height, and there forms a very rapid cataract; hence the epithet *præceps*, and hence the steam caused by its fall. *Anienus* is the epithet formed from it. *Anienus* is also the god of the river.

ANISA'TUM, *f.* A wine in which aniseeds are infused thus: take of Ascalon wine, (this was a strong wine,) $\mathfrak{f}$ ss xxx. honey $\mathfrak{f}$ ss x. aniseeds $\mathfrak{z}$ v. mix them and let them stand together a few days, then strain off the clear liquor.

A'NISE, *f.* [*anisum*, Lat.] A species of apium or parsley with large sweet-scented seeds. See *ILLICUM*, *PIMPINELLA*, and *BUBON*.

ANISIFO'LIUM, *f.* in botany. See *LIMONIA*.

ANISOMARA'THRUM, *f.* in botany. See *SCANDIX*.

A'NIUS, in fabulous history, king of the island of Delos, and high-priest of Apollo. He had three daughters, Oeno, Spermo, and Elais, to whom Bacchus gave the power of changing whatever they pleased into wine, corn, and oil. When Agamemnon went to the Trojan war, he wished to carry them with him to supply his army with provisions; but they complained to Bacchus, who changed them into doves.

AN'KER, *f.* [*ancher*, Du.] A liquid measure chiefly used at Amsterdam. It is the fourth part of the awm, and contains two *stekans*: each *stekan* consists of sixteen mingles; the mingle being equal to two of our wine quarts.

AN'KLE, *f.* [*ahcleow*, Sax. *anchel*, Du.] The joint which joins the foot to the leg.

ANKLE-BONE, *f.* [from *ankle* and *bone*.] The bone of the ankle.

AN'NA, or ANNE, [אנה Heb. gracious.] A Christian name of women.

ANNA, one of the three principalities into which Arabia Deserta is divided.

ANNA, one of the chief cities of the above principality, and formerly a famed mart-town, is situated in lat. 33. 57. and lon. 42. 10. E. on the river Euphrates, in a fruitful and pleafant soil. It has two streets, which are divided by the river. That on the Mesopotamia side is about two miles long, but thinly peopled, and by none but tradesmen; that on the opposite side is about six miles in length, and it is there that the principal inhabitants of the city dwell. Every house has some ground belonging to it; and these grounds are loaded with noble fruit trees, as lemons, oranges, citrons, quinces, figs, dates, pomegranates, olives, all very large and in great plenty. Some of the flat grounds are sown with corn and other grain, which yield likewise a considerable crop. This city is the common rendezvous of all the robbers that infest the country, and from which they disperse themselves into all parts of the Desert. Here they meet to consult; here they hold their grand council, and deliberate where to rob next with success. It is with great difficulty that the Turkish aga, and the janissaries, who are kept here, can levy the tribute imposed by the Turks on all the commodities carried through this city, which is one of the great thoroughfares for the passing of the caravans that go to and from Aleppo, Tripoli, Damascus, Bagdad, and some other parts of the Turkish empire.

ANNA, in fabulous history, the sister of Pygmalion and Dido, who followed her sister into Africa. After the death of Dido, she retired to Malta, from whence Pygmalion would have carried her away; but she got safe into Italy, where *Æneas* gave her honourable reception, for the

the kindness she had shewn him when he was at Carthage. However, Lavinia, the wife of Æneas, contrived her death; and, being informed of this by her sister in a dream, she fled to the river Numicius, of which she became a nymph.

ANNA'LE, *f.* in the church of Rome, a term applied to the masses celebrated for the dead during a whole year.

ANNA' LIS CLAVUS, *f.* the nail which the prætor, consul, or dictator, drove into the wall of Jupiter's temple annually upon the ides of September, to shew the number of years. But this custom was superseded by reckoning years by consulships. The ceremony was sometimes performed to avert the plague, &c.

AN'NALIST, *f.* A writer of annals.

ANNALS, *f.* [*annales*, Lat.] Histories digested in the exact order of time; narratives in which every event is recorded under its proper year. It has no singular:

Could you with patience hear, or I relate,
O nymph! the tedious *annals* of our fate;
Through such a train of woes if I should run,
The day would sooner than the tale be done! *Dryden.*

—We are assured, by many glorious examples in the *annals* of our religion, that every one, in the like circumstances of distress, will not act and argue thus; but thus will every one be tempted to act. *Rogers.*

Annals differ from perfect history in this, that annals are but a bare relation of what passes every year, as a journal is of what passes every day; whereas history relates not only the transactions themselves, but also the causes, motives, and springs, of actions. Annals require nothing but brevity; history demands ornament. Cicero informs us of the origin of annals. To preserve the memory of events, the *pontifex maximus*, says he, wrote what passed each year, and exposed it on tables in his own house, where every one was at liberty to read: this they called *annales maximi*; and hence the writers who imitated this simple method of narrating facts were called *annalists*.

ANNAN, the capital of Annandale, a division of Dumfriesshire in Scotland; a small town, containing about 600 inhabitants, and situated on a river of the same name, in lon. 3. o. W. lat. 54. 40. N. This place, which is a royal borough, has some trade in wine, and exports annually between 20,000 and 30,000 Winchester bushels (10,000 and 15,000 bolls) of corn. Vessels of about 250 tons can come within half a mile of the town; and of sixty, as high as the bridge; which consists of five arches defended by a gateway. A fabric for carding and spinning of cotton has lately been erected, and the town begins to increase. Here was formerly a castle; which was built by the Bruces after they became lords of Annandale. Upon the death of David II. the son of king Robert, in 1371, this castle (Lochmaben), and the lordship of Annandale, came to Thomas Randolph earl of Murray, and went with his sister Agnes to the Dunbars earls of March: after their forfeiture it went to the Douglasses, who also lost it by the same fate; and then having come to Alexander duke of Albany, he, for rebelling against his brother king James III. and plundering the fair of Lochmaben in 1484, was also forfeit. Since which time it continued in the hands of the king, and became the great key of the west border.

The stewartry or district of Annandale, of which Lochmaben castle was the chief fortalice, is a fertile vale, twenty-four miles long, and about fourteen miles broad: from its vicinity to England, and the continual incursions and predatory wars of the borderers, the greatest part of it was uncultivated and common: but, within the last forty years, all these wastes and commons have been divided and brought into culture, and the country has assumed a new appearance; which may be ascribed not only to the division of the commons, but likewise to the improvement made in the roads, and particularly in the great western road from Edinburgh to London by Moffat, Grately, and Carlisle. Annandale formed a part of the Roman province of Valentia; and, Severus's wall ending here, it abounds with Roman stations and antiquities. The camps

at Birrens in Middlebie, and on the hill of Burnfwork, are still entire, and their form is preserved; and the traces and remains of a military road are now visible in different parts of the country. The ruins of the house or castle of Auchincass, in the neighbourhood of Moffat, once the seat of that potent baron, Thomas Randolph, earl of Murray, lord of Annandale, and regent of Scotland, in the minority of David II. covers above an acre of ground, and even now conveys an idea of the plan and strength of the building. The ancient castle of Comlongan, formerly belonging to the Murrays, earls of Annandale, is still in a tolerable state of preservation.

ANNA'NO, a strong fort of Italy, in the duchy of Milan. It has been twice taken by the French; but was restored to the duke of Savoy in 1706. It is seated on the river Tanaro, in lat. 44. 40. N. lon. 8. 30. E.

ANNA'POLIS, the capital of Maryland, and the wealthiest town of its size in North America. It is situated at the mouth of Severn river, and was originally known by that name, which was changed for its present one in 1694, when it was made a port-town, and the residence of a collector and naval officer. It stands on a healthy spot, thirty miles south of Baltimore, in lat. 29. 25. N. and is a place of but little note in the commercial world. The houses are generally large and elegant, indicative of great wealth; the number of inhabitants does not exceed 2000. The design of those who planned the city was to have the whole in the form of a circle, with the streets like radii, beginning at the centre, where the state-house stands, and thence diverging in every direction. The principal part of the buildings are arranged agreeably to this plan.

ANNAPOLIS ROYAL, a town of Nova Scotia, is seated in the bay of Fundy; and, though a mean place, was formerly the capital of the province. It has one of the finest harbours in America, capable of containing 1000 vessels at anchor in the utmost security. The place is also protected by a fort and garrison. At the bottom of the harbour is a point of land, which divides two rivers; and on each side there are pleasant meadows, which in spring and autumn are covered with all sorts of fresh water fowl. There is a trade carried on by the Indians with furs, which they exchange for European goods. Lat. 45. 10. N. lon. 64. 5. W.

ANNAS, [of אָנָּא Heb. gracious.] A high-priest of the Jews.

AN'NATS, *f.* [*annates*, Lat.] First fruits; because the rate of first fruits, paid to spiritual livings, is after one year's profit. Masses said in the Romish church for the space of a year, or for any other time, either for the soul of a person deceased, or for the benefit of a person living. It has no singular. See FIRST FRUITS.

ANNE, queen of Great Britain. This amiable and illustrious princess was descended from a race of kings, the most ancient of any in Europe. She was second daughter of James duke of York, afterwards king James II. by Mrs. Anne Hyde, eldest daughter of Edward earl of Clarendon. The duke was privately married to this lady during his first exile, in 1659. In 1660, she was, by an order of council, declared duchess of York, and to have the precedence of the princesses of Orange and the queen of Bohemia. The duchess died at the palace of St. James's, March 15, 1671; she had issue by the duke four sons and four daughters: Charles, born October 22, 1660; Mary, born April 30, 1662; James, born July 12, 1663; Anne, born February 6, 1664; Charles, born July 4, 1665; Edgar, born September 14, 1667; Henrietta, born January 13, 1669; and Catharine, born February 9, 1670; of whom Charles, James, Charles, and Henrietta, died in her life-time; and Edgar and Catharine did not survive her a year; but Mary and Anne lived to be queens of England. Princess Mary was about nine years old, and princess Anne about seven, at the death of their mother. On the death of king William III. who died on Sunday, March 8, 1702, about eight in the morning, princess Anne was, about three the same afternoon, proclaimed queen of Great Britain, France, and Ireland,

Ireland, in the cities of London and Westminster, and was crowned April 23 following. The most remarkable events in her reign were, War declared against France and Spain, May 4; prince George made lord high admiral; the earl, afterwards duke, of Marlborough, generalissimo; an unsuccessful attempt on Cadix; Vigo taken by the English and Dutch, October 12; 1702. Admiral Bembow betrayed; the great storm, November; 1703. Order of the thistle revived; victory at Schellenburgh; the great battle at Hochstet or Blenheim, where the French lost 30,000 men, had 10,000 men taken prisoners, and marshal Tallard their general, in August; the sea-fight off Malaga, August 13; 1704. The battle of Ramilies, May 12; the union between England and Scotland, signed July 22; and the battle of Turin; all in 1706. The battle of Almanza, April 14, 1707. Sir Cloudesley Shovel wrecked on the rocks of Scilly; the battle of Oudenarde, June 30; Minorca taken by general Stanhope, September 18; the action of Wymondale, September 28; the city of Lille taken, October 12; 1708. The battle of Malplaquet, September 11, 1709. The battle of Saragossa, August 9; general Stanhope taken prisoner at Brihuega, November 26; the battle of Villa Viciosa, November 29; 1710. The duke of Ormond separates the British forces from the allies, July 5; and the action of Denain, July 13; 1712. The peace of Utrecht signed March 30, 1713. Sunday, at a little after seven o'clock in the morning, August 1, 1714, the queen died, having lived forty-nine years, five months, and six days; and reigned twelve years and five months, wanting seven days. There had been a new vault made on the south side and towards the east end of Henry VII's chapel, to deposit the body of Charles II. in which that prince, queen Mary, king William III. and prince George of Denmark, were laid. Here the remains of queen Anne were likewise deposited; and, there being no more room left, the vault is closed with brick-work. She had been married to his royal highness prince George, brother to the then king of Denmark, July 28, 1683, by whom she had a daughter still-born, May 12, 1684; lady Mary, born June 2, 1685, died February, 1690; lady Anne Sophia, born May 12, 1686, died February following; William duke of Gloucester, born July 24, 1689, and lived till eleven-years of age; Mary, born October, 1690, and lived long enough to be baptized; and George, who died soon after he was born. Prince George, her husband, died October 28, 1710.

Thus died Anne Stuart, queen of Great Britain, and one of the best and greatest monarchs that ever filled that throne. In her person she was of the middle stature, and, before she bore children, well made. Her hair was dark, her complexion sanguine, her features strong, but not irregular; her whole countenance was dignified and agreeable. In the accomplishments of the mind, as a woman, she was not deficient; she understood music, loved painting, and had some taste for works of genius. What was most remarkable, was a clear harmonious voice, always admired in the graceful delivery of her speeches to parliament, inasmuch that it used to be a common saying in the mouth of every one, "that her very speech was music." Good-nature, the true characteristic of the Stuarts, predominated in her temper, which was a compound of benevolence, generosity, indolence, and timidity, but not without a due sensibility of any slight which she thought was offered to her person or her dignity; to these all her actions, both as a monarch and as a woman, may be ascribed; these were the sources both of her virtues and her failings; her greatest blessing upon earth was that entire union of affections and inclinations between her and her royal consort, which made them a perfect pattern of conjugal love. She was a fond and tender mother, an easy and indulgent mistress, and a most gracious sovereign; but she had more than once reason to repent her giving up her heart, and trusting her secrets without reserve to her favourites. She was never expensive, but saved money out of her 50,000*l.* a-year, which, after she came to the

crown, was paid to prince George of Denmark, and was his by right. She retained to the last the true principles of that religion which she had early imbibed; and was charitable without ostentation. She had a great reverence for clergymen eminent for learning and good lives, and was particularly beneficent to the poorer sort of them, of which she left an evidence which bears her name, and will perpetuate both that and her bounty to all succeeding generations.

We cannot here omit the character of queen Anne, as written by the duchess of Marlborough, a lady who had such an opportunity of thoroughly knowing the queen, and who bore so great a part in many of the transactions of that glorious reign:

"Queen Anne was very graceful and majestic in her person: religious without affectation; she always meant well; she had no false ambition, which appeared by her never complaining at king William's being preferred to the crown before her, when it was taken from the king, her father, for following such counsels, and pursuing such measures, as rendered the revolution necessary. It was her greatest affliction to act against him, even for security. Her journey to Nottingham was never concerted, but occasioned by the great consternation she was under at the king's sudden return from Salisbury. She always paid the greatest respect to king William and queen Mary; never insisted upon any one circumstance of grandeur more than what was established in her family by king Charles II. though, after the revolution, she was presumptive heir to the crown, and, after the death of her sister, was in the place of prince of Wales. Upon her accession to the throne, the civil list was not increased. The late earl of Godolphin, lord high-treasurer of England, has often said, that from accidents in the customs, and lenity in the collection, it did not arise, one year with another, to more than 500,000*l.* a-year. She had no vanity in her expences, nor bought any one jewel in the whole time of her reign. She paid out of her civil list many pensions granted in former reigns, which have since been thrown upon the public. When a war was necessary, to secure Europe against the power of France, she contributed in one year towards the war, out of her civil list, 100,000*l.* in ease of her subjects. She granted the revenues arising from the first-fruits, to augment the provisions of the poorer clergy. She never refused her private charity to proper objects. Till a few years before her death, she never had but 20,000*l.* a-year for her privy-purse; at the latter end of her reign it did not exceed twenty-six thousand pounds a-year; which was much to her honour, because it is subject to no account: and, as to her robes, it will appear by the records in the exchequer, that in nine years she spent only 32,050*l.* including the coronation expence. She was extremely well-bred: treated her chief ladies and servants as if they had been her equals: her behaviour to all that approached her was decent and full of dignity, and shewed condescension, without art or meanness. All this I know to be true, *Sarah Marlborough.*"

The above character is cut round the pedestal, on which stands a full-length figure of the queen, at Blenheim, the seat of the duke of Marlborough.

ANNE of AUSTRIA, widow of Lewis XIII. was invested with the regency of France, on the death of her husband. She soon resigned herself entirely to the influence of cardinal Mazarine; and it is now generally supposed that she married him, and had by him a son, afterwards so mysteriously confined in the Bastille, under the appellation of the man with the iron-mask. Lewis XIV. was about five years old at the death of his father. Madame de Bavie, in her Letters, says, "Abbé ——— was detected in an intrigue: Anne of Austria however did much worse; she was not contented with intriguing with cardinal Mazarine, she married him." This she could do, as the cardinal had not taken priest's orders. Mazarine, however, became very soon tired of the queen, and used her very ill, the usual consequence of such a marriage. Yet, when

Mazarine

QUEEN ANNE.

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Mazarine founded this queen respecting the marriage of her son Lewis XIV. with one of his nieces, she nobly replied, "If the king was capable of degrading himself so far, I would put myself with my second son at the head of the whole French nation against the king and against you." At the dukes of Norfolk's seat at Holme, near Hereford, there is a whole-length portrait of the princess, with this inscription, "*Anne reine de France, grosse de six mois; fait par Beaubrun 1638.*" and indeed the queen's pregnancy is pretty visible in the picture.

St. ANNE'S DAY, a festival of the Christian church, celebrated by the Latins on the 26th of July, but by the Greeks on the 9th of December. It is kept in honour of Anne, or Anna, mother of the Virgin Mary.

To ANNE'AL, *v. a.* [*alan*, Sax. to heat.] To heat glass, that the colours laid on it may be fixed:

But when thou dost *anneal* in glass thy story,
 ——— then the light and glory
 More rev'rend grows, and more doth win,
 Which else shews wat'rish, bleak, and thin. *Herbert.*

To heat glass after it is blown, that it may not break. To heat any thing in such a manner as to give it the true temper.

ANNE'ALING, *f.* by the workmen called *nealing*, is particularly used in tempering glass. It consists in placing the bottles, &c. whilst hot, in a kind of oven or furnace, where they are suffered to cool gradually; they would otherwise be too brittle for use. Metals are rendered hard and brittle by hammering: they are therefore made red-hot, in order to recover their malleability; and this is called *nealing*. The difference between unannealed and annealed glass, with respect to brittleness, is very remarkable. When an unannealed glass-vessel is broken, it often flies into a small powder, with a violence seemingly very unproportioned to the stroke it has received. In general, it is in greater danger of breaking from a very slight stroke than from one of some considerable force. One of those vessels will often resist the effects of a pistol-bullet dropt into it from the height of two or three feet; yet a small angular pebble falling into it will make it burst into small fragments. This takes place sometimes immediately on dropping the pebble into it: but often the vessel will stand for several minutes after, seemingly secure; and then, without any new injury, it will fly to pieces. If the vessel be very thin, it does not break in this manner, but seems to possess all the properties of annealed glass. The same phenomena are still more strikingly seen in glass drops or tears. They are globular at one end, and taper to a small tail at the other. They are the drops which fall from the melted glass on the rods on which the bottles are made. They drop into the tubs of water which are used in the work; and the greater part of them burst immediately in the water. When those that remain entire are examined, they discover all the properties of unannealed glass in the highest degree. They will bear a smart stroke on the thick end without breaking; but, if the small tail be broken, they burst into small powder with a loud explosion. They appear to burst with more violence, and the powder is smaller, in an exhausted receiver than in the open air. When they are annealed, they lose these properties. Some attempt to account for this phenomenon, by supposing that the sudden cold applied to the surface forms a strong coat by which the particles within are prevented from expanding as glass naturally does in passing from a fluid to a solid state. On the breaking of any part of this hard case, the particles are supposed to be set at liberty, and thus produce an explosion. This theory however will not bear examination, though it must be confessed philosophy does not furnish us with any that is better. See GLASS.

A process similar to what is practised with glass is now used for rendering kettles and other vessels of cast-iron less brittle: of it the same explanation may be given.

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The greater number of metals diminish in bulk when they pass from a fluid to a solid state; but iron, on the contrary, expands. Forged iron has long been procured, by placing a mass of cast-iron under large hammers, and making it undergo violent and repeated compression. A process is now used for converting cast-iron into forged, by heat alone. The cast-iron is placed in an air-furnace, and kept for several hours in a degree of heat, by which it is brought near to a fluid state. It is then allowed to cool gradually, and is found to be converted into a substance similar to forged iron. This process is conducted under a patent; although, if Reaumur's experiments upon cast-iron be consulted, it will appear not to be a new discovery. By these experiments it is ascertained, that, if cast-iron be exposed for any length of time to a heat considerably below its melting point, the texture and properties are not changed: but, if it be kept in a heat near the melting point, the surface soon becomes lamellated like forged-iron; and the lamellated structure extends farther into the mass in proportion to the length of time in which it is exposed to that degree of heat. When it is continued for a sufficient time, and then allowed to cool gradually, it is found to possess the lamellated structure throughout. See IRON.

AN'NECY, a city of Savoy, seated between Chambery and Geneva, on the banks of a lake of the same name, from whence run several brooks, which flow thro' the town, and form a river. There are piazzas in most of the streets, which serve to shelter the inhabitants from rain. It has several collegiate and parish churches, as well as convents for men and women. The lake is about nine miles long and four broad. Lat. 45. 53. N. lon. 6. 12. E.

AN'NESLEY (Arthur), earl of Anglesey, and lord privy seal in the reign of Charles II. was the son of Sir Francis Annesley, Bart. and was born at Dublin on the 10th of July, 1614. He was of the university of Oxford, and afterwards studied the law at Lincoln's Inn. He had a considerable share in the public transactions of the sixteenth century: for in the beginning of the civil war he sat in the parliament held at Oxford; but afterwards became reconciled to the opposite party, and was sent commissioner to Ulster, to oppose the designs of the rebel Owen Roe O'Neal. He engaged in several other affairs with great success. He was president of the council of state after the death of Cromwell, and was principally concerned in bringing about the restoration: soon after which, Cha. II. raised him to the dignity of a baron, by the title of lord Annesley, of Newport-Pagnel, Bucks; and a short time after, he was made earl of Anglesey. During that reign he was made treasurer of the navy, and lord privy seal. In October 1680, his lordship was charged by Dangerfield, in an information delivered upon oath, at the bar of the house of commons, with endeavouring to stifle evidence in relation to the popish plot. The uneasiness he received from this attack did not prevent his speaking his opinion freely in the house of lords, particularly in regard to the popish plot. About the same time he answered lord Castlereagh's Memoirs, in which that nobleman endeavoured to paint the Irish rebellion in the lightest colours; and a sharp dispute was raised, which ended in the seals being taken from him. He possessed great abilities, had uncommon learning, and was well acquainted with the constitution and laws of England. He wrote, besides his Animadversions on Castlereagh's Memoirs, 1. The Privileges of the House of Lords and Commons stated. 2. A Discourse on the House of Lords. 3. Memoirs. 4. The History of the Troubles in Ireland, from the rebellion in 1641 till the restoration. 5. Truth unveiled, in behalf of the Church of England; and some other works. He died in April 1686, in the 73d year of his age; and was succeeded by his son James.

To ANNE'X, *v. a.* [*annecto*, *annexum*, Lat. *annexer*, Fr.] To unite to at the end; as, He *annexed* a codicil to his will. To unite, as a smaller thing to a greater; as, He *annexed* a province.

a province to his kingdom. To unite *à posteriori*; annexion always pre-supposing something: thus we may say, Punishment is *annexed* to guilt, but not guilt to punishment:

Nations will decline so low
From virtue, which is reason, that no wrong,
But justice, and some fatal curse *annex'd*,
Deprives them of their outward liberty.

Milton.

He cannot but love virtue wherever it is, and *annex* happiness always to the exercise of it. *Atterbury*.—The temporal reward is *annexed* to the bare performance of the action, but the eternal to obedience. *Rogers*.

ANNEX, *f.* The thing annexed; additament.—Failing in his first attempt to be but like the highest in heaven, he hath obtained of men to be the same on earth, and hath accordingly assumed the *annexes* of divinity. *Brown*.

ANNEXATION, *f.* Conjunction; addition. Union; act or practice of adding or uniting.—If we can return to that charity and peaceable-mindedness, which Christ so vehemently recommends to us, we have his own promise, that the whole body will be full of light, (Matt. vi.) that all other Christian virtues will, by way of concomitance or *annexation*, attend them. *Hammond*.

ANNEXATION, in law, a term used to imply the uniting of lands or rents to the crown.

ANNEXION, *f.* The act of annexing; addition.—It is necessary to engage the fears of men, by the *annexion* of such penalties as will overbalance temporal pleasure. *Rogers*.

ANNEXMENT, *f.* The act of annexing. The thing annexed.

ANNIHILABLE, *adj.* [from *annihilate*.] That which may be reduced to nothing; that which may be put out of existence.

To ANNIHILATE, *v. a.* [ad and *nihilum*, Lat.] To reduce to nothing; to put out of existence.—It is impossible for any body to be utterly *annihilated*; but that, as it was the work of the omnipotency of God to make somewhat of nothing, so it requireth the like omnipotency to turn somewhat into nothing. *Bacon*. To destroy, so as to make the thing otherwise than it was. To annul; to destroy the agency of any thing.

ANNIHILATION, *f.* The act of reducing to nothing. The state of being reduced to nothing:

That knowledge, which as spirits we obtain,
Is to be valued in the midst of pain:

Annihilation were to lose heav'n more:

We are not quite exil'd where thought can soar. *Dryden*.

Christians, Heathens, Jews, divines, philosophers, &c. have their peculiar systems concerning annihilation; and we find great disputes among them about the reality, the possibility, the means, measures, prevention, ends, &c. of annihilation. The first notions of the production of a thing from, or reduction of it to, nothing, Dr. Burnet shews, arose from the Christian theology; the words *creation* and *annihilation*, in the sense now given to them, having been equally unknown to the Hebrews, the Greeks, and the Latins. The ancient philosophers in effect denied all annihilation as well as creation, resolving all the changes in the world into new modifications, without supposing the production of any thing new, or destruction of the old. By daily experience, they saw compounds dissolved; and that in their dissolution nothing perished but their union or connection of parts: when in death the body and soul were separated, the man they held was gone, but that the spirit remained in its original the great soul of the world, and the body in its earth from whence it came; these were again wrought by nature into new compositions, and entered new states of being which had no relation to the former.

The Socinians, and other Christian writers, shocked with the horrible prospect of eternal torments, have taken refuge in the system of annihilation. This system seems countenanced by Scripture; for that the words *death*, *destruction*, and *perishing*, whereby the punishment of the wicked is most frequently expressed in Scripture, do most

properly import annihilation and an utter end of being. To this Tillotson answers, that these words, as well as those corresponding to them in other languages, are often used, both in Scripture and other writings, to signify a state of great misery and suffering, without the utter extinction of the miserable. Thus God is often said in Scripture to bring *destruction* on a nation, when he sends judgments upon them, but without exterminating or making an end of them. So, in other languages, it is frequent, by *perishing*, to express a person's being made miserable; as in that known passage in Tiberius's letter to the Roman senate: *Ita me dii, deaque omnes, pejus perdant, quam hodie perire me sentio*. As to the word *death*, a state of misery which is as bad or worse than death may properly enough be called by that name; and thus the punishment of wicked men after the day of judgment is in the book of Revelations frequently called the *second death*.

It has been much disputed among divines, whether, at the consummation of all things, this earth is to be annihilated, or only purified, and fitted for the habitation of some new order of beings. Gerard in his Common Places, and Hakewil in his Apology, contend earnestly for a total abolition or annihilation. Ray, Calmet, and others, think the system of renovation or restitution more probable, and more consonant to Scripture, reason, and antiquity. The fathers who have treated on the question are divided; some holding that the universe shall not be annihilated, but only its external face changed; others asserting, that the substance of it shall be destroyed.

ANNI NUBILES, in law, denotes the marriageable age of a woman, viz. after she has arrived at twelve.

ANNIVERSARY, *f.* [*anniversarius*, Lat.] A day celebrated as it returns in the course of the year. The act of celebration, or performance, in honour of the anniversary day.—For encouragement to follow the example of martyrs, the primitive Christians met at the places of their martyrdom, to praise God for them, and to observe the *anniversary* of their sufferings. *Stillingfleet*.—Anniversary is an office in the Romish church, celebrated now only once a year, but which ought to be said daily through the year, for the soul of the deceased. *Ayliffe*.

ANNIVERSARY, *adj.* [*anniversarius*, Lat.] Returning with the revolution of the year; annual; yearly.—The heaven whirled about with admirable celerity, most constantly finishing its *anniversary* vicissitudes. *Ray*.

ANNOBON', a small island of Africa, on the coast of Loango, belonging to the Portuguese. It lies in lat. 1. 50. S. lon. 5. 10. E. and receives its name from being discovered on New-year's Day. According to Pyrad, it is about six French leagues in compass. Here are two high mountains, the tops of which being continually covered with clouds, occasion frequent rains. On the south-east of the island are two rocks; one of which is low, and upon a level with the surface of the sea; the other higher and larger, but both dangerous in the night to shipping; but between them the channel is deep and clear. These rocks are inhabited by vast numbers of birds, so tame, that the sailors frequently catch them with their hands. On the same side of the island is a convenient watering-place at the foot of a rivulet, which tumbles from the mountains down to a valley covered with orange and citron trees, &c. affording a pleasant and refreshing shade; but the road on the north-west side is difficult and dangerous, though most frequented by ships who have no intention of touching upon the continent. In either place it is difficult to take in a sufficient quantity of water, on account of the violent breakings of the sea, and a stone entrenchment erected by the negroes, from which they annoy all strangers that attempt to land. The true road for shipping lies on the north-east side, where they may anchor in seven, ten, thirteen, or sixteen, fathoms, on a fine sand close to the land, opposite to the village where the negroes have thrown up their entrenchments. The climate is wholesome, and the air clear and serene for the greatest part of the year. Every part of the island is watered by pleasant brooks, and fresh water

The Trifid fruited Custard Apple

J. Rysbrack del.

Published as the Act directs Feb. 1796 by J. Wilkes.

Bartow sculp.

water springs, which, however, at the new and full moons, or in all high tides, acquire a brackishness. The banks of every rivulet are covered with palms, whence the inhabitants extract their wine by incision. Here are a number of fertile valleys, which produce Turkey-corn, rice, millet, yams, potatoes, &c. and afford pasture for abundance of oxen, sheep, goats, &c. Poultry and fish also abound here; but the only mercantile production is cotton, which is esteemed equal in quality to any produced in India, though the quantity is small. All the inhabitants are meanly clothed; the women go bare-headed, and have also the upper part of the body naked, modesty being defended by a piece of linen wrapt under their stomach, and falling down in form of a petticoat, or wide apron, to the knees. The men wear only a linen girdle round the loins, with a small flap before. The women carry their children on their backs, and suckle them over the shoulder. All the inhabitants are subject to the Portuguese governor, who is the chief person in the island; at the same time that the negroes have their own chief subordinate to him.

AN'NO DO'MINI, the computation of time from the incarnation of our Saviour. The Romans began their æra of time from the building of Rome; the Grecians computed by Olympiads; and the Christians reckon from the birth of Jesus Christ.

ANNOI'SANCE, *f.* [from *annoy*, but not now in use.] In law, it hath a double signification. Any hurt done either to a public place, as highway, bridge, or common river; or to a private, by laying any thing that may breed infection, by encroaching, or such-like means. The writ that is brought upon this transgression. See NUISANCE, the word now used.

ANNOMÆ'ANS, the name of the thorough-placed Arians in the fourth century, because they held the essence of the Son of God to be unlike that of the Father.

ANNOMINATION, *f.* in rhetoric, the fame with what is otherwise called *paronomasia*. See PARONOMASIA.

ANNO'NA, *f.* In botany, a genus of the polyandria polygynia class, ranking in the natural order of eoadunatae. The generic characters are—Calyx: perianthium three-leaved, small; leaflets cordate, concave, acuminate. Corolla: petals six, cordate, sessile; the three alternate interior ones less. Stamina: filaments scarcely any; antheræ very numerous, placed on the receptacle. Pistillum: germ roundish, placed on a roundish receptacle; styles none; stigmas obtuse, numerous, covering the whole germ. Pericarpium: a berry, very large, roundish, clothed with a scaly bark, one-celled. Seeds: very many, hard, ovate-oblong, placed in a ring, nestling.—*Essential Character.* Calyx, three-leaved; petals, six; berry, many-seeded, roundish, with a scaly bark.

Species. 1. *Annona muricata*, or rough-fruited custard-apple, or sour sop: leaves oval-lanceolate, smooth, acute; fruits muricate; petals ovate, the interior ones obtuse, shorter. The first species is a middle-sized tree, rarely above twelve or fourteen, or at most twenty, feet high. Trunk upright, with stiff, round, smooth, branches, and a brownish ash-coloured bark. It is a native of the West Indies, and is common in every savannah of Jamaica, flowering in the spring. The large succulent fruit is agreeable to new-comers, and over-heated habits; but it is so common, and so much in use among the negroes, that it is hardly ever used among the better sort of people. The smell and taste of the fruit, flowers, and whole plant, resemble very much those of black currants. There is a variety of it in Jamaica with inodorous leaves, larger flowers of a fulvous colour, and spherical mucronate fruits.

2. *Annona tripetala*, or broad-leaved custard-apple: leaves ovate, acute, pubescent beneath; flowers three-petalled; petals lanceolate, coriaceous, tomentose. The second sort grows to a very large tree in South America, and is well furnished with branches. Leaves bright green, much larger than those of any other species. The fruit is oblong, scaly on the outside, and of a dark purple colour when ripe; the flesh is soft and sweet, and has many

brown seeds intermixed with it, which are very smooth and shining. This fruit is esteemed by the Peruvians as one of their most delicate sorts.

3. *Annona squamosa*, or undulated custard-apple or sweet sop: leaves oblong, acute, smooth; fruits obtusely sealed; outer petals lanceolate, inner ones minute. The third sort is a small tree, about eight feet in height, and is frequently rather a shrub. The trunk is smooth, and the branches spreading and round. Flowers usually in pairs, green without, whitish within. Seeds flattened a little, black with a white scar on the side, wrapped in a succulent cottony substance. It is a native both of the East and West Indies. The fruit is sweet, and is eaten in those countries.

4. *Annona reticulata*, or netted custard-apple: leaves oblong-lanceolate, acute, smooth; fruits ovate, reticulate-areolate; outer petals lanceolate, inner minute. The fourth sort is a tree which grows to the height of twenty-feet or more, with spreading branches; the bark is smooth and of an ash-colour. The leaves are of a light green colour, and have several deep transverse ribs, ending in acute points. They are alternate in two rows, elongate, broad, rounded at the base, acuminate with a blunted tip, entire about the edge, veined, smooth on both sides. Petioles gibbous, short, excavated, smooth. Flowers three or four close together, peduncled, nodding, whitish. It is a native both of the East and West Indies; and, according to Browne, the fruit is much esteemed by many people. Swartz says, that it is seldom eaten. It was cultivated in 1690, in the royal garden at Hampton-court.

5. *Annona hexapetala*, or long-leaved custard-apple: leaves elliptic-oblong, acute, smooth; petals spatulate, equal, acute. It is a native of China, and is cultivated in the East Indies.

6. *Annona palustris*, or shining-leaved custard-apple: leaves oblong, rather obtuse, smooth; fruits areolate. This is a small tree, only a fathom in height, or little more. It grows wild in soft marshy places in Jamaica; and bears a fine sweet-scented fruit, of no disagreeable flavour; but it is said to be a strong narcotic, and is not eaten on that account. It is called *alligator-apple*. The wood of this tree is so very soft, even after it is dried, that it is frequently used by the country-people instead of corks, to stop up their jugs and calabashes; whence it has now universally obtained the name of *cork-wood* in Jamaica.

7. *Annona triloba*, or trifid-fruited custard-apple: leaves elliptic, acute, smooth; flowers pendulous, campanulate; calyxes ovate; petals many, oval. The trunk of this tree is seldom bigger than the small of a man's leg, and rises ten or twelve feet high, having a smooth greenish-brown bark. In March, when the leaves begin to sprout, its blossoms begin to appear, consisting each of six greenish-white petals. The fruit grows in clusters of three, and sometimes four, together; they are at first green, and when ripe yellow, covered with a thin smooth skin, which contains a yellow pulp, of a sweet luscious taste; in the middle of which lie, in two rows, twelve seeds, divided by so many thin membranes. All parts of the tree have a rank, if not a fetid, smell; and the fruit is relished by few, except negroes. These trees grow usually in low shady swamps, and in a very fat soil. Mr. Miller observes, that this is rather a shrub than a tree, and that the flowers, at least in England, are of a rusty purple colour. He mentions, that the largest plant he had seen, was in the duke of Argyll's garden at Whitton, near Hounslow, which produced flowers the beginning of May. It is a native of the Bahama islands, Carolina, Maryland, and Virginia; and the seeds are frequently brought to England by the title of papaw-tree. Introduced here in 1736 by Collinson.

8. *Annona glabra*, or smooth custard-apple: leaves lanceolate-ovate, fruits conoid smooth. This shrub, or small tree, grows to the height of about sixteen feet, covered with a smooth greenish bark; the leaves are thick, stiff, and shaped like those of a lemon. The fruit is covered with a smooth yellowish-green skin; the pulp is of the consistence of a ripe pear, and contains many conical

brown.

brown seeds: this is an eatable fruit, of a sweet insipid taste; it is the food of guanas, and many other wild creatures. It is a native of North America.

9. *Annona Asiatica*, or Asiatic custard-apple: leaves lanceolate, smooth, shining, marked with lines. This is a middle-sized tree, with spreading branches. Native of the East Indies. Cultivated there and in China.

10. *Annona Africana*, or African custard-apple: leaves lanceolate pubescent. The branches are rugged with little dots. This, though it has the name of *Africana*, is said to be a native of America. These fruits are much esteemed by the natives of the countries where they grow naturally, are reckoned very cooling and wholesome, and are frequently given to sick persons.

Propagation and Culture. The seventh fort will thrive in the open air in England, if it is planted in a warm situation; but the plants should be trained up in pots, and sheltered in winter for two or three years, until they have acquired some strength; then they may be turned out of the pots in the spring, and planted in full ground, where they are to remain. This fort produced flowers in the curious garden of his grace the duke of Argyle, at Whitton, near Hounslow, where it grew in the open air for some years, as also in the nursery of the late Mr. Gray, near Fulham. The seeds are frequently brought to England from North America; they are much larger than those of the other species, and many plants have been raised in the gardens near London. The shape of the leaves is also different; this casts its leaves in autumn, whereas all the others retain their leaves, never casting them until the spring, when the new leaves come out. The fruit is very different from those of the other species, two or three growing together at their foot-stalks. When the seeds of this fort are sown, they frequently remain a whole year in the ground; therefore the earth in the pots should not be disturbed, where they are sown, if the plants do not come up the first year; and the pots should be sheltered in winter, and the following spring, if they are plunged into a new hot-bed, the plants will come up much sooner than those which are sown in the open air, and will have more time to get strength before the winter. All the other forts, which are natives of the hot parts of America, or the East Indies, are too tender to live in this country, if they are not preserved in warm stoves; they come up very easily from the seeds which are brought over, if they are fresh; but these seeds must be sown on a good hot-bed, or in pots of light earth, and plunged into a hot-bed of tanner's bark in February, which is by much the best time; because, when the plants come up early, they will have time to get strength before the cold weather comes on in the autumn. Some of these plants are twelve or fourteen feet high in our gardens, and there were plants of the seventh fort in the garden at Chelsea, which were more than twenty feet high, and they produced flowers two or three years.

ANNONA, *f.* in Roman antiquity, denotes provision for a year of all sorts, as of flesh, wine, &c. but especially of corn. *Annona* is likewise the allowance of oil, salt, bread, flesh, corn, wine, hay, and straw, which was annually provided by the contractors for the maintenance of an army.

ANNO'NÆ PREFEC'TUS, *f.* in antiquity, an extraordinary magistrate, whose business it was to prevent a scarcity of provision, and to regulate the weight and fineness of bread.

ANNONA'Y, a town of France in the department of Ardeche and late province of Dauphiny, seated on the confluence of the Cances and Deumes, twelve miles south-west of Vienne. Lat. 45. 15. N. lon. 4. 52. E.

ANN'OT, a small city in the mountains of Provence in France. Lat. 44. 4. N. lon. 7. 0. E.

ANNOTA'TIO, *f.* The very beginning of a febrile paroxysm, called also the attack of the paroxysm. There is another *annotatio* or *epifemafia*, which is proper to hectic fevers, happening an hour or two after eating: in this there is no shivering with cold, as in the other fort.

ANNO'TATION, *f.* [*annotatio*, Lat.] Explications or remarks written upon books; notes.—It might appear very improper to publish *annotations*, without the text itself whereunto they relate. *Boyle*.

ANNO'TATOR, *f.* [Lat.] A writer of notes, or annotations; a scholiast; a commentator.—I have not that respect for the *annotators*, which they generally meet with in the world. *Felton*.

To ANNO'UNCE, *v. a.* [*annoncer*, Fr. *annuncio*, Lat.] To publish; to proclaim. To pronounce; to declare by a judicial sentence:

Of the Messiah I have heard foretold
By all the prophets; of thy birth at length
Announc'd by Gabriel with the first I knew. *Milton*.

To ANNO'Y, *v. a.* [*annoyer*, Fr.] To incommode; to vex; to teaze; to molest:

As one who long in populous city pent,
Where houses thick, and sewers, annoy the air,
Forth issuing on a summer's morn to breathe
Among the pleasant villages, and farms
Adjoin'd, from each thing nict conceives delight. *Milton*.

—Insects seldom use their offensive weapons, unless provoked: let them but alone, and annoy them not. *Ray*.

ANNOY, *f.* Injury; molestation; trouble:
Sleep, Richmond, sleep in peace, and wake in joy;
Good angels guard thee from the boar's annoy.

Shakespeare.

"After annoy comes joy:" H. Ger. *Auf schmerzen, schertzen*. After rain, sun-shine, *Post nubila phœbus*. A saying people are apt to comfort themselves with in trouble, upon a supposition, that, as sun-shine follows rain, so good fortune must necessarily succeed evil fortune.

ANNOY'ANCE, *f.* That which annoys; that which hurts.—Crows, ravens, rooks, and magpies, are great annoyances to corn. *Mortimer*.—The state of being annoyed; or act of annoying.—The greatest annoyance and disturbance of mankind has been from one of those two things, force or fraud. *South*.

ANNOY'ER, *f.* The person that annoys.

AN'NUAL, *adj.* [*annuel*, Fr. from *annus*, Lat.] That which comes yearly:

Annual for me the grape, the rose, renew
The juice nectareous, and the balmy dew. *Pope*.

That which is reckoned by the year. That which lasts only a year.—The dying in the winter of the roots of plants that are *annual*, seemeth to be caused by the over-expend of the sap; which being prevented, they will superannuate, if they stand warm. *Bacon*.—Every tree may, in some sense, be said to be an *annual* plant, both leaf, flower, and fruit, proceeding from the coat that was superinduced over the wood the last year. *Ray*.

ANNUAL MOTION of the EARTH. See *ASTRONOMY*.

ANNUAL LEAVES, are such leaves as come up afresh in the spring, and perish in winter. These stand opposed to *EVER-GREENS*.

ANNUAL PLANTS, called also simply *annuals*, are such as only live their year, i. e. come up in the spring and die again in the autumn; and accordingly are to be recruited every year.

ANNUALLY, *adv.* Yearly; every year.—The whole strength of a nation is the utmost that a prince can raise *annually* from his subjects. *Swift*.

AN'NUEL of NORWAY, of which mention is made in the acts of parliament of king James III. was an annual payment of an hundred marks sterling, which the kings of Scotland were obliged to pay to the kings of Norway, in satisfaction for some pretensions which the latter had to the Scottish kingdom, by virtue of a conveyance made thereof by Malcolm Kenmore, who usurped the crown after his brother's decease. This *annuel* was first established in 1266; in consideration whereof the Norwegians

regions renounced all title to the succession to the isles of Scotland. It was paid till the year 1468, when the annu- el, with all its arrears, was renounced in the contract of marriage between king James III. and Margaret daughter of Christian I. king of Norway, Denmark, and Sweden.

ANNUITANT, f. He that possesses or receives an annuity.

ANNUITY, f. [*annuité*, Fr.] A yearly allowance. A yearly rent to be paid for term of life or years. The differences between a *rent* and an *annuity* are, that every rent is going out of land; but an annuity changes only the granter, or his heirs, that have assets by descent. The second difference is, that, for the recovery of an annuity, no action lies, but only the writ of annuity against the granter, his heirs, or successors; but, of a rent, the same actions lie as do of land. The third difference is, that an annuity is never taken for assets, because it is no freehold in law, nor shall be put in execution upon a *statute-merchant*, *statute-staple*, or *elegit*, as a rent may. *Cowell*.

If a man by deed grant to another the sum of 20l. a-year, without expressing out of what lands it shall issue; no land at all shall be charged with it, but it is a mere personal annuity. 2 *Blackst.* 40.

ANNUITIES, a term for any periodical income, arising from money lent, or from houses, lands, salaries, pensions, &c. payable from time to time; either annually, or at other intervals of time. Annuities may be divided into such as are *certain*, and such as depend on some *contingency*, as the continuance of a life, &c. Annuities are also divided into annuities in *possession*, and annuities in *reversion*; the former meaning such as have commenced; and and the latter such as will not commence till some particular event has happened, or till some given period of time has elapsed. Annuities may be farther considered as payable either *yearly*, or *half-yearly*, or *quarterly*, &c. The *present value* of an annuity, is that sum, which, being improved at interest, will be sufficient to pay the annuity.

The *present value* of an *annuity certain*, payable yearly, is calculated in the following manner: Let the annuity be 1, and let r denote the amount of 1l. for a year, or 1l. increased by its interest for one year. Then, 1 being the present value of the sum r , and having to find the present value of the sum 1, it will be, by proportion thus, $1 : r$

$:: 1 : \frac{1}{r}$ the present value of 1l. due a year hence. In like manner $\frac{1}{r^2}$ will be the present value of 1l. due 2

years hence; for $r : 1 :: \frac{1}{r} : \frac{1}{r^2}$. In like manner $\frac{1}{r^3}$, $\frac{1}{r^4}$, &c. will be the present value of 1l. due at the end of

3, 4, 5, &c. years respectively; and, in general, $\frac{1}{r^n}$ will be the value of 1l. to be received after the expiration of n years. Consequently the sum of all these, or $\frac{1}{r} + \frac{1}{r^2} +$

$\frac{1}{r^3} + \frac{1}{r^4} +$ &c. continued to n terms, will be the present value of all the n years annuities. And the value of the perpetuity, is the sum of the series continued, *ad infinitum*. But this series, it is evident, is a geometrical progression, whose first term and common ratio are each $\frac{1}{r}$, and the number of its terms n ; and therefore the sum s of all the terms, or the present value of all the annual payments, will be $s = \frac{1}{r-1} - \frac{1}{r-1} \times \frac{1}{r^n}$.

When the annuity is a perpetuity, it is plain that the last term $\frac{1}{r^n}$ vanishes, and therefore $\frac{1}{r-1} \times \frac{1}{r^n}$ also vanishes; and consequently the expression becomes barely

$s = \frac{1}{r-1}$; that is, any annuity divided by its interest for one year, is the value of the perpetuity. So, if the rate of interest be 5 per cent. then $\frac{100}{5} = 20$ is the value of the perpetuity at 5 per cent. Also $\frac{100}{4} = 25$ is the value of

the perpetuity at 4 per cent. And $\frac{100}{3} = 33\frac{1}{3}$ is the value of the perpetuity at 3 per cent. interest: and so on. If the annuity is not to be entered on immediately, but after a certain number of years, as m years; then the present value of the reversion is equal to the difference between two present values, the one for the first term of m years, and the other for the end of the last term n ; that is, equal to the difference between $\frac{1}{r-1} - \frac{1}{r-1} \times \frac{1}{r^m}$, and $\frac{1}{r-1} -$

$$\frac{1}{r-1} \times \frac{1}{r^n}, \text{ or } = \frac{1}{r-1} \times \frac{1}{r^m} - \frac{1}{r^n}.$$

Annuities certain differ in value, as they are made payable yearly, half-yearly, or quarterly. And, by proceeding as above, using the interest or amount of a half-year, or a quarter, as those for the whole year were used, the following set of theorems will arise; where r denotes as before, the amount of 1l. and its interest for a year, and n the number of years during which any annuity is to be paid; also P denotes the perpetuity $\frac{1}{r-1}$, Y denotes $\frac{1}{r-1}$

$- \frac{1}{r-1} \times \frac{1}{r^n}$ the value of the annuity supposed payable yearly, H the value of the same when it is payable half-yearly, and Q the value when payable quarterly; or univ-ersally, M the value when it is payable every m part of a year.

$$\text{THEOR. 1. } Y = P - P \times \left(\frac{1}{r}\right)^n.$$

$$\text{THEOR. 2. } H = P - P \times \left(\frac{2}{r+1}\right)^{2n}.$$

$$\text{THEOR. 3. } Q = P - P \times \left(\frac{4}{r+3}\right)^{4n}.$$

$$\text{THEOR. 4. } M = P - P \times \left(\frac{m}{r+m-1}\right)^{mn}.$$

Example 1.

Let the rate of interest be 4 per cent. and the term 5 years; and consequently $r = 1.04$, $n = 5$, $P = 25$; also let $m = 12$, or the interest payable monthly in theorem 4: then the present value of such annuity of 1l. a-year, for 5 years, according as it is supposed payable 1l. yearly, or $\frac{1}{2}$ l. every half year, or $\frac{1}{4}$ l. every quarter, or $\frac{1}{12}$ l. every month or $\frac{1}{12}$ th part of a year, will be as follows:

$$Y = 25 - 25 \times .821928 = 4.4518$$

$$H = 25 - 25 \times .820348 = 4.4913$$

$$Q = 25 - 25 \times .819543 = 4.5114$$

$$M = 25 - 25 \times .818996 = 4.5251$$

Example 2. Supposing the annuity to continue 25 years, the rate of interest and every thing else being as before; then the values of the annuities for 25 years will be

$$Y = 25 - 25 \times .375118 = 15.6221$$

$$H = 25 - 25 \times .371527 = 15.7118$$

$$Q = 25 - 25 \times .369709 = 15.7573$$

$$M = 25 - 25 \times .368477 = 15.7881$$

Example 3. And, if the term be 50 years, the values will be

$$Y = 25 - 25 \times .140713 = 21.4822$$

$$H = 25 - 25 \times .138032 = 21.5492$$

$$Q = 25 - 25 \times .136685 = 21.5829$$

$$M = 25 - 25 \times .135775 = 21.6056$$

Example 4. Also, if the term be 100 years, the values will be

$$\begin{aligned} Y &= 25 - 25 \times .019800 = 24.5050 \\ H &= 25 - 25 \times .019053 = 24.5237 \\ Q &= 25 - 25 \times .018683 = 24.5329 \\ M &= 25 - 25 \times .018435 = 24.5391 \end{aligned}$$

Hence the difference in the value by making periods of payments smaller, for any given term of years, is the more as the intervals are smaller, or the periods more frequent. The same difference is also variable, both as the rate of interest varies, and also as the whole term of years n varies; and, for any given rate of interest, it is evident that the difference, for any periods m of payments, first increases from nothing as the term n increases, when n is 0, to some certain finite term or value of n , when the difference D is the greatest or a maximum; and that afterwards, as n increases more, that difference will continually decrease to nothing again, and vanish when n is infinite: also the term or value of n , for the maximum of the difference, will be different according to the periods of payment, or value of m . And the general value of n , when the difference is a maximum between the yearly payments and the payments of m times in a year, is expressed by this formula, viz.

$$n = \frac{\frac{ml \cdot \frac{m+r-1}{m}}{l \cdot r}}{\frac{ml \cdot \frac{m+r-1}{m}}{m} - l \cdot r}, \text{ where } l \text{ denotes the logarithm of the quantity following it.}$$

Hence, taking the different values of m , viz. 2 for half-years, 4 for quarters, 12 for monthly payments, &c. and substituting, in the general formula, the term or value of n for each case, when the difference in the present worths of the annuities, will be as follows, reckon-interest at 4 per cent. viz.

$$\begin{aligned} n &= \frac{\frac{2l \cdot \frac{r+1}{2}}{l \cdot r}}{\frac{2l \cdot \frac{r+1}{2}}{2} - l \cdot r} = 25.3777 \text{ for half-yearly payments,} \\ n &= \frac{\frac{4l \cdot \frac{r+3}{4}}{l \cdot r}}{\frac{4l \cdot \frac{r+3}{4}}{4} - l \cdot r} = 25.3200 \text{ for quarterly payments,} \\ n &= \frac{\frac{12l \cdot \frac{r+11}{12}}{l \cdot r}}{\frac{12l \cdot \frac{r+11}{12}}{12} - l \cdot r} = 25.2643 \text{ for monthly payments.} \end{aligned}$$

Annuities may also be considered as in arrears, or as forborn, for any number of years; in which case each payment is to be considered as a sum put out to interest for the remainder of the term after the time it becomes due. And as $1l.$ due at the end of 1 year amounts to r at the end of another year, and to r^2 at the end of the third year, and to r^3 at the end of the 4th year, and so on; therefore by adding always the last year's annuity, or 1, to the amounts of all the former years, the sum of all the annuities and their interests will be the sum of the following geometrical series, $1+r+r^2+r^3+r^4 \dots$ to r^n , continued till the last term be r^{n-1} , or till the number of terms be n , the number of years the annuity is forborn. But the sum of this geometrical

progression is $\frac{r^n-1}{r-1}$, which therefore is the amount of $1l.$ annuity forborn for n years. And this quantity being multiplied by any other annuity a , instead of 1, will produce the amount for that other annuity.

But the amounts of annuities, or their present values, are easiest found by the two following Tables of numbers for the annuity of $1l.$ which are ready computed from the foregoing principles.

TABLE I.
The Amount of an Annuity of $1l.$ at Compound Interest.

n	at 3 per cent.	$3\frac{1}{2}$ per cent.	4 per cent.	$4\frac{1}{2}$ per cent.	5 per cent.	6 per cent.
1	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
2	2.03000	2.03500	2.04000	2.04500	2.05000	2.06000
3	3.09090	3.10623	3.12160	3.13703	3.15250	3.18360
4	4.18363	4.21494	4.24646	4.27819	4.31013	4.37462
5	5.30914	5.36247	5.41632	5.47071	5.52563	5.63709
6	6.46841	6.55015	6.63298	6.71689	6.80191	6.97532
7	7.66246	7.77941	7.89829	8.01915	8.14201	8.39384
8	8.89234	9.05169	9.21243	9.38001	9.54911	9.87477
9	10.15911	10.36850	10.58280	10.80211	11.02656	11.49132
10	11.46388	11.73139	12.00611	12.28821	12.57789	13.18070
11	12.80760	13.14199	13.48635	13.84118	14.20679	14.97164
12	14.19203	14.60196	15.02501	15.40403	15.91713	16.86994
13	15.61779	16.11303	16.62634	17.15991	17.71298	18.88214
14	17.08632	17.67699	18.29191	18.93211	19.59853	21.01507
15	18.59891	19.29568	20.03239	20.78405	21.57856	23.27597
16	20.15588	20.97103	21.82453	22.71934	23.65747	25.67253
17	21.76159	22.70502	23.69751	24.74171	25.84037	28.21288
18	23.41444	24.49969	25.64541	26.85508	28.13238	30.90565
19	25.11687	26.35718	27.67123	29.06356	30.53900	33.75999
20	26.87037	28.27568	29.77808	31.37142	33.06595	36.78559
21	28.67649	30.26947	31.96920	33.78314	35.71925	39.99273
22	30.53678	32.32890	34.24797	36.30338	38.50521	43.39222
23	32.45288	34.46041	36.61780	38.93703	41.43048	46.99583
24	34.42647	36.66653	39.08200	41.68920	44.50205	50.81558
25	36.45926	38.94980	41.64591	44.56521	47.72710	54.86451
26	38.55304	41.31310	44.31174	47.57064	51.11345	59.15938
27	40.70963	43.75906	47.08421	50.71132	54.66913	63.70577
28	42.93092	46.29063	49.96758	53.99333	58.40257	68.52811
29	45.21885	48.91080	52.96602	57.42303	62.32271	73.63980
30	47.57542	51.62268	56.08494	61.00707	66.43883	79.05819
31	50.00268	54.42947	59.32834	64.75239	70.76076	84.80108
32	52.50276	57.33450	62.70147	68.66025	75.29833	90.89978
33	55.07784	60.34121	66.20953	72.75623	80.05377	97.34316
34	57.73018	63.45315	69.85791	77.03025	85.06636	104.18375
35	60.46208	66.67401	73.65222	81.49662	90.32031	111.43478
36	63.27594	70.00760	77.59831	86.16397	95.82632	119.12087
37	66.17422	73.45787	81.70225	91.04134	101.62814	127.26812
38	69.15945	77.02889	85.97034	96.13820	107.70955	135.90421
39	72.23423	80.72491	90.40915	101.46442	114.09502	145.05846
40	75.40126	84.55028	95.02552	107.03032	120.79977	154.76107
41	78.66330	88.50954	99.82654	112.84669	127.83976	165.04706
42	82.02320	92.60737	104.81960	118.92479	135.23175	175.95954
43	85.48389	96.84803	110.01238	125.27640	142.99334	187.50758
44	89.04841	101.23832	115.41288	131.91384	151.14301	199.75803
45	92.71886	105.78107	121.02939	138.84997	159.70016	212.74351
46	96.50146	110.48403	126.87057	146.09821	168.68510	226.50612
47	100.39650	115.35097	132.94530	153.67203	178.11942	241.09261
48	104.40340	120.38826	139.26321	161.58790	188.02539	256.56453
49	108.52465	125.60185	145.83373	169.85936	198.42667	272.95840
50	112.79687	130.99791	152.66708	178.50303	209.34800	290.33500
51	117.18077	136.58284	159.77377	187.53566	220.81540	308.75006
52	121.69620	142.36324	167.16472	196.97477	232.85617	328.28142
53	126.34708	148.34595	174.85131	206.83853	245.49897	348.97831
54	131.13750	154.53806	182.84536	217.14637	258.77392	370.91701

TABLE II.

The present Value of an Annuity of 1l.

Yrs	at 3 per cent.	3½ per cent.	4 per cent.	4½ per cent.	5 per cent.	6 per cent.
1	0.97087	0.96518	0.96154	0.95694	0.95238	0.94340
2	1.91347	1.89369	1.88610	1.87267	1.85941	1.83335
3	2.82861	2.80164	2.77509	2.74896	2.72325	2.67301
4	3.71710	3.67308	3.62990	3.58753	3.54595	3.40511
5	4.57971	4.51505	4.45182	4.38998	4.32948	4.21236
6	5.41719	5.32855	5.24214	5.15787	5.07569	4.91732
7	6.23028	6.11454	6.00205	5.89270	5.78637	5.58238
8	7.01965	6.87396	6.73274	6.59589	6.46321	6.20379
9	7.78611	7.60769	7.43533	7.26879	7.10782	6.80169
10	8.53020	8.31561	8.11090	7.91272	7.72173	7.36009
11	9.25262	9.00155	8.76048	8.52892	8.30541	7.88089
12	9.95400	9.66333	9.38507	9.11858	8.86325	8.38848
13	10.63496	10.30274	9.98565	9.68285	9.39357	8.85266
14	11.29607	10.92052	10.50312	10.2283	9.89864	9.29498
15	11.93794	11.51741	11.11839	10.73955	10.37966	9.71225
16	12.56110	12.09412	11.65230	11.23402	10.83777	10.10590
17	13.16612	12.65132	12.16567	11.70719	11.27407	10.47726
18	13.75351	13.18968	12.65930	12.15999	11.68959	10.82760
19	14.32380	13.70984	13.13394	12.59329	12.08532	11.15312
20	14.87747	14.21240	13.59033	13.00794	12.46221	11.46992
21	15.41502	14.67977	14.02916	13.40472	12.82115	11.76408
22	15.93542	15.16712	14.45112	13.78442	13.16300	12.04158
23	16.44361	15.62041	14.85684	14.14777	13.48857	12.30338
24	16.93554	16.05837	15.14690	14.49548	13.79864	12.55036
25	17.41315	16.48151	15.62208	14.82821	14.09394	12.78336
26	17.87684	16.89035	15.98277	15.14661	14.37519	13.00317
27	18.32703	17.28536	16.32959	15.45130	14.64303	13.21053
28	18.76411	17.66702	16.66306	15.74287	14.89813	13.40616
29	19.18845	18.03577	16.98371	16.02189	15.14107	13.59072
30	19.60044	18.39205	17.29203	16.28889	15.37245	13.76483
31	20.00043	18.73628	17.58849	16.54433	15.59281	13.92909
32	20.38877	19.06887	17.87355	16.78886	15.80268	14.08404
33	20.76579	19.39211	18.14765	17.02286	16.00255	14.23023
34	21.13184	19.70608	18.41120	17.24676	16.19290	14.36814
35	21.48722	20.00066	18.66461	17.46101	16.37419	14.49825
36	21.83225	20.29049	18.90828	17.66604	16.54685	14.62099
37	22.16724	20.57053	19.14258	17.86224	16.71120	14.73678
38	22.49240	20.84109	19.36786	18.04999	16.86780	14.84502
39	22.80828	21.10250	19.58448	18.22966	17.01704	14.94907
40	23.11477	21.35507	19.79277	18.40158	17.15909	15.04630
41	23.41240	21.59910	19.99305	18.56611	17.29437	15.13802
42	23.70136	21.83488	20.18565	18.72355	17.42321	15.22454
43	23.98190	22.06269	20.37079	18.87421	17.54591	15.30617
44	24.25427	22.28276	20.54884	19.01838	17.66277	15.38318
45	24.51871	22.49545	20.72004	19.15935	17.77407	15.45583
46	24.77545	22.70092	20.88465	19.28837	17.88007	15.52437
47	25.02471	22.89944	21.04294	19.41471	17.98102	15.58803
48	25.26671	23.09124	21.19513	19.53561	18.07716	15.65003
49	25.50166	23.27656	21.34147	19.65130	18.16872	15.70753
50	25.72976	23.45562	21.48218	19.76201	18.25593	15.76186
51	25.95123	23.62862	21.61740	19.86795	18.33898	15.81308
52	26.16624	23.79576	21.74758	19.96933	18.41807	15.86139
53	26.37499	23.95726	21.87267	20.06634	18.49340	15.90637
54	26.57766	24.11330	21.99296	20.15938	18.56515	15.94908

The Use of TABLE I.

To find the Amount of an Annuity forborn any number of Years. Take out the amount from the first table, for the proposed years and rate of interest; then multiply it by the annuity in question; and the product will be its amount for the same number of years, and the rate of interest. And the converse to find the rate or time.

EXAM. 1. To find how much an annuity of 50l. will amount to in 20 years at 3½ per cent. compound interest. On the line of 20 years, and in the column of 3½ per cent. stands 28.27968, which is the amount of an annuity of 1l.

for the 20 years; and therefore 28.27968, multiplied by 50, gives 1413.984l. or 1413l. 19s. 8d. for the answer.

EXAM. 2. In what time will an annuity of 20l. amount to 1000l. at 4 per cent. compound interest? Here the amount of 1000l. divided by 20l. the annuity, gives 50, the amount of 1l. annuity for the same time and rate. Then, the nearest tabular number in the column of 4 per cent. is 49.96758, which, standing on the line of 28, shews that 28 years is the answer.

EXAM. 3. If it be required to find at what rate of interest an annuity of 20l. will amount to 1000l. forborn for 28 years. Here 1000 divided by 20 gives 50 as before; then looking along the line of 28 years, for the nearest to this number 50, I find 49.96758 in the column of 4 per cent. which is therefore the rate of interest required.

The Use of TABLE II.

EXAM. 1. To find the present value of an annuity of 50l. which is to continue 20 years, at 3½ per cent. By the table, the present value of 1l. for the same rate and time, is 14.21240; therefore 14.21240 × 50 = 710.62l. or 710l. 12s. 4d. is the present value sought.

EXAM. 2. To find the present value of an annuity of 20l. to commence 10 years hence, and then to continue for 40 years, or to terminate 50 years hence, at 4 per cent. interest. In such cases as this, it is plain we have to find the difference between the present values of two equal annuities for the two given times; which therefore will be effected by subtracting the tabular value of the one term from that of the other, and multiplying by the annuity. Thus,

Tabular value for 50 years 21.48218

Tabular value for 10 years 8.11090

The difference 13.37128

Multiply by 20

Gives 267.4256, or 267l. 8s. 6d. [the answer.]

The foregoing observations, rules, and tables, contain all that is important in the doctrine of *annuities certain*. And, for farther information, reference may be had to arithmetical writings, particularly Malcolm's Arithmetic, page 595; Simpson's Algebra, sect. 16; Dodson's Mathematical Repository, page 298, &c. Jones's Synopsis, ch. 10; Philos. Trans. vol. lxxvi. page 109.

For what relates to the doctrine of *annuities on lives*, see ASSURANCE, COMPLEMENT, EXPECTATION, LIFE ANNUITIES, &c.

To ANNU'L, *v. a.* [from *nullus*, Lat.] To make void; to nullify; to abrogate; to abolish.—That which gives force to the law, is the authority that enacts it; and whoever destroys this authority, does, in effect, *annul* the law. Rogers. To reduce to nothing; to obliterate:

Light, the pure work of God, to me's extinct;

And all her various objects of delight

Annul'd, which might in part my grief have eas'd. Milton.

AN'NULAR, *adj.* [annulus, Lat.] Something in the form of, or resembling, a ring. It is also a peculiar denomination of the fourth finger, commonly called the *ring-finger*.

AN'NULARY, *adj.* [annulus, Lat.] In the form of rings.—Because continual respiration is necessary, the wind-pipe is made with *annular* cartilages, that the sides of it may not flag and fall together. Ray.

AN'NULET, *f.* [annulus, Lat.] a little ring.—In heraldry, a difference or mark of distinction, which the fifth brother of any family ought to bear in his coat of arms. *Annulets* are also a part of the coat-armour of several families; they were anciently reputed a mark of nobility and jurisdiction, it being the custom of prelates to receive their investiture *per baculum & annulum*.—In architecture, the small square members in the Doric capital, under the quarter round, are called *annulets*. *Annulet* is also used for a narrow

a narrow flat moulding common to other parts of the column; so called, because it encompasses the column round.

To ANNUMERATE, *v. a.* [*annumero*, Lat.] To add to a former number; to unite to something before mentioned.

ANNUMERATION, *f.* [*annumeratio*, Lat.] Addition to a former number.

ANNUNCIADA, or ANNUNTIATA, *f.* An order of knighthood in Savoy, first instituted by Amadeus I. in the year 1409. Their collar was of fifteen links, interwoven one with another, in form of a true-lover's knot; and the motto, F. B. R. T. signifying, *Fortitudo ejus Rhodum tenuit*. Amadeus VIII. gave the name *Annunciada* to this order, which was formerly known by that of *The knot of love*; changing at the same time the image of St. Maurice, patron of Savoy, which hung at the collar, for that of the Virgin Mary; and, instead of the motto above-mentioned, substituting the words of the angel's salutation.

ANNUNCIADA is also a title of several religious orders, instituted at different times and at different places, in honour of the annunciation.

To ANNUNCIATE, *v. a.* [*annuncio*, Lat.] To bring tidings; to relate something that has happened: a word not in popular use.

ANNUNCIATION, *f.* The tidings brought by the angel Gabriel to the virgin Mary of the incarnation of Christ.

ANNUNCIATION is also a festival, kept by the church on the 25th of March, in commemoration of these tidings. This festival appears to be of very great antiquity, having been observed before the time of the council of Trullo, in which there is a canon forbidding the celebration of all festivals in Lent, excepting the Lord's day, and the feast of the annunciation: so that we may date its original from the seventh century. In the Romish church, on this feast, the pope performs the ceremony of marrying or cloystering a certain number of maidens, who are presented to him in the church, clothed in white serge, and muffled up from head to head to foot. An officer stands by; with purses containing notes of fifty crowns for those who make choice of marriage, and notes of a hundred for those who choose to veil.

ANNUNCIATION is likewise a title given by the Jews to part of the ceremony of the passover.

ANNUNCIATOR, *f.* The name of an officer in the church of Constantinople. It was his business to inform the people of the festivals that were to be celebrated.

ANUS CLIMACTERICUS, the years 63 and 81, of which, in astrology, there is an opinion, that those years have an influence on man's life. They consist of a number of nines; as 7 times 9 is 63, and 9 times 9 is 81.

AN'ODA, *f.* in botany. See SIDA.

ANO'DUS, a word used by chemists for what is separated from the nourishment by the kidneys. The Greek word *anodes*, *anodus*, from *a* neg. and *odus*, a tooth, signifies toothless.

ANODYNE, *f.* [from *a* neg. and *odyn*, pain.] Anodynes are medicines which ease pain, and procure sleep. They are divided into three sorts, viz. 1. *Paregorica*. *Παρεγογεω*, *mitigo*, called also *anetica*. Paregorics are such as assuage pain. 2. *Hypnotica*, *hypnopaos*. Hypnotics, or such as relieve by procuring sleep, *πνους*, *somnus*. 3. *Narcotica*. Narcotics, or such as ease the patient by stupifying him; *ναρκωω*, *stupefacio*. Opiates and narcotics destroy sensation. Some hypnotics and paregorics procure ease and sleep by removing the offending cause, as nitre, camphor, &c. But the term anodyne is now generally employed for those means only which relieve pain by diminishing or destroying sensibility. The doses of these medicines are generally regulated by the pulse; yet this rule is not without exceptions. If the pulse is strong, a larger dose is safe; if weak, a less dose must be given. Camphor is the best anodyne in nervous cases, and at the decline of fevers. Hemlock procures ease and sleep without causing that

head-ach, next morning, usually complained of after taking opium. Anodynes should not be given without great caution, on a full stomach, nor in dropfies.

ANODYNE-BALSAM. See PHARMACY.

To ANOIN'T, *v. a.* [*oindre*, *enoindre*, part. *oint*, *enoint*, Fr.] To rub over withunctuous matter, as oil, or unguents. To consecrate by unction. To smear; to be rubbed upon:

Warm waters then, in brazen caldrons borne,
Are pour'd to wash his body, joint by joint,
And fragrant oils the stiffen'd limbs anoint. *Dryden.*

ANOIN'TER, *f.* The person that anoints.

ANOIN'TERS, *f.* A religious sect in some parts of England, so called from the ceremony they used of anointing all persons before they admitted them into their church. They founded their opinion of anointing upon the fifth chapter of James, verses 14 and 15.

ANOLYMPIADES, *f.* in antiquity, a name given by the Elians to those Olympic games which had been celebrated under the direction of the Pisceans and Arcadians. The Elians claimed the sole right of managing the Olympic games, in which they sometimes met with competitors. The hundred and fourth Olympiad was celebrated by order of the Arcadians, by whom the Elians were at that time reduced very low; this, as well as those managed by the inhabitants of Pisa, they called *Ανολυμπιαδες*, that is, "unlawful Olympiads;" and left them out of their annals, wherein the names of their victors and other occurrences were registered.

ANO'MALISM, *f.* Anomaly; irregularity; deviation from the common rule.

ANOMALISTICAL YEAR, in astronomy, called also *periodical year*, is the space of time in which the earth, or a planet, passes through its orbit. The anomalistical, or common, year, is somewhat longer than the tropical year; by reason of the precession of the equinox. And the apses of all the planets have a like progressive motion; by which it happens that a longer time is necessary to arrive at the aphelion, which has advanced a little, than to arrive at the same fixed star. For example, the tropical revolution of the sun, with respect to the equinox, is - - - - - 365d 5h 48' 45"; but the sidereal, or return to the same star, 365 6 9 11; and the anomalistic revolution is - 365 6 15 20, because the sun's apogee advances each year 65" $\frac{1}{2}$ with respect to the equinoxes, and the sun cannot arrive at the apogee till he has passed over the 65" $\frac{1}{2}$ more than the revolution of the year answering to the equinoxes. To find the anomalistic revolution, say, As the whole secular motion of a planet minus the motion of its aphelion, is to 100 years or 3155760000 seconds, so is 360 degrees, to the duration of the anomalistic revolution.

ANO'MALOUS, *adj.* [*anomale*, Fr. *anomalus*, Lat. of *ανωμαλ*, of *a* priv. and *ομαλ*, equal, Gr.] Irregular; out of rule; deviating from the general method or analogy of things. It is applied, in grammar, to words deviating from the common rules of inflexion: and, in astronomy, to the seemingly irregular motions of the planets.—Metals are gold, silver, copper, tin, lead, and iron: to which we may join that *anomalous* body, quicksilver or mercury. *Locke.*

ANO'MALOUSLY, *adv.* Irregularly; in a manner contrary to rule.—Eve was not solemnly begotten, but suddenly framed, and *anomalously* proceeded from Adam. *Brown.*

ANO'MALY, *f.* in astronomy, is an irregularity in the motion of a planet, by which it deviates from the aphelion or apogee; or it is the angular distance of the planet from the aphelion or apogee; that is, the angle formed by the line of the apses, and another line drawn through the planet. Kepler distinguishes three kinds of anomaly; *mean*, *eccentric*, and *true*.

Mean or *Simple Anomaly*, in the ancient astronomy, is the distance of a planet's mean place from the apogee; which Ptolemy calls the angle of the mean motion. But, in the modern

perpendicular to the transverse axis AB, and meet the circle in D described on the same axis; then the mean anomaly may also be represented by the circular trilineal ASD, which is always proportional to the elliptic one ASP. Or, drawing SG perpendicular to the radius DC produced; then the mean anomaly is also proportional to SG + the circular arc AD, as is demonstrated by Keil, in his *Leß. Astron.* Hence, taking $DH = SG$, the arc AH, or angle ACH, will be the mean anomaly in practice, as expressed in degrees of a circle, the number of those degrees being to 360° , as the elliptic trilineal area ASP, is to the whole area of the ellipse; the degrees of mean anomaly, being those in the arc AH, or angle ACH.

Eccentric Anomaly, or of the centre, in the modern astronomy, is the arc AD of the circle ADB intercepted between the apsis A and the point D determined by the perpendicular DPE to the line of the apses, drawn through the place P of the planet. Or it is the angle ACD at the centre of the circle. Hence the eccentric anomaly is to the mean anomaly, as AD to AD + SG, or as AD to AH, or as the angle ACD to the angle ACH.

True or Equated Anomaly, is the angle ASP at the sun, which the planet's distance AP from the aphelion appears under; or the angle formed by the radius vector or line SP drawn from the sun to the planet, with the line of the apses. The true anomaly being given, it is easy from thence to find the mean anomaly. For the angle ASP, which is the true anomaly, being given, the point P in the ellipse is given, and thence the proportion of the area ASP to the whole ellipse, or of the mean anomaly to 360° degrees. And for this purpose, the following easy rules for practice are deduced from the properties of the ellipse, by M. de la Caille, in his *Elements of Astronomy*, and M. de la Lande, art. 1240, &c. of his *Astronomy*. 1st, As the square root of SB the perihelion distance, is to the square root of SA the aphelion distance, so is the tangent of half the true anomaly ASP, to the tangent of half the eccentric anomaly ACD. 2d, The difference DH or SG between the eccentric or mean anomaly, is equal to the product of the eccentricity CS, by the sine of SCG the eccentric anomaly just found. And in this case, it is proper to express the eccentricity in seconds of a degree, which will be found by this proportion, as the mean distance 1 : the eccentricity :: 206264.8 seconds, or $57^\circ 17' 44'' .8$, in the arc whose length is equal to the radius, to the seconds in the arc which is equal to the eccentricity CS; which being multiplied by the sine of the eccentric anomaly, to radius 1, as above, gives the seconds in SG, or in the arc DH, being the difference between the mean and eccentric anomalies. 3d, To find the radius vector SP, or distance of the planet from the sun, say either, As the sine of the true anomaly is to the sine of the eccentric anomaly, so is half the less axis of the orbit, to the radius vector SP; or, as the sine of half the true anomaly is to the sine of half the eccentric anomaly, so is the square root of the perihelion distance SB, to the square root of the radius vector or planet's distance SP.

But, the mean anomaly being given, it is not so easy to find the true anomaly, at least by a direct process. Kepler, who first proposed this problem, could not find a direct way of resolving it, and therefore made use of an indirect

one, by the rule of false position, as may be seen page 695 of Kepler's *Epitome Astron.* Copernic. See also §. 623 of Wolfius *Elem. Astron.* Now the easiest method of performing this operation, would be to work first for the eccentric anomaly, viz. assume it nearly, and from it to assume compute what would be its mean anomaly by the rule above given, and find the difference between this result and the mean anomaly given; then assume another eccentric anomaly, and proceed in the same way with it, finding another computed mean anomaly, and its difference from the given one; and treating these differences as in the rule of position for a nearer value of the eccentric anomaly: repeating the operation till the result comes out exact. Then, from the eccentric anomaly, thus found, compute the true anomaly by the first rule above laid down.

Of this problem, Dr. Wallis first gave the geometrical solution by means of the protracted cycloid; and Sir Isaac Newton did the same at prop. 31. lib. 1. Princip. But, these methods being unfit for the purpose of the practical astronomer, various series for approximation have been given, viz. several by Sir Isaac Newton, in his "*Fragmenta Epistolæ*," page 26, as also in the Schol. to the prop. above-mentioned, which is his best, being not only fit for the planets, but also for the comets, whose orbits are very eccentric. Dr. Gregory, in his *Astron.* lib. 3. has also given the solution by a series, as well as M. Reyneau, in his "*Analyse Démontrée*," page 713, &c. And a better still for converging is given by Keil, in his "*Prælect. Astron.*" page 375; he says, if the arc AH be the mean anomaly, calling its sine e , cosine f , the eccentricity g , also putting $z = ge$, and $a = 1 + fg$; then the eccentric anomaly

AD will be $= \frac{\tau z}{a} \times (1 - \frac{z^2}{a^2} \&c.)$ supposing $\tau = 57^\circ 29' 57'' .8$

degrees; of which the first term $\frac{\tau z}{a}$ is sufficient for all the planets, even for Mars itself, where the error will not exceed the 200th part of a degree; and in the orbit of the earth, the error is less than the 10000th part of a degree.

Dr. Seth Ward, in his "*Astronomia Geometrica*," takes the angle AFP at the other focus, where the sun is not, for the mean anomaly, and thence gives an elegant solution. But this method is not sufficiently accurate when the orbit is very eccentric, as in that of the planet Mars, as is shewn by Bullialdus, in his defence of the Philolaic. Astron. against Dr. Ward. However, when Newton's correction is made, as in the Schol. above-mentioned, and the problem resolved according to Ward's hypothesis, Sir Isaac affirms that, even in the orbit of Mars, there will scarcely ever be an error of more than one second.

ANO'MIA, *f.* in zoology, a genus of insects belonging to the order of vermes testacea. The shell is bivalve, and the valves are unequal. One valve is perforated near the hinge; affixed by that perforation to some other body. There are twenty-five species of the anomia; of which only two are natives of the British seas, viz. 1. The ephippium, with the habit of an oyster; the one side convex, the other flat; perforated; adherent to both bodies, often to oyster-shells, by a strong tendinous ligature; colour of the inside perlaceous. Size, near two inches diameter. 2. The squammula, with shells resembling the scales of fish; very delicate and silvery; much flattened; perforated; very small. Adheres to oysters, crabs, lobsters, and shells. The species of this genus are commonly called *beaked cochles*. No name has been given to the fish that inhabit it; for the recent shells of this kind are so very rare, that there is scarcely one to be found perfect. They are perhaps, as well as that which has given its form to the *corru ammonis*, inhabitants of the deepest part of the ocean; consequently it must be some extraordinary agitation of that great body of water that can bring them at all to our knowledge in their recent state. The fossil species of the anomia genus are uncommonly numerous in this island, in our chalk-

pits and limestone-quarries; and, in Gloucestershire, they are as common on the ploughed lands as pebbles in other places.

ANOMOE'ANS, *f.* in ecclesiastical history, the name by which the pure Arians were called in the fourth century, in contradiction to the Semi-Arians. The word is formed from the Greek, *ἀνομοι*, different, dissimilar: for the pure Arians asserted, that the Son was in nature different from, and in nothing like, the Father; whereas the Semi-Arians acknowledged a likeness of nature in the Son; at the same time that they denied, with the pure Arians, the consubstantiality of the world. The Semi-Arians condemned the Anomoeans in the council of Se-lencia; and the Anomoeans, in their turn, condemned the Semi-Arians in the councils of Constantinople and Antioch, erasing the word *ἀνομοι*, like, out of the Formula of Rimini and that of Constantinople.

ANOMORHOMBOIDIA, *f.* in natural history, the name of a genus of spars; the word is derived from the Greek *ἀνωμαλῆς*, irregular, and *ρομβοειδής*, a rhomboidal figure. The bodies of this genus are pellucid crystalline spars of no determinate or regular external form, but always breaking into regularly rhomboidal masses; easily fissile, and composed of plates running both horizontally and perpendicularly through the masses, but cleaving more readily and evenly in an horizontal than in a perpendicular direction; the plates being ever composed of irregular arrangements of rhomboidal concretions. Of this genus there are five known species. 1. A white, bright, and shattery, one; found in great quantities in the lead-mines of Derbyshire, Yorkshire, and Wales. 2. A milk-white, opaque, and shattery, one, found in some parts of France, and very plentifully in Germany, and sometimes in Wales and Scotland, and in the hills of Yorkshire. 3. A hard, dull, and snow-white, one, found in some of the mines in Derbyshire, and in many of our northern counties. 4. A hard, grey, and pellucid, one, found in the lead-mines of Yorkshire, and very common in Germany. And, 5. A pellucid and colourless one, found in the lead-mines of Derbyshire and Yorkshire. All these, in some degree, have their double refraction of the island crystal. See **ISLAND-CRYSTAL**.

ANOM'PHALOUS, *adj.* [of *α* and *ὀμφαλ*, a navel, Gr.] Without a navel, as it is supposed our first parents were created, not wanting nourishment in the womb that way.

A'NOMY, *f.* [of *α* priv. and *νομ*, Gr.] Breach of law.—If sin be good, and just, and lawful, it is no more evil, it is no sin, no *anomy*. *Bramhall*.

ANON', *adv.* [Junius imagines it to be an elliptical form of speaking for *in one*, that is, *in one minute*; Skinner from *a* and *anon*, or *near*; Minshew from *on on*.] Quickly; soon; in a short time.—He was not without design at that present, as shall be made out *anon*; meaning by that device to withdraw himself. *Clarendon*. Sometimes; now and then; at other times. In this sense is used *ever and anon*, for now and then:

Full forty days he pass'd, whether on hill
Sometimes, *anon* in shady vale, each night,
Or harbour'd in one cave, is not reveal'd. *Milton*.

ANO'NA, *f.* in botany. See **ACHRAS**, **ANNONA**, **CHRISOPHYLLUM**, **CRATÆVA**, **SLOANEA**.

ANO'NIS, *f.* in botany. See **GLYCINE**, **HEDISARUM**, **ONONIS**, **SOPHORA**.

ANO'NYMOUS, *adv.* [of *α* priv. and *ὄνομα*, nameless, Gr.] Something that is nameless, or of which the name is concealed. It is a term usually applied to books which do not express the author's name, or to authors whose names are unknown.

ANONYMOUS, in law. The sending anonymous letters demanding money, &c: is felony by the black act, 9 Geo. I. cap. 22. See **LETTER**.

ANO'NYMOUSLY, *adv.* Without a name.—I would know whether the edition is to come out *anonymously*, among complaints of spurious editions.

ANOREX'IA, or **AN'OREXY**, *f.* [from *α* neg. and *ὄρεξις*, appetite, Gr. also *ἀποψitia*, *ψitia*.] A want of appetite, without loathing of food. See **MEDICINE**.

ANOS'MIA, *f.* [from *α*, non, and *ὀσμη*, odour, Gr.] A diminution or loss of smelling. See **MEDICINE**.

ANOS'SI, a province of the island of Madagascar, lying between lat. 23. 18. and 26. 0. S. It is watered by many rivers, most of which run into the *Franchere*, *Ramcavate*, or *Immour*, the spring of which is in a mountain called *Mang-hage*, and discharges itself into the sea in lat. 25. 18. S. The mouth of this river is often stopped, and the course to the sea interrupted, unless kept open by the overflowings of great rains and high tides. Next in size to the *Franchere* is the *Manghofia*, which springs from a mountain called *Siliva*, and empties itself into the sea, where large ships may ride at anchor. Crocodiles breed in these and all the other rivers of the island. Between the two rivers lies Cape St. Romain, half a mile distant from the mouth of the *Franchere*. When the Cape is passed, the coast forms a great bay, which extends to the mouth of the river called *Dian Panouge* or *Pitorah*. In the middle of this bay the land runs out, and almost forms a peninsula called *Tholangare*. Fort Dauphin lies to the north of this peninsula, and Port Dauphin over-against it. The country is beautiful; abounds in fruit-trees; is fertile in pasture for cattle; and, if carefully cultivated, would produce all the necessaries of life. It is surrounded by high mountains, which are covered with woods and shrubs; but, about four miles distant from Fort Dauphin, the adjacent hills are quite destitute of verdure. The French often dug in this neighbourhood for mines of gold and silver, particularly in one mountain, where several springs flow near each other and empty themselves into a neighbouring river. In this river they found several stones and heaps intermixed with yellow clay, with a great quantity of black and white spangles shining like silver, which they carefully pounded and washed, but without effect. About sixty yards above these springs the grass, and every sort of vegetable, appears half dried and yellow, from a metalline sulphur, which gives that aspect; but the top of the mountain is covered with a fresh and beautiful verdure. It is said that the Portuguese found gold at the foot of this mountain on the north side, but that the place they had dug was filled up by the chiefs of the country after the Portuguese had been driven out.

The province of Anossi is inhabited by three different sorts of whites, and four sorts of negroes. The whites are distinguished by the names of *Rohandrians*, *Anacandrians*, and *Ondzatsi*. The whites are distinguished from the negroes by the general name of *Zaferamina*, or *Rahimini*; and the Rohandrians are distinguished above the other whites. When they proceed to an election of a sovereign, whom they call *Ompiandrian*, or *Dian Bahouache*, he is chosen from the Rohandrian race. Next to him the others hold the rank of princes, and are honoured as such by all the rest of the subjects. The Anacandrians are descendants of the chiefs, but who have degenerated, and are accounted the bastards of princes, or those who are descended from a Rohandrian and any inferior white or black woman. These are likewise called by the name of *Ontempassemaca*, or people from the sandy parts of Mecca, from whence, they say, came the Rohandrians. Both the Rohandrians and Anacandrians wear long hair, which hangs down in curls; and enjoy the privilege of killing beasts. The Ondzatsi, or lowest class of whites, are descended from the bastards of the Anacandrians. These are all fishermen, and are allowed to kill no land animal except a chicken.

The four classes of negroes are named *Voadziri*, *Lohavohits*, *Ontsoa*, and *Ondeves*. The Voadziri, the most powerful and the richest, are masters of several villages, and descended from the aborigines of the country. They enjoy the privilege of killing beasts, when at a distance from the whites, and no Rohandrian or Anacandrian in the village. The Lohavohits are descendants from the Voadziri, and also lords; but with this difference, that the one commands

mands a whole district, and the jurisdiction of the others extends only to their own village and family. They are also permitted to kill those beasts they intend to eat, when at a distance from the whites. The Ontsoa are next to the Lohavohits, and are their near relations. The Ondeves are the lowest of all, being originally slaves by father and mother. The inhabitants of this province have no temples, and very little appearance of religion; only they keep up a custom of immolating beasts upon particular occasions, as in sickness, planting yams or rice, on assemblies, &c. They offer the first-born beast to the devil and to God, naming the devil first, in this manner, *Dianbilis Aminhanhabare*, or "Lord Devil and God." There are several towns on the river Franchere; and near this river the Portuguese had a fort built upon a steep rock, and several buildings below, with inclosures, which furnished all forts of necessities for their subsistence; but they were all massacred by the natives.

This province seems originally to have been inhabited by negroes. The whites or Zaferamini settled in it about 250 years ago, and conquered the negroes. But they themselves were conquered by the French, though under the government of a king whom they honoured as a god. In 1642, Captain Rivault obtained a permission to establish a colony in this part of the island; and accordingly he took possession of it in the name of the king of France, in September, that same year. The French landed 200 men, well armed, and provided with store of ammunition and necessities for building a fort, which they immediately set about; but no sooner did the natives observe their intention, than they used their utmost art to prevent their design from taking effect. This created a war, in which the French were victors; and, the natives becoming in time much better reconciled to them, they intermarried, and lived up and down in several towns at some distance from one another, not above five or six in a place. This tranquillity lasted for some years; but at last the natives, growing jealous, resolved to free themselves from a foreign yoke; and accordingly formed a conspiracy to cut off all the French in one day; which they soon after effected, not leaving a single person alive. In 1644, the above-mentioned Fort Dauphin was erected in lat. 25. 6. S. Many buildings were erected behind the fort, adjoining to the governor's house, with great inclosures, that produced every sort of fruit and kitchen herb. In 1656, this fort was accidentally destroyed by fire; but was soon after repaired, and still continues, notwithstanding the catastrophe above-mentioned, and its garrison carries on frequent wars with the natives.

ANOTHER, *adj.* [from *an* and *other*.] Not the same. One more; a new addition to the former number. Any other; any one else.—If one man sin against *another*, the judge shall judge him. 1 *Samuel*, ii. 25.

Why not of her? prefer'd above the rest
By him with knightly deeds, and open love profess'd;
So had *another* been, where he his vows address'd. *Dryden*.

Not one's self. Widely different; much altered.—When the soul is beaten from its station, and the mounds of virtue are broken down, it becomes quite *another* thing from what it was before. *South*.

ANOTHERGAINES, *adj.* Of another kind. This word is found only in Sidney.—If my father had not plaid the haily fool, I might have had *anothergainies* husband than Dametas. *Sidney*.

ANOTHERGUESS, *adj.* [This word, though rarely used in writing, is somewhat frequent in colloquial language: it appears to be corrupted from *another guise*; that is, of a different *guise*, or manner, or form.] Of a different kind.—Oh Hocus! where art thou? It used to go in *anotherguess* manner in thy time. *Arbutnot*.

ANOTTA, or **ARNOTTA**, *f.* in dying, an elegant red colour, formed from the pellicles or pulp of the seeds of the *bixa*, a tree common in South America. It is also called *Terra Orleana*, and *Roucou*.—See **BIXA**. The red

seeds, cleared from the pods, are steeped in water for seven or eight days, or longer, till the liquor begins to ferment; then strongly stirred, stamped with wooden paddles and beaters, to promote the separation of the red skins: this process is repeated several times, till the seeds are left white. The liquor, passed through close canesieves, is pretty thick, of a deep red colour, and a very ill smell; in boiling, it throws up its colouring matter to the surface in form of scum, which is afterwards boiled down by itself to a due consistence, and made up while soft into balls. The anotta commonly met with among us, is moderately hard and dry, of a brown colour on the outside, and a dull red within. It is difficultly acted upon by water, and tinges the liquor only of a pale brownish-yellow colour. In rectified spirit of wine, it very readily dissolves, and communicates a high orange or yellowish-red. Hence it is used as an ingredient in varnishes, for giving more or less of an orange-cast to the simple yellows. Alkaline salts render it perfectly soluble in boiling water, without altering its colour. Wool or silk boiled in the solution acquire a deep, but not a very durable, orange-dye. Its colour is not changed by alum or by acids, any more than by alkalis: but, when imbibed in cloth, it is discharged by soap, and destroyed by exposure to the air. It is said to be an antidote to the poisonous juice of manioc or cassava. Labat informs us, that the Indians prepare an anotta greatly superior to that which is brought to us, of a bright shining red colour, almost equal to carmine: that, for this purpose, instead of steeping and fermenting the seeds in water, they rub them with the hands, previously dipt in oil, till the pellicles come off, and are reduced into a clear paste; which is scraped from off the hands with a knife, and laid on a clean leaf in the shade to dry. De Laet, in his notes on Margrave's Natural History of Brazil, mentions also two kinds of anotta; one of a permanent crimson colour, used as a fucus or paint for the face; and another which gives a colour inclining more to that of saffron. This last, which is our anotta, he supposes to be a mixture of the first sort with certain resinous matters, and with the juice of the root of the tree. The wax or pulp in which the seeds are inclosed, is a cool agreeable rich cordial, and has been long in use among the Indians and Spaniards in America, who still mix it with their chocolate, both to heighten the flavour and raise the colour. It is said to be a successful remedy in bloody fluxes. The roots have much the same properties with the wax; but these are observed to work more powerfully by the urinary passages: they are used by some people in their broths, and seem to answer all the purposes of the pulp, but in a more faint degree.

ANOUT, a small island in the Schagerrack, or that part of the sea of Denmark which has Norway on the north, Jutland on the west, and the isle of Zealand on the south; it lies in lat. 56. 36. N. lon. 13. 0. E.

AN'SÆ, or **AN'SES**, in astronomy, those seemingly prominent parts of the ring of the planet Saturn, discovered in its opening, and appearing like handles to the body of the planet; from which appearance the name *ansæ* is taken.

ANSA'RIANS, a people of Syria, so called in the country, but styled in Delile's maps *Enfarians*, and in those of Danvill, *Nassaris*. The territory occupied by these Ansaria is that chain of mountains which extends from Antakia to the rivulet called *Nahr-el-Kahir*, or the Great River. The history of their origin, though little known, is yet instructive. The following account is from the *Bibliothèque Orientale* of Affemani, a writer who has drawn his materials from the best authorities. "In the year of the Greeks 1202, (A. D. 891,) there lived at the village of Nasar, in the environs of Koufa, an old man, who, from his fastings, his prayers, and his poverty, passed for a saint: several of the common people declaring themselves his partisans, he selected from among them twelve disciples to propagate his doctrine. But the commandant of the place, alarmed at his proceedings, seized the old

man,

man, and confined him in prison. In this reverse of fortune, his situation excited the pity of a girl who was slave to the gaoler, and she determined to give him his liberty: an opportunity soon offered to effect her design. One day when the gaoler was gone to bed intoxicated, and in a profound sleep, the gently took the keys from under his pillow, and, after opening the door to the old man, returned them to their place unperceived by her master. The next day, when the gaoler went to visit his prisoner, he was extremely astonished at finding he had made his escape, and the more so since the prison-door was locked, and he could perceive no marks of violence. He therefore judiciously concluded he had been delivered by an angel, and eagerly spread the report, to avoid the reprehension he merited: the old man, on the other hand, asserted the same thing to his disciples, and preached his doctrines with more earnestness than ever. He even wrote a book, in which, among other things, he says, 'I have seen Christ, who is the word of God, who is Ahmad, son of Mohammad, son of Hanafa, of the race of Ali; who also is Gabriel: and he said to me, Thou art he who readeth with understanding; thou art the man who speaketh truth; thou art the camel which preserveth the faithful from wrath; thou art the beast which carrieth their burden; thou art the Spirit, and John, the son of Zachary.' Go, and preach to men, that they make four genuflections in praying; two before the rising of the sun, and two before his setting, turning their faces towards Jerusalem.' This old man, passing into Syria, propagated his opinions among the lower orders of the country people, numbers of whom believed in him: and after a few years he went away, and no one ever knew what became of him." Such was the origin of the Ansfarians, who are, for the most part, inhabitants of the mountains before-mentioned.

The Ansfaria are divided into several tribes or sects; among which are distinguished the Shamsia, or adorers of the sun; the Kelbia, or worshippers of the dog; and the Kadimousia, who are said to pay a particular homage to that part in women which corresponds to the priapus. Many of the Ansfaria believe in the metempsychosis; others reject the immortality of the soul; and in general, in that civil and religious anarchy, that ignorance and rudeness, which prevail among them, these peasants adopt what opinions they think proper, following the sect they like best, and frequently attaching themselves to none. Their country is divided into three principal districts, farmed by the chiefs called *Mohaddamim*. Their tribute is paid to the pacha of Tripoli, from whom they annually receive their title. Their mountains are in general not so steep as those of Lebanon, and consequently are better adapted to cultivation; but they are also more exposed to the Turks; and hence, doubtless, it happens, that with greater plenty of corn, tobacco, wines, and olives, they are more thinly inhabited than those of their neighbours, the Maronites and the Druzes.

ANSATED, *adj.* [*ansatus*, Lat.] Having handles; or something in the form of handles.

ANSE, an ancient town of France, in the late Lyonnais, ten miles north of Lyons. Lat. 45. 55. N. lon. 6. 55.

ANSELM, [*Anselm*, Teut. a defender of his companions.] A proper name of men.

ANSELM, archbishop of Canterbury, in the reigns of William Rufus and Henry I. He was born in the year 1033, at Aost, a town in Savoy, at the foot of the Alps. He became a monk in the abbey of Bec, in Normandy; of which he was afterwards chosen prior, and then abbot. In the year 1092, he was invited to England by Hugh earl of Chester; and in the year following was made archbishop of Canterbury. He enjoined celibacy on the clergy; for which he was banished by king Rufus, but recalled by Henry at his coming to the crown. He refused to consecrate such bishops as were invested by the king, according to pope Urban's decree; flatly denying it to be the king's prerogative: for this he was ousted again; till, the pope and king agreeing, he was recalled in 1107. At the coun-

cil of Bari, in the kingdom of Naples, the pope being puzzled by the arguments of the Greeks against the Holy Ghost's proceeding from the Father, he called upon Anselm, who was present, and he discussed their objections with great applause. He wrought many miracles, if we believe the author of his life, both before and after his death, which happened at Canterbury, in the 76th year of his age, anno 1109. He was canonised in the reign of Henry VII. Anselm, though we may disregard him as a saint, deserves to be remembered as one of the principal revivers of literature, after three centuries of profound ignorance. His works have been printed at Nuremb. 1491. Paris, 1544 and 1549. Venice, 1549. Cologne, 1573 and 1612. Lyons, 1630. The best edition is that of father Gerberon, printed at Paris in 1675. It is divided into three parts; the first contains dogmatical tracts, and is intitled *Monologia*; the second contains practical and devotional tracts; the third part consists of letters, in four books.

ANSER, *f.* in ornithology, the trivial name of a species of Anas. See ANAS.

ANSER, in astronomy, a small star, of the fifth or sixth magnitude, in the milky way, between the swan and eagle, first brought into order by Hevelius.

ANSERES, *f.* the name which Linnæus gives to his third order of birds. See ZOOLOGY.

ANSE/RINA, *f.* in botany. See POTENTILLA.

ANSIBA'RII, or ANSIVA'RII, an ancient people of Germany, situated in the neighbourhood of the Chauci. All we know of their history is, that, in the reign of the emperor Nero, they were driven from their own possessions by the Chauci. Being then in a forlorn condition, they took possession of some uninhabited lands, which had been used as pasture for the horses of the Roman soldiers. They were led by one Boiocalus, a man of great valour, and of known fidelity to the Romans. He remonstrated to the Romans, who objected to their taking possession of these lands, That the territory in dispute was large; and requested, that it might be allowed to an unhappy people, driven from their own habitations; that, at the same time, wide tracts might be retained for the horses and cattle of the soldiers to graze in; that it was inconsistent with humanity to famish men in order to feed beasts, &c. and at last, lifting up his eyes to heaven, he asked the celestial luminaries how they could behold a desolate soil, and if they would not more justly let loose the sea to swallow up usurpers, who had engrossed the whole earth? To this the Roman commander, Avitus, replied, That the weakest must submit to the strongest; and, that since the gods, to whom they had appealed, had left the sovereign judgment to the Romans, they were resolved to suffer no other judges than themselves. To Boiocalus himself, however, he privately offered lands, as a reward for his long attachment to the Romans: but this offer the brave German rejected, as a price for betraying his people; adding, "A place to live in we may want, but a place to die in we cannot." The Ansibarii now invited the neighbouring nations to join them against the Romans; but they, dreading the power of that nation, refused to give them any assistance: upon which they applied to the neighbouring nations, begging leave to settle in their territories; but, being every where driven out as enemies and intruders, these unhappy people were reduced to wander up and down, till every one of them perished.

ANSIKO, a kingdom of Africa, bounded on the west by the river Umbre, which runs into the Zaire, the kingdom of Wangua, and the Amboes who border on Loango; on the north, by some deserts of Nubia; and on the south, by Songo and Sonda, provinces of Congo. Here are great numbers of wild beasts, as lions, rhinoceroses, &c. and many copper-mines. The king of Anisiko, or the great Macoco, commands thirteen kingdoms, and is esteemed the most powerful monarch in Africa. The inhabitants of Angola have a tradition, that this is the proper country of the Giagas, who came originally from Sierra Leona, and

over-ran like a torrent the whole coast as far as Benguela; that, being weakened by numerous battles, and unable to force the defiles in order to return to Sierra Leona, they arrived on the borders of Monomotapa, where being defeated, they were forced to remain in the provinces of Anfiko. Be this as it will, the Anfikans yield not in the least to the Giagas in fierceness and barbarity. They are cannibals, who try the courage of their prisoners of war by shooting at them as at marks, directing their arrows above or around their heads; and whoever discovers the least signs of fear, is immediately devoured. Those who appear intrepid and resolute, have their noses and ears bored, and two fore-teeth of the upper jaw drawn. They are then improved in brutality, by accustoming them to the most horrid cruelties.

The Anfikans are well-proportioned and strong; wandering about from place to place, without either sowing or reaping. They are dreaded for their extreme brutality, and never traded with by the Europeans. Their language is barbarous, and difficult to be learned, even by the inhabitants of Congo. The most distinguished among them wear red and black caps of Portuguese velvet: the lower ranks go naked from the waist upwards; and anoint their bodies with a composition of pounded white sandal-wood and palm-oil. Their arms are battle-axes, and small but very strong bows, adorned with serpents skins. Their strings are made of supple and tender shoots of trees, that will not break, and their arrows of hard and light wood. These people, who kill birds flying, shoot with such surprising swiftness, that they are said to discharge twenty-eight arrows from the bow before the first falls to the ground. With equal dexterity they manage their battle-axes. The current money in this country is the zimbo or shell, which is fished for, and passes among several African nations. They worship the sun as their chief deity; whom they represent by the figure of a man, and the moon by that of a woman. They have also an infinite number of inferior deities, each individual having a particular idol whom he addresses on certain occasions.

AN'SLO, a sea-port town of Norway, in the province of Aggerhuys, with a bishop's see. The supreme court of justice is held here for Norway. It is seated on a bay of the same name. Lat. 50. 24. N. lon. 16. 14. E.

AN'SON (George), a gentleman whose merit and good fortune, as a naval commander, exalted him to the rank of nobility. He was the son of William Anson, Esq. of Huckborough, in Staffordshire; and, shewing an early inclination for the sea, received a suitable education. The first command he enjoyed was that of the Weazle sloop in 1722; but the most memorable action of his life, and the foundation of his future good fortune, took place on his receiving the command of five ships, a sloop, and two victuallers, equipped to annoy the Spaniards in the South Seas, and to co-operate with admiral Vernon across the isthmus of Darien; an expedition the principal object of which failed by the unaccountable delay in fitting out. He sailed, however, in Sept. 1740; doubled Cape Horn in a dangerous season; lost most of his men by the scurvy; and with only one remaining ship, the Centurion, crossed the great Pacific Ocean. If no considerable national advantage resulted from this voyage, commodore Anson made his own fortune, and enriched his surviving companions, by the capture of a rich galleon on her passage from Acapulco to Manilla; with which he returned home round the Cape of Good Hope. If he was lucky in meeting this galleon, he was no less fortunate in escaping a French fleet then cruising in the channel, by sailing through it during a fog. He arrived at Spithead in June 1744. In a short time after his return, he was appointed rear-admiral of the blue, and one of the lords of the admiralty. In April 1745, he was made rear-admiral of the white, and the following year vice-admiral of the blue; at which time he was chosen to represent the borough of Heydon in parliament. In 1747, being on-board the Prince George of 90 guns, in company with admiral Warren, and twelve other ships, he

intercepted, off Cape Finisterre, a powerful fleet bound from France to the East and West Indies; when, by his valour and conduct, he again enriched himself and his officers, and at the same time strengthened the British navy, by taking six men of war and four East Indiamen, not one of them escaping. The French admiral, M. Jonquiere, on presenting his sword to the conqueror, said, *Monsieur, vous avez vaincu l'Invincible, et la Gloire vous suit*: "Sir, you have conquered the Invincible, and Glory follows you;" pointing to the ships, named the *Invincible* and *Glory*, he had taken. For his signal services, he was created baron of Soberton in Hants. The same year he was appointed vice-admiral of the red; and, on the death of Sir John Norris, was made vice-admiral of England. In 1748 he was made admiral of the blue: he was afterwards appointed first lord of the admiralty, and was at length made admiral and commander in chief of his majesty's fleet; in which rank he continued, with a very short interval, until his death; and the last service he performed was to convoy queen Charlotte to England. He died in June 1762. No performance ever met with a more favourable reception, than the account of Anson's voyage round the world. Though it is printed under the name of his chaplain, it was composed under his lordship's own inspection, and from the materials he himself furnished, by the ingenious Mr. Benjamin Robins.

AN'SPACH (the marquisate of), a small territory of Franconia, in Germany, bounded on the north by the bishoprics of Wartburg and Bamberg, which last likewise lies to the west; by the earldoms of Holach and Oeting, with the bishoprick of Aichstet, on the south; and the palatinate of Bavaria and the territory of Nuremberg on the east. The country is fruitful, and interspersed with woods, which render it agreeable for hunting. Besides the city Anspach, which is the capital, the chief towns are Kreglin, Swabach, Kreilsheim, Rot, and Wasser-Trudung.

ANSPACH is a small but pretty town, very well built, and has several churches. It is walled round, but has no other fortifications. In the palace there is a remarkable cabinet of curiosities. It is seated on a river of the same name, and belongs to the house of Brandenburg. Lat. 49. 14. N. long. 10. 42. E.

ANSPESSA'DES, in the French armies, a kind of inferior officers in the foot, below the corporals, but above the common centinels. There are usually four or five of them in a company.

ANSTRUTHER *East* and *West*, two royal boroughs of Scotland, situated on the south-east coast of the county of Fife, in lat. 56. 20. N. long. 2. 25. W.

To AN'SWER, *v. n.* [The etymology is uncertain: the Saxons had *andswarian*, but in another sense; the Dutch have *antwoorden*.] To speak in return to a question:

Are we succour'd? are the Moors remov'd?

Answer these questions first, and then a thousand more.

Answer them all together.

Dryden.

To speak in opposition.—No man was able to *answer* him a word. *Matthew*, xxii. 46.—To be accountable for: with *for*.—Some men have sinned in the principles of humanity, and must *answer for* not being men. *Brown*.—To vindicate; to give a justificatory account of; with *for*.—The night, so imprudently fixed for my last, made little impression on myself; but I cannot *answer for* my family. *Swift*.—To give an account.—How they have been since received, and so well improved, let those *answer* either to God or man, who have been the authors and promoters of such wise council. *Temple*.—To correspond to; to suit with.—As in water face *answereth* to face, so the heart of man to man. *Prov.* xxvii. 19.—To be equivalent to; to stand for something else.—A feast is made for laughter, and wine maketh merry: but money *answereth* all things. *Ecc.* x. 19.—To satisfy any claim or petition of right or justice.—Zelmane with rageful eyes bade him defend himself; for no less than his life would *answer* for it. *Sidney*.—To act reciprocally:

Say, dost thou yet the Roman harp command?
Do the strings *answer* to thy noble hand?

Dryden.

To stand as opposite or correlative to something else.—There can but two things create love, perfection and usefulness; to which *answer*, on our part, 1. Admiration; and, 2. Desire: and both these are centered in love. *Taylor.*—To bear proportion to.—Weapons must needs be dangerous things, if they *answered* the bulk of so prodigious a person. *Swift*—To perform what is endeavoured or intended by the agent.—Our part is, to choose out the most deserving objects, and the most likely to *answer* the ends of our charity; and, when this is done, all is done that lies in our power: the rest must be left to Providence. *Atterbury.*—To comply with:

He dies that touches of this fruit,
Till I and my affairs are *answered*.

Shakespeare.

To succeed; to produce the wished event.—In operations upon bodies for their version or alteration, the trial in great quantities doth not *answer* the trial in small: and so deceiveth many. *Bacon.*—To appear to any call or authoritative summons; in which sense, though figuratively, the following passage may be, perhaps, taken.—Thou wert better in thy grave, than to *answer* with thy uncovered body this extremity of the skies. *Shakespeare.*—To be over-against any thing:

Fire *answers* fire, and, by their paly beams,
Each battle sees the other's umber'd face.

Shakespeare.

AN'SWER, *f.* That which is said, whether in speech or writing, in return to a question, or position.—How can we think of appearing at that tribunal, without being able to give a ready *answer* to the questions which he shall then put to us, about the poor and the afflicted, the hungry and the naked, the sick and imprisoned? *Atterbury.* An account to be given to the demand of justice. In law, a confutation of a charge exhibited against a person.—A personal *answer* ought to have three qualities; it ought to be pertinent to the matter in hand; it ought to be absolute and unconditional; it ought to be clear and certain. *Ayliffe.*

AN'SWER-JOBBER, *f.* [from *answer* and *jobber*.] He that makes a trade of writing answers.—What disgusts me from having any thing to do with *answer-jobbers*, is, that they have no conscience. *Swift.*

ANSWERABLE, *adj.* [from *answer*.] That to which a reply may be made; that which may be answered; as, the argument, though subtle, is yet *answerable*. Obligated to give an account; obliged to answer any demand of justice; or stand the trial of an accusation.—Will any man argue, that if a physician should manifestly prescribe poison to all his patients, he cannot be justly punished, but is *answerable* only to God? *Swift.*—Correspondent.—The daughters of Atlas were ladies who, accompanying such as came to be registered among the worthies, brought forth children *answerable* in quality to those that begot them. *Raleigh.*—Proportionate; suitable:

Only add

Deeds to thy knowledge *answerable*; add faith,
Add virtue, patience, temperance; add love,
By name to come call'd charity, the soul
Of all the rest.

Milton.

Suitable; suited. Equal; equivalent.—There be no kings whose means are *answerable* unto other men's desires. *Raleigh.*—Relative; correlative.—That, to every petition for things thankful, there should be some *answerable* sentence of thanks provided particularly to follow, is not requisite. *Hooker.*

ANSWERABLY, *adv.* In due proportion; with proper correspondence; suitably.—The broader seas are, if they be entire, and free from islands, they are *answerably* deeper. *Brewster.*

ANSWERABLENESS, *f.* The quality of being answerable.

ANSWERER, *f.* He that answers; he that speaks in return to what another has spoken.—I know your mind, and will satisfy it; neither will I do it like a niggardly *answerer*, going no farther than the bounds of the question. *Sidney.*—He that manages the controversy against one that has written first.—It is very unfair in any writer to employ ignorance and malice together; because it gives his *answerer* double work. *Swift.*

ANT, in zoology. See FORMICA, and TERMES.

ANT-BEAR, or Ant-eater, in zoology. See MYRMECOPHAGA.

ANT-EGGS, a name popularly given to a kind of little white balls found in the banks or nests of ants, supposed to be the ova of this insect. Later naturalists, however, have observed, that these are not properly the ants eggs, but the young brood themselves in their first state; they are so many little vermiculi wrapped up in a film, or skin, composed of a sort of silk, which they spin out of themselves as silk-worms and caterpillars do. At first they are hardly observed to stir: but, after a few days continuance, they exhibit a feeble motion of flexion and extension; and begin to look yellowish and hairy, shaped like small maggots, in which shape they grow up till they are almost as big as ants. When they pass their metamorphosis, and appear in their proper shape, they have a small black speck on them close to the anus of the inclosed ant, which M. Leeuwenhoek probably enough imagines to be the feces voided by it. These supposed ants eggs are brought up every morning in summer, near the top of the bank, where they are lodged, all the warm part of the day, within reach of the sun's influence. At night, or if it be cool, or likely to rain, they carry them down to a greater depth; so that you may dig a foot deep before you come at them. The true ants eggs are the white substance which, upon opening their banks, appears to the eye like the scatterings of fine white sugar, or salt, but very soft and tender. Examined by a microscope, it is found to consist of several pure white appearances, in distinct membranes, all figured like the smaller sort of birds eggs, and as clear as a fish's bladder.

ANT-HILLS, are little hillocks of earth, which the ants throw up for their habitation and the breeding of their young. They injure dry pastures, not only by wasting so much land as they cover, but by hindering the scythe in mowing the grass, and yielding a poor hungry food pernicious to cattle. The usual manner of destroying these hills is to cut them into four parts from the top, and then dig into them so deep as to take out the core below, so that, when the turf is laid down again, it may lie somewhat lower than the level of the ground; by this means it will be wetter than the rest of the land; and this will prevent the ants from returning to the same place, which otherwise they would certainly do. The earth that is taken out must be scattered to a great distance, otherwise they will collect it together and make another hill just by. The proper time for doing this is in winter. Human dung is a better remedy than all these, as is proved by experiment; for it will kill great numbers of them, and drive all the rest away, if only a small quantity of it be put into their hills. A considerable reward was lately given to M. Tatin, at Paris, for the invention of the following composition to destroy ants, caterpillars, &c. Take of black soap, of the best quality, 1½ lb. flowers of sulphur, 1½ lb. mushrooms, of any kind, 2 lb. river or rain water, 15 gallons. Divide the water into two equal parts; pour one part into a barrel, of any convenient size, which should be used only for this purpose; let the black soap be stirred in till it is dissolved, and then add to it the mushrooms, after they have been slightly bruised. Let the remaining half of the water be made to boil in a kettle; put the whole quantity of sulphur into a coarse open cloth, tied up, with a stone or other weight, to make it sink to the bottom. During twenty minutes (being the time the boiling should continue) stir it well with a stick, and let the packet of sulphur be squeezed, so as to make it yield

to the water all its power and colour. The water, when taken off the fire, is to be poured into the barrel, containing the other half; where it is to be stirred for a short time with a stick; this stirring must be repeated every day, until the mixture becomes fetid in the highest degree. When we wish to make use of this water, we need only sprinkle it, or pour it, upon the plants, or plunge their branches into it. Ants, caterpillars, beetles, bed-bugs, *aphides*, and many other insects, are killed by a single injection of this water. Insects which live under ground, those which have a hard shell, hornets, wasps, &c. require to be gently and continually injected, till the water has penetrated to the bottom of their abode. Ant-hills, particularly, require two, four, six, or eight, quarts of water, according to the size and extent of the ant-hill, which should not be disturbed till twenty-four hours after the operation. If the ants which happen to be absent should assemble, and form another hill, it must be treated in the way before mentioned. We may advantageously add to the mixture two ounces of *nux vomica*, which should be boiled with the sulphur; the water, by this means, will acquire more power, particularly if used for destroying ants. When all the water has been made use of, the sediment should be thrown into a hole dug in the ground, lest the poultry, or other domestic animals, should eat it.

AN'T, a contraction for *and it*, or rather, *and if it*; as, *a'nt please you*; that is, *and if it please you*.

AN'TA, in the ancient architecture, a square pilaster, placed at the corners of buildings.

ANTA, of *Ante*, a small kingdom on the gold-coast of Africa, extending about ten leagues in length. The soil is exceedingly rich, and the face of the country beautiful. The air is also much more salubrious than in most other places of the gold-coast; it being observed by all writers, that the number of deaths here bears no proportion to that on any other part of the coasts of Guinea. This country contains the following villages, which deserve a particular description on account of the commerce they carry on; viz. *Bourtrey*, *Tokorari*, *Sukooda*, and *Sama*. Formerly Anta was potent and populous, inhabited by a bold and rapacious people, who greatly annoyed the Europeans by their frequent incursions; but, by continual wars with their neighbours, they are now greatly enfeebled, and the country is in a manner depopulated.

ANTÆUS, in fabulous history, a giant of Libya, son of Neptune and Terra. Designing to build a temple to his father, of men's skulls, he slew all he met; but Hercules fighting him, and perceiving the assistance he received from his mother (for by a touch of the earth he refreshed himself when weary), he lifted him up from the ground, and squeezed him to death.

ANTÆUS, was king of Mauritania; and from several circumstances, with which we are supplied by various authors, it appears extremely probable that he was the same person with Atlas: they were both of them the sons of Neptune, who reigned over Mauritania, Numidia, and a great part of Libya. They both ruled with absolute power over a great part of Africa, particularly Tingitania. Hercules defeated and slew Antæus in the fame war wherein he took the Libyan world from Atlas: both Atlas and Antæus invaded Egypt, and contended with Hercules in the wars with the gods, and were both vanquished by him. Antæus, as well as Atlas, was famed for his knowledge in the celestial sciences: from whence we may fairly conclude them to have been the same king of Mauritania. Antæus, in his wars with Hercules, who commanded an army of Egyptians and Ethiopians, behaved with great bravery and resolution. Receiving large reinforcements of Libyan troops, he cut off vast numbers of Hercules's men: but that celebrated commander, having at last intercepted a strong body of Mauritanian or Libyan forces sent to the relief of Antæus, gave him a total overthrow, wherein both he and the best part of his forces were put to the sword. This decisive action put Hercules in possession of

Libya and Mauritania, and consequently of all the riches in those kingdoms; hence arose the fable, that Hercules finding Antæus, a giant of an enormous size, with whom he was engaged in single combat, to receive fresh strength as often as he touched his mother earth when thrown upon her, at last lifted him up in the air and squeezed him to death. Hence likewise may be deduced the fable, intimating, that Hercules took Atlas's globe upon his own shoulders, overcame the dragon that guarded the orchards of the Hesperides, and made himself master of all the golden fruit. The golden apples, so frequently mentioned by the old mythologists, were the treasures that fell into Hercules's hands upon Antæus's defeat, the Greeks giving the Oriental word *ἄντα* riches, the signification affixed to their own term, *ἄντα*, apples. After the most diligent and impartial examination of all the different hypotheses of historians and chronologers, relating to Atlas and Antæus, we find none so little clogged with difficulties as that of Sir Isaac Newton. According to that illustrious author, Ammon, the father of Sefac, was the first king of Libya, or that vast tract extending from the borders of Egypt to the Atlantic Ocean; the conquest of which country was effected by Sefac in his father's life-time. Neptune afterwards excited the Libyans to a rebellion against Sefac; slew him; and then invaded Egypt under the command of Atlas or Antæus, the son of Neptune, Sefac's brother and admiral. Not long after, Hercules, the general of Thebais and Ethiopia for the gods or great men of Egypt, reduced a second time the whole continent of Libya, having overthrown and slain Antæus near a town in Thebais, from that event called Antæa or Antæopolis: this is the notion advanced by Sir Isaac Newton, who endeavours to prove, that the first reduction of Libya by Sefac happened a little above a thousand years before the birth of Christ, as the last by Hercules did some few years after.

ANTAGOGÉ, in rhetoric, a figure by which, when the accusation of the adversary is unanswerable, we load him with the same or other crimes.

ANTAGONIST, *f.* [*antagoniste*, Fr. *antagonista*, Lat. of *ανταγωνιστης*, of *αντι*, against, and *αγωνισμα*, to strive, Gr.] One who contends with another; an opponent. It implies generally a personal and particular opposition.—It is not fit that the history of a person should appear till the prejudice both of his *antagonists* and adherents be softened and subdued. *Addison*.—Contrary.—The short club consists of those who are under five feet; ours is to be composed of such as are above six. These we look upon as the two extremes and *antagonists* of the species; considering all these as neutrals, who fill up the middle space. *Addison*.

ANTAGONIST MUSCLES, in anatomy, those which have opposite functions; as flexors and extensors, abductors and adductors, &c.

To ANTAGONIZE, *v. n.* [from *αντι* and *αγωνιζω*.] To contend against another.

ANTALGIC, *adj.* [from *αντι*, against, and *αλγη*, pain.] That which alluages pain; anodyne.

ANTANACLASIS, *f.* [Lat. from *αναντακλασις*, from *αναντακλω*, Gr. to drive back.] A figure in rhetoric, when the same word is repeated in a different, if not in a contrary, signification; as, *In thy youth learn some craft, that in old age thou mayest get thy living without craft.* *Craft*, in the first place, signifies science or occupation; in the second, deceit or subtilty. It is also a returning to the matter at the end of a long parenthesis; as, *Shall that heart (which does not only feel them, but hath all motion of his life placed in them), shall that heart, I say, &c.*

ANTANISOPHYLLUM, *f.* in botany. See BOERHAAVIA.

ANTANDROS, a city and port of Troas, where Æneas built his fleet after the destruction of Troy. There is a hill in its neighbourhood called Alexandria, where Paris sat, as some suppose, when the three rival goddesses appeared before him contending for the prize of beauty. It takes its name from Antandros, a general of the Eolians. It is now called *S. Dimitri*.

ANTAPHRODITIC,

ANTAPHRODITIC, *adj.* [from *αντι*, against, and *Αφροδιτη*, Venus.] That which is efficacious against the venereal disease. That which is proper to diminish the semen, and consequently extinguish or lessen all desires of venery.

ANTAPODOSIS, *f.* [*ανταποδοσις*, of *αντι*, *απο*, and *διδωμι*, Gr.] The counterpart or latter clause of a similitude, answering to the former.

ANTAPOPLECTIC, *adj.* [*αντι*, against, and *αποπληξις*, Gr. an apoplexy.] Good against apoplexy.

ANTARCTIC POLE, [*antarcticque*, F. *antarcticus*, L. of *ανταρκτικος*, of *αντι*, against, or opposition to, and *αρκτικος*, northern, Gr.] denotes the southern pole, or southern end of the earth's axis.—The stars near the antarctic pole never appear above our horizon in these latitudes:

They that had sail'd from near the antarctic pole,
Their treasure safe, and all their vessels whole,
In sight of their dear country ruin'd be,
Without the guilt of either rock or sea.

Waller.

ANTARCTIC CIRCLE, is a small circle parallel to the equator, at the distance of $23^{\circ} 28'$ from the antarctic or south pole.—At one time of the year the sun never rises above the horizon of any part within this circle; and at other times he never sets.

ANTARES, in astronomy, the scorpion's heart; a fixed star of the first magnitude, in the constellation *Scorpio*.

ANTARTHRETIC, *adj.* [*αντι*, against, and *αρθριτις*, Gr. the gout.] Good against the gout.

ANTASTHMATIC, *adj.* [from *αντι* and *ασθμα*, Gr.] Good against the asthma.

ANTAVARE, a province of the island of Madagascar, lying about $21^{\circ} 30'$ S. lat. and bounded by the province and cape of Manoufi. The greatest part of it is watered by the river Mananzari, whose source is in the red mountains of Ambohitimene.

AN'TE, in heraldry, denotes that the pieces are let into one another in such a form as there is expressed; for instance, by dove-tails, rounds, swallow-tails, or the like.

AN'TE, a Latin particle signifying *before*, which is frequently used in compositions; as, *antediluvian*, before the flood; *antechamber*, a chamber leading into another apartment.

AN'TEACT, *f.* [from *ante* and *act*, Lat.] A former act.

ANTEAMBULATION, *f.* [from *ante* and *ambulatio*, Lat.] A walking before.

ANTECANIS, is used by some astronomers, to denote the constellation otherwise called *canis minor*, or the star *procyon*. It is so called, as preceding or being the forerunner of the *canis major*, and rising a little before it.

To **ANTECE'DE**, *v. n.* [from *ante*, before, and *cedo*, Lat. to go] To precede; to go before.—It seems consonant to reason, that the fabric of the world did not long *anteced* its motion. *Hale*.

ANTECE'DENCE, *f.* The act or state of going before; precedence.—It is impossible that mixed bodies can be eternal, because there is necessarily a pre-existence of the simple bodies, and an *antecedence* of their constitution preceding the existence of mixed bodies. *Hale*.

ANTECE'DENCE, in astronomy, is when a planet appears to move contrary to the usual course or order of the signs in the zodiac, as from east to west.

ANTECE'DENT, *adj.* [*antecedens*, Lat.] Going before; preceding. *Antecedent* seems used only with regard to time; *precedent*, with regard both to time and place. It has to before the thing which is supposed to follow.—No one is so hardy as to say, God is in his debt; that he owed him a nobler being: for existence must be *antecedent* to merit. *Collier*.

ANTECE'DENT, *f.* in mathematics, denotes the first of the two terms of a ratio, or that term which is compared with the other. Thus, if the ratio be 2 to 3, or *a* to *b*; then 2 or *a* is the antecedent.

ANTECE'DENT, *f.* That which goes before.—A duty of

fo mighty an influence, that it is indeed the necessary *antecedent*, if not also the direct cause, of a sinner's return to God. *South*.—In grammar, the noun to which the relative is subjoined; as, the *man* who comes hither.—Let him learn the right joining of substantives with adjectives, the noun with the verb, and the relative with the *antecedent*. *Ascham*.—In logic, the first proposition of an enthymeme, or argument consisting only of two propositions.—Conditional or hypothetical propositions are those whose parts are united by the conditional particle *if*; as, *if* the sun be fixed, the earth must move; *if* there be no fire, there will be no smoke. The first part of these propositions, or that wherein the condition is contained, is called the *antecedent*, the other is called the *consequent*. *Watts*.

ANTECE'DENTLY, *adv.* In the state of antecedence, or going before; previously.—We consider him *antecedently* to his creation, while he yet lay in the barren womb of nothing, and only in the number of possibilities. *South*.

ANTECES'SOR, *f.* [Latin.] One that goes before, or leads another; the principal. It was an appellation given to those who excelled in any science. Justinian applied it particularly to professors of civil law; and, in the universities of France, the teachers of law take the title *anteceffores* in all their theses.

ANTECEDENTAL METHOD, is a branch of general geometrical proportion, or universal comparison, and is derived from an examination of the antecedents of ratios, having given consequents, and a given standard of comparison, in the various degrees of augmentation and diminution, which they undergo by composition and decomposition. This is a method invented by Mr. James Glenie, and published by him in 1793; a method which he says he always used instead of the fluxional and differential methods, and which is totally unconnected with the ideas of motion and time. See the author's treatise above-mentioned, and also his *Doctrine of Universal Comparison, or General Proportion*, 1789, upon which it is founded.

ANTECHAMBER, *f.* The chamber that leads to the chief apartment:

The empress has the antechambers past,

And this way moves with a disorder'd haste. *Dryden*.

To **AN'TEDATE**, *v. a.* [from *ante*, and *do*, *datum*, Lat.] To date earlier than the real time, so as to confer a fictitious antiquity.—By reading, a man does, as it were, *antedate* his life, and makes himself contemporary with the ages past. *Collier*. To take something before the proper time:

Our joys below it can improve,

And antedate the bliss above.

Pope.

ANTEDILUVIAN, *adj.* [from *ante*, before, and *deluvium*, Lat. a deluge.] Existing before the deluge.—During the time of the deluge, all the stone and marble of the *antediluvian* earth were totally dissolved. *Woodward*.—Relating to things existing before the deluge.—The text intends only the line of Seth, conduceable unto the genealogy of our Saviour, and the *antediluvian* chronology. *Brown*.

ANTECIANS, or **ANTOECI**, *f.* in geography, the inhabitants of the earth which occupy the same semicircle of the same meridian, but equally distant from the equator, the one north, and the other south; as Peloponnesus and the Cape of Good Hope. These have their noon, or midnight, or any other hour, at the same time; but their seasons are contrary, being spring to the one, when it is autumn with the other; and summer with the one, when it is winter with the other; also the length of the day to the one, is equal to the length of the night to the other.

ANTEDILUVIANS, *f.* a general name for all mankind who lived before the flood, in which are included the whole of the human race from Adam to Noah, and his family. Moses not having set down the particular time of any transaction before the flood, except only the years of the fathers' age wherein the several descendants of Adam

in

in the line of Seth were begotten, and the length of their several lives; it has been the business of chronologers to endeavour to fix the years of the lives and deaths of those patriarchs, and the distance of time from the creation to the deluge. In this there would be little difficulty were there no varieties in the several copies we now have of Moses's writings; which are, the Hebrew, the Samaritan, and the Greek versions of the Septuagint; but, as these differ very considerably from one another, learned men are much divided in their opinions concerning the chronology of the first ages of the world; some preferring one copy, and some another. That the reader may the better judge of the variations with respect to the ages of the patriarchs, in the three copies in this period, they are exhibited in the following table, with the addition of those of Josephus.

AGES OF THE ANTEDILUVIAN PATRIARCHS.

Their ages at their sons' birth.					Years they lived after their sons' birth.		
	Heb.	Sam.	Sept.	Jof.	Heb.	Sam.	Sept.
Adam, -	130	130	230	130	800	800	700
Seth, -	105	105	205	105	807	807	707
Enos, -	90	90	190	90	815	815	715
Cainan, -	70	70	170	70	840	840	740
Mahalaaleel, -	65	65	165	65	830	830	730
Jared, -	162	62	162	62	800	785	800
Enoch, -	65	65	165	65	300	300	200
Methufelah, -	187	67	167	187	782	653	802
Lamech, -	182	53	188	182	595	600	565
Noah, as aged at the flood, }	600	600	600	600			
To the flood,	1656	1307	2262	1556			

How long each of these lived is at once known by respectively adding the age at his sons' birth to the number of years he existed afterwards. Some writers, in order to explain the variations in the lives or ages of the same patriarchs, have added separate chronological tables, shewing in what year of his contemporaries the birth and death of each patriarch happened, according to the computation of each of the three copies alluded to. St. Jerom tells us, that, in his time, there were some copies of the Samaritan Pentateuch which make Methufelah 187 years old at the birth of Lamech, and Lamech 182 at the birth of Noah, just as the Hebrew does. Now, if these numbers be approved as the true original numbers, the interval from the creation to the flood will be 1556 years; differing from the Hebrew computation but 100 years in the age of Jared at the birth of Enoch; and if this last be allowed to be a mistake of the transcriber, by his dropping a number, and writing 62 instead of 162, as has been suspected, the Samaritan will be perfectly reconciled with the Hebrew, and all differences between them will vanish. As to the Septuagint, in the common editions of that version, the age of Methufelah at the birth of Lamech is 167; and consequently the sum of this period, according to them, is no more than 2242. But in this case Methufelah will outlive the flood 14 years; and we may well wonder, with Eusebius, where he was preserved. To obviate this objection, we are told, that, in some copies, Methufelah is said to have lived but 782 (not 802) years after the birth of Lamech, and no more than 949 in all. But the Alexandrian manuscript entirely takes away the difficulty, by giving the same number in this place with the Hebrew. Pezron is of opinion, that the age of Lamech at the birth of Noah should be but 182, as it is both in the Hebrew and in Josephus, supposing, with St. Austin, that the present number is the error of the scribe who first copied the original Septuagint manuscript in Ptolemy's library. So that he computes 2256 years to the flood. And, if this correction be admitted, and one more mentioned also by St. Austin, viz. that Lamech lived 595 years after the birth of Noah, and not 565, as in the present copies, there

there will then remain no other difference between the Septuagint and the Hebrew than 600 years added to the ages of the six patriarchs when they begat their sons, and Methufelah will, conformably to the Hebrew and Samaritan, die in the year of the flood. Having premised this chronological view, we shall proceed to the history of that remote period. The antediluvian world was, in all probability, stocked with a much greater number of inhabitants than the present earth either actually does, or perhaps is capable of containing or supplying. This seems naturally to follow from the great length of their lives, which exceeding the present standard of life in the proportion, at least, of ten to one, the antediluvians must accordingly in any long space of time double themselves, at least in about the tenth part of the time in which mankind do now double themselves. It has been supposed that they began to get children as early, and left off as late, in proportion, as men do now; and that the several children of the same father succeeded as quickly one after another as they usually do at this day; and as many generations, which are but successive with us, were contemporary before the flood, the number of people living on the earth at once would be by that means sufficiently increased to answer any defect which might arise from other circumstances not considered. So that, if we make a computation on these principles, we shall find, that the number of mankind before the deluge would easily amount to above one hundred thousand millions (even according to the Samaritan chronology), that is, to twenty times as many as our present earth has, in all probability, now upon it, or can well be supposed capable of maintaining in its present constitution. With respect to the patriarchal history, and the Mosaic account of the antediluvian world, they are already, it is presumed, so much impressed on the reader's mind, by his acquaintance with the Scriptures, that it would be a needless and unnecessary task to repeat them here. The Jews and eastern nations, however, having recorded many important traditions concerning the antediluvians, which ancient and profane history contributes to support, it may not be uninteresting, nor unacceptable to the reader, to be informed how exactly these accounts agree with those of the sacred historian. They are as follow:

After the death of Adam, Seth, with his family, separated themselves from the profligate race of Cain, and chose for their habitation the mountain where Adam was buried, the Cainites remaining below, in the plain where Abel was killed; and, according to the tradition, this mountain was so high, that the inhabitants could hear the angels singing the praises of God, and even join them in that service. Here they lived in great purity and sanctity of manners. Their constant employment was praising God, from which they had few or no avocations; for their only food was the fruits of the trees which grew on the mountain, so that they had no occasion to undergo any servile labours, nor the trouble of sowing and gathering in their harvest. They were utter strangers to envy, injustice, or deceit. Their only oath was "By the blood of Abel;" and they every day went up to the top of the mountain to worship God, and to visit the body of Adam, as a mean of procuring the divine blessing. Here, by contemplation of the heavenly bodies, they laid the foundations of the science of astronomy; and, lest their inventions should be forgotten, or lost before they were publicly known, understanding, from a prediction of Adam's, that there would be a general destruction of all things, once by fire, and once by water, they built two pillars, one of brick, and the other of stone, that, if the brick one happened to be overthrown by the flood or otherwise destroyed, that of stone might remain. This last, Josephus says, was to be seen in his time in the land of Syriac, (thought to be Upper Egypt.) The descendants of Seth continued in the practice of virtue till the 40th year of Jared, when an hundred of them hearing the noise of the music and the riotous mirth of the Cainites below, agreed to go down to them from the holy mountain. On their arrival in the

plain, they were immediately captivated by the beauty of the women, who were naked, and with whom they defiled themselves; and this is what is meant by the intermarriage of the sons of God with the daughters of men, mentioned by Moses. The example of these apostate sons of Seth was soon followed by others; and from time to time great numbers continued to descend from the mountain, who in like manner took wives from the abandoned race of Cain. From these marriages sprung the giants (who, however, according to Moses, existed before); and these, being as remarkable for their impiety as for their strength of body, tyrannized in a cruel manner, and polluted the earth with wickedness of every kind. This defection became at last so universal, that none were left in the holy mountain, except Noah, his wife, his three sons and their wives.

Berosus, a Chaldean historian, who flourished in the time of Alexander the Great, enumerates ten kings who reigned in Chaldea before the flood; of whom the first, called *Alores*, is supposed to be Adam, and Xifuthrus, the last, to be Noah. This Alorus declared that he held his kingdom by divine right, and that God himself had appointed him to be the pastor of the people. According to this historian, in the first year of the world, there appeared out of the Red Sea, at a place near the confines of Babylon, a certain irrational animal called *Oannes*. He had his whole body like that of a fish: but beneath his fish's head grew another of a different sort (probably a human one). He had also feet like a man, which proceeded from his fish's tail, and a human voice, the picture of him being preserved ever after. This animal conversed with mankind in the day-time, without eating any thing: he delivered to them the knowledge of letters, sciences, and various arts: he taught them to dwell together in cities, to erect temples, to introduce laws, and instructed them in geometry: he likewise shewed them how to gather seeds and fruits, and imparted to them whatever was necessary and convenient for a civilized life; but after this time there was nothing excellent invented. When the sun set, *Oannes* retired into the sea, and continued there all night. He not only delivered his instructions by word of mouth, but, as our author assures us, wrote of the origin of things, and of political economy. This, or a similar animal, is also mentioned by other authors. Of Alasporus, the second king, nothing remarkable is related. His successor, Amelon, or Amillarus, was of a city called *Pantabibla*. In his time another animal resembling the former appeared, 260 years after the beginning of this monarchy. Amelon was succeeded by Metalarus; and he by Daonus, all of whom were of the same city. In the time of the latter, four animals of a double form, half man and half fish, made their appearance. Their names were, *Euedocus*, *Eneugamus*, *Encubulus*, and *Anementus*. Under the next prince, who was likewise of *Pantabibla*, appeared another animal of the same kind, whose name was *Odacon*. All these explained more particularly what had been concisely delivered by *Oannes*.

In the reign of the tenth king, Xifuthrus, happened the great deluge, of which Berosus gives the following account: Cronus, or Saturn, appeared to Xifuthrus in a dream, and warned him, that on the 15th day of the month *Dæsius* mankind would be destroyed by a flood; and therefore commanded him to write down the original, intermediate state, and end, of all things, and bury the writings under ground in Sippara, the city of the sun; that he should also build a ship, and go into it with his relations and dearest friends, having first furnished it with provisions, and taken into it fowls and four-footed beasts; and that when he had provided every thing, and was asked whither he was sailing, he should answer, *To the gods, to pray for happiness to mankind*. Xifuthrus did not disobey; but built a vessel, whose length was five furlongs, and breadth two furlongs. He put on-board all he was directed; and went into it with his wife, children, and friends. The flood being come, and soon ceasing, Xifuthrus let out certain birds, which finding no food, nor place to rest upon, returned again to the ship. Xifuthrus, after some

days, let out the birds again; but they returned to the ship, having their feet daubed with mud: but, when they were let go the third time, they came no more to the ship, whereby Xifuthrus understood that the earth appeared again; and thereupon he made an opening between the planks of the ship, and, seeing that it rested on a certain mountain, he came out with his wife, and his daughter and his pilot: and having worshipped the earth, and raised an altar, and sacrificed to the gods, he and those who went out with him disappeared. They who were left behind in the ship, finding that Xifuthrus and the persons that accompanied him did not return, went out themselves to seek for him, calling him aloud by his name; but Xifuthrus was no more to be seen by them: only a voice came out of the air, which enjoined them, as their duty was, to be religious; and informed them, that on account of his own piety he was gone to dwell with the gods, and that his wife and daughter and pilot were partakers of the same honour. It also directed them to return to Babylon, and that, as the fates had ordained, they should take the writings from Sippara, and communicate them to mankind; and told them that the place where they were was the country of Armenia. When they had heard this, they offered sacrifice to the gods, and unanimously went to Babylon; and, when they came thither, they dug up the writings at Sippara, built many cities, raised temples, and rebuilt Babylon.

The Egyptians, who would give place to no nation in point of antiquity, have also a series of kings, who, as is pretended, reigned in Egypt before the flood; and, to be even with the Chaldeans, began their account the very same year that theirs does according to Berosus. There was an ancient chronicle extant among the Egyptians, not many centuries ago, which contained 30 dynasties of princes who ruled in that country, by a series of 113 generations, through an immense space of 36,525 years, during which Egypt was successively governed by three different races; of whom the first were the *Auritæ*, the second the *Mestrai*, and the third the Egyptians. But this extravagant number of years Manetho, to whose remains we must chiefly have recourse for the ancient Egyptian history, has not adopted, however in other respects he is supposed to have been led into errors in chronology by this old chronicle, which yet seems to have been a composition since Manetho's time.

The account given by Berosus is manifestly taken from the writings of Moses; but we have another account of the first ages of mankind, in which no mention is made of the flood at all. This is contained in some fragments of a Phœnician author called *Sanchoniatho*, who is by some said to have been contemporary with Gideon, by others to have lived in the days of king David; while some boldly assert there never was such a person, and that the whole is a fiction of Philo-Biblius, in opposition to the books of Josephus, written against Apion. To gratify the reader's curiosity, however, we have subjoined an account of the first ten generations mentioned by him, which are supposed by the compilers of the Universal History to correspond to the generations mentioned by Moses before the flood. *Sanchoniatho* having delivered his cosmogony, or generation of the other parts of the world, begins his history of mankind with the production of the first pair of mortals, whom Philo, his translator, calls *Protogonus* and *Æon*; the latter of whom found out the food which was gathered from trees. Their issue were called *Genus* and *Genea*, and dwelt in Phœnicia: but, when the great droughts came, they stretched forth their hands to heaven towards the sun; for him they thought the only God and Lord of heaven, calling him *Beelsamen*, which in Phœnician is *Lord of heaven*, and in Greek *Zeus*.

Afterwards from *Genus*, the son of *Protogonus* and *Æon*, other mortal issue was begotten, whose names were *Phos*, *Pur*, and *Phlox*; that is, *Light*, *Fire*, and *Flame*. These found out the way of generating fire, by the rubbing of pieces of wood against each other, and taught men

the use thereof. They begat sons of vast bulk and height, whose names were given to the mountains on which they seized: so from them were named mount *Cassius*, *Libanus*, *Antilibanus*, and *Brathys*. Of these last were begotten *Memurum*, and *Hypsuranius*; but they were so named by their mothers, the women of those times, who without shame lay with any man they could light upon. *Hypsuranius* inhabited Tyre, and he invented the making of huts of reeds and rushes and the papyrus. He also fell into enmity with his brother *Ufous*, who first invented a covering for his body out of the skins of the wild beasts which he could catch. And, when violent tempests of winds and rains came, the boughs in Tyre, being rubbed against each other, took fire, and burnt the wood there. And *Ufous*, having taken a tree, and broke off its boughs, was so bold as to venture upon it into the sea. He also consecrated two rude stones, or pillars, to fire and wind; and he worshipped them, and poured out to them the blood of such wild beasts as had been caught in hunting. But, when these were dead, those that remained consecrated to them stumps of wood and pillars, worshipping them, and kept anniversary feasts unto them.

Many years after this generation came *Agreus* and *Halicus*, the inventors of the arts of hunting and fishing, from whom huntsmen and fishermen are named. Of these were begotten two brothers, the inventors of iron and of the forging thereof: one of these, called *Chroyfor*, the same with *Hephestus*, or *Vulcan*, exercised himself in words and charms and divinations; found out the hook, bait, and fishing-line, and boats slightly built; and was the first of all men that sailed. Wherefore he also was worshipped after his death for a god: and they called him *Zeus Michius*, or *Jupiter the engineer*; and some say his brothers invented the way of making walls of brick. Afterwards from this generation came two brothers; one of whom was called *Technites*, or the artist; the other, *Gienus Autochthon*, i.e. the home-born man of the earth. These found out to mingle stubble, or small twigs, with the brick-earth, and to dry them in the sun, and so made tiling. By these were begotten others; of which one was called *Agrus*, field; the other *Agroerus*, or *Agrotes*, husbandmen, who had a statue much worshipped, and a temple carried about by one or more yoke of oxen, in Phœnicia, and among those of Byblus he is eminently called the *greatest of the gods*. These found out how to make courts about mens houses, and fences, and caves or cellars. Husbandmen, and such as use dogs in hunting, derive from these; and they are also called *Aletæ* and *Titans*. Of these were begotten *Amynus* and *Magus*, who shewed men to constitute villages and flocks. In these men's age there was one *Eliun*, which imports in Greek *Hypsilus*, i.e. the most high, and his wife was named *Beruth*, who dwelt about Byblus: and by him was begot *Epigerus*, or *Autochthon*, whom they afterwards called *Uranus*, i.e. heaven; so that from him that element which is over us, by reason of its excellent beauty, is called *heaven*: and he had a sister of the same parents called *Ge*, the earth; and by reason of her beauty the earth had her name given to it. *Hypsilus*, the father of these, dying in fight with wild beasts, was consecrated, and his children offered sacrifices and libations to him. But *Uranus*, taking the kingdom of his father, married his sister *Ge*, and had by her four sons; *Ilus*, who is called *Cronus*, or *Saturn*; *Betylus*; *Dagon*, who is *Siton*, or the god of corn; and *Atlas*: but by other wives *Uranus* had much issue.

As to the customs, policy, and other general circumstances, of the antediluvians, we can only form conjectures. The only thing we know as to their religious rites, is, that they offered sacrifices, and that very early, both of the fruits of the earth, and of animals; but whether the blood and flesh of the animals, or only their milk and wool, were offered, is a disputed point.—Of their arts and sciences, we have not much more knowledge. The antediluvians seem to have spent their time rather in luxury and wantonness, to which the abundant fertility of the first

earth invited them, than in discoveries and improvements, which probably they stood much less in need of than their successors. The art of working metals was found out by the last generation of Cain's line; and music, which they might be supposed to practise for their pleasure, was not brought to any perfection, if invented, before the same generation. Some authors have supposed astronomy to have been cultivated by the antediluvians, though this is probably owing to a mistake of *Josephus*. As to their politics and civil constitutions, we have not so much as any circumstances whereon to build conjecture. It is probable, the patriarchal form of government, which certainly was the first, was set aside when tyranny and oppression began to take place, and much sooner among the race of Cain than that of Seth. It seems also, that their communities were but few, and consisted of vastly larger numbers of people than any formed since the flood; or rather, it is a question, whether, after the union of the two great families of Seth and Cain, there were any distinction of civil societies, or diversity of regular governments, at all. It is more likely, that all mankind then made but one great nation, though living in a kind of anarchy, divided into several disorderly associations; which, as it was almost the natural consequence of their having, in all probability, but one common language, so it was a circumstance which greatly contributed to that general corruption which otherwise perhaps could not have so universally overspread the antediluvian world. And for this reason chiefly, as it seems, so soon as the posterity of Noah were sufficiently increased, a plurality of tongues was miraculously introduced at Babel, in order to divide them into distinct societies, and thereby prevent any such total depravation for the future.

Of the condition of the antediluvians, Mr. Whitehurst, in his *Inquiry into the original state and formation of the earth*, has given us the following picture: "Under a mild and serene sky, and when the spontaneous productions of the earth were more than sufficient for the calls of nature, without art or labour, mankind had no need of any other protection from the inclemency of the seasons, nor of barns for winter's store, than the benevolent Author of nature had plentifully provided for them. Consequently, in a state of nature like this, there was no temptation to acts of violence, injustice, fraud, &c. every one having plenty and enough, each equally partook of the numerous blessings thus amply provided for him. Power and property being equally diffused, men lived together in perfect peace and harmony, without law, and without fear; therefore it may be truly said of the antediluvians, that they slept away their time in sweet repose on the ever-verdant turf. Such apparently was the state of nature in the first ages of the world, or from the creation to the first convulsion in nature, whereby the world was not only universally deluged, but reduced to a heap of ruins." But this ingenious author, whose *Inquiry* is not professedly repugnant to revelation, seems here to have lost himself in a pleasing reverie. At least he has forgot to inform us, For what purpose, under such circumstances, he supposes the deluge to have been sent upon the earth; and, How we are to understand the account given by Moses, who represents the antediluvians, not as an innocent race, quietly reposing on the ever-verdant turf, but as a corrupt generation, by whom "the earth was filled with violence."

One of the most extraordinary circumstances which occurs in the antediluvian history, is the vast length of human lives in those first ages, in comparison with our own. Few persons now arrive to eighty or an hundred years; whereas, before the flood, they frequently lived to near a thousand: a disproportion almost incredible, though supported by the joint testimonies of sacred and profane writers. Some, to reconcile the matter with probability, have imagined that the ages of those first men might possibly be computed, not by solar years, but months; an expedient which reduces the length of their lives rather to a shorter period than our own. But for this there is not

the least foundation; besides the many absurdities that would thence follow, such as their begetting children at about six years of age, as some of them in that case must have done, and the contraction of the whole interval between the creation and the deluge to considerably less than two hundred years, even according to the larger computation of the Septuagint. Again: Josephus, the Jewish historian, and some Christian divines, are of opinion, that before the flood, and some time after, mankind in general did not live to such a remarkable age, but only a few beloved of God, such as the patriarchs mentioned by Moses. They reason in this manner: Though the historian records the names of some men whose longevity was singular, yet that is no proof that the rest of mankind attained to the same period of life, more than that every man was then of gigantic stature, because he says, *in those days there were giants upon the earth*. Besides, had the whole of the antediluvians lived so very long, and increased in numbers in proportion to their age, before the flood of Noah, the earth could not have contained its inhabitants, even supposing no part of it had been sea. And had animals lived so long, and multiplied in the same manner as they have done afterwards, they would have consumed the whole produce of the globe, and the stronger would have extinguished many species of the weaker. Hence they conclude, that, for wise and good ends, God extended only the lives of the patriarchs, and a few beside, to such an extraordinary length.

But most writers maintain the longevity of mankind in general in the early world, not only upon the authority of sacred, but likewise of profane, history. And for such a constitution, the moral reasons are abundantly obvious. When the earth was wholly unpeopled, except by one pair, it was necessary to endow men with a stronger frame, and to allow them a longer continuance upon earth for peopling it with inhabitants. In the infant state of every mechanical art, relating to tillage, building, clothing, &c. it would require many years' experience to invent proper tools and instruments to ease men of their labour, and by multiplied essays and experiments to bring their inventions to any degree of maturity and perfection. Every part of their work must have been exceedingly arduous from such a penury and coarseness of tools, and must have required longer time and more strength of body than afterwards, when mechanical knowledge was introduced into the world. If parents at this period had not continued long with their children, to have taught them the arts of providing for themselves, and have defended them from the attacks of wild beasts, and from other injuries to which they were exposed, many families would have been totally extinguished. But one of the best and most valuable ends which longevity would answer was, the transmitting of knowledge, particularly of religious knowledge, to mankind. And thus, before writing was invented, or any such easy and durable mode of conveyance was found out, a very few men served for many generations to instruct their posterity, who would not be at a loss to consult living and authentic records.

The natural causes of this longevity are variously assigned. Some have imputed it to the sobriety of the antediluvians, and the simplicity of their diet; alleging that they had none of those provocations to gluttony, which wit and vice have since invented. Temperance might undoubtedly have some effect, but not possibly to such a degree. There have been many temperate and abstemious persons in later ages, who yet seldom have exceeded the usual period. Others have thought that the long lives of those inhabitants of the old world proceeded from the strength of their stamina, or first principles of their bodily constitutions: which might, indeed, be a concurrent, but not the sole and adequate, cause of their longevity; for Shem, who was born before the deluge, and had all the virtue of the antediluvian constitution, fell three hundred years short of the age of his forefathers, because the greater part of his life was passed after the flood. Others have imputed the longe-

vity of the antediluvians to the excellency of their fruits, and some peculiar virtue in the herbs and plants of those days. But to this supposition it has been objected, that, as the earth was cursed immediately after the fall, its productions we may suppose gradually decreased in their virtue and goodness till the flood; and yet we do not see the length of men's lives decreased considerably, if at all, during that interval. Waving this objection, as the import of the curse is variously interpreted, it appears certain that the productions of the earth were at first, and probably continued till after the deluge, of a different nature from what they were in future times. Buffon supposes this difference may have continued gradually to diminish for many ages subsequent to that catastrophe. The surface of the globe (according to his theory) was in the first ages of the world less solid and compact; because, gravity having only acted for a short time, terrestrial bodies had not acquired their present density and consistence. The surface being more loose and moist, its productions would of course be more ductile and capable of extension: their growth, therefore, and even that of the human body, would require a longer time of being completed. The softness and ductility of the bones, muscles, &c. would probably remain for a longer period, because every species of food was more soft and succulent. Hence the full expansion of the human body, or when it was capable of generating, must have required 120 or 150 years; and the duration of life would be in proportion to the time of growth, as is uniformly the case at present: for if we suppose the age of puberty, among the first races of men, to have been 130 years, as they now arrive at that age in 14 years, the age of the antediluvians will be in exact proportion to that of the present race; since by multiplying these two numbers by seven, for example, the age of the present race will be 90, and that of the antediluvians will be 910. The period of man's existence, therefore, may have gradually diminished in proportion as the surface of the earth acquired more solidity by the constant action of gravity: and it is probable, that the period from the creation, to the days of David, was sufficient to give the earth all the density it was capable of receiving from the influence of gravitation; and consequently that the surface of the earth has ever since remained in the same state, and that the terms of growth in the productions of the earth, as well as the duration of life, have been invariably fixed from that period.

It has been further supposed, that a principal cause of the longevity under consideration was the wholesome constitution of the antediluvian air, which, after the deluge, became corrupted and unwholesome, breaking, by degrees, the pristine crasis of the body, and shortening men's lives, in a very few ages, to near the present standard. The temperature of the air and seasons before that catastrophe are upon very probable grounds supposed to have been constantly uniform and mild: the burning heats of summer and the severities of winter's cold were not then come forth, but spring and autumn reigned perpetually together: and indeed, the circumstance above all others most conducive to the prolongation of human life in the post-diluvian world appears to be an equal and benign temperature of climate; whence it seems reasonable to infer, that the same cause might have produced the same effect in the antediluvian world.

ANTE'GO. See ANTI'GUA.

ANTEJURAMEN'TUM, *f.* by our ancestors called *juramentum calumnie*, an oath which anciently both accuser and accused were to take before any trial or purgation. The accuser was to swear, that he would prosecute the criminal; and the accused so make oath, on the day he was to undergo the ordeal, that he was innocent of the crime charged against him.

ANTELA'BIA, *f.* [*προχειλα*, from *προ* and *χειλος*, Gr. a lip.] The extremities of the lips.

ANTELOPE, *f.* in zoology. See CAPRA.

ANTELU'CAN,

ANTELUCAN, *adj.* in ecclesiastical writers, is applied to things done in the night or before day. We find frequent mention of the antelucan assemblies of the ancient Christians, in times of persecution for religious worship.

ANTEMERIDIAN, *adj.* [from *ante*, before, and *meridian*, Lat. noon.] Before noon.

ANTEMETIC, *adj.* [ἅντι, against, and ἔμεω, Gr. to vomit.] That which has the power of calming the stomach; of preventing or stopping vomit.

ANTEMUNDANE, *adj.* [from *ante*, before, and *mundus*, Lat. the world.] That which was before the creation of the world.

ANTEMURA'LE, *f.* in the ancient military art, denotes much the same with what the moderns call an *out-work*.

ANTENA'TI, *f.* in English history, is chiefly understood of the subjects of Scotland, born before king James the First's accession to the English crown, and alive after it. Those who were born after the accession were denominated *postnati*. The antenati were considered as aliens in England, whereas the postnati claimed the privilege of natural subjects.

ANTENCLE'MA, *f.* in oratory, is where the whole defence of the person accused turns on criminating the accuser. Such is the defence of Orestes, or the oration of Milo: *Occisus est, sed latro. Exfectus, sed raptor*.

ANTENEAS'MUS, *f.* The same with enthusiasm. A particular kind of madness; in it the patient is furiously irritated, and endeavours to lay violent hands on himself. These people are apt to be seized with sudden convulsive startings of the hands and feet; and therefore is thought to coincide with the *chorea sancti viti* in some degree.

ANTENICE'NE, *f.* in ecclesiastical writers, denotes a thing or person prior to the first council of Nice. We say, the Antenicene faith, Antenicene creeds, Antenicene fathers.

ANTEN'NÆ, *f.* in the history of insects, slender bodies with which nature has furnished the heads of these creatures, being the same with what in English are called *horns* or *feelers*. See **ENTOMOLOGY**.

ANTENUM'BER, *f.* [from *ante*, Lat. and *number*.] The number that precedes another.—Whatsoever virtue there is in numbers, for conducing to consent of notes, is rather to be ascribed to the *antenumber*, than to the entire number, as that the sound returneth after six, or after twelve; so that the seventh or thirteenth is not the matter, but the sixth or the twelfth. *Bacon*.

ANTENNA'RIA, *f.* in botany. See **GNAPHALIUM**.

ANTEN'OR, *f.* a Trojan prince, who was said to have betrayed his country, because he concealed Ulysses in his house. He had three sons, all killed at the siege of Troy; and, after the destruction of his country, he migrated to Italy, where he built a city, now called Padua.

ANTEPAGMEN'TA, *f.* in the ancient architecture, the jambs of a door. They are also ornaments, or garnishings, in carved work, of men, animals, &c. made either of wood or stone, and set on the architrave.

ANTEPAST, *f.* [from *ante*, before, and *pastum*, Lat. to feed.] A foretaste; something taken before the proper time.—Were we to expect our bliss only in the satiating our appetites, it might be reasonable, by frequent *antepasts*, to excite our gust for that profuse perpetual meal. *Decay of Piety*.

ANTEPENU'LT, *f.* [*antepenultima*, Lat.] The last syllable but two, as the syllable *te* in *antepenuli*: a term of grammar.

ANTEPILA'NI, *f.* in the Roman armies, a name given to the hastati and principes, because they marched next before the triarii, who were called *pilani*.

To ANTEPONE, *v. a.* [*antepono*, Lat.] To set one thing before another, to prefer one thing to another.

ANTEPOSITION, *f.* a grammatical figure, whereby a word, which by the ordinary rules of syntax ought to follow another, comes before it. As when, in the Latin, the adjective is put before the substantive, the verb before the nominative case, &c.

ANTEPREDICAMENT, *f.* [*antepredicamentem*, Lat.] Something to be known in the study of logic, previously to the doctrine of the predicament.

ANTEQUIE'RA, a handsome town of Spain, in the kingdom of Granada, divided into two parts, the upper and lower. The upper is seated on a hill, and has a castle: the lower stands in a fertile plain, and is watered with a great number of brooks. There is a large quantity of salt in the mountain; and five miles from the town, a spring famous for the cure of the gravel. Lat. 36. 51. N. long. 4. 40. W.

ANTE'RIOR, *adj.* [*anterior*, Lat.] Going before, either with regard to time or place.—If that be the *anterior* or upper part wherein the senses are placed, and that the posterior and lower part, which is opposite thereunto, there is no inferior or former part in this animal; for the senses being placed in both extremes, make both ends *anterior*, which is impossible. *Brown*.

ANTERIOR'ITY, *f.* Priority; the state of being before, either in time or situation.

ANTEROS, a son of Mars and Venus, and a deity that punished slighted love. Mars perceiving that Cupid did not grow, he demanded the reason of Themis, who told him it was because he had not a companion; upon which she gave him Anteros, with whom Cupid began to grow. They are often represented like two children, with wings on their shoulders, and striving for the branch of a palm-tree, to teach us that true love always endeavours to overcome by kindness and gratitude.

AN'TES, *f.* [Lat.] Pillars of large dimensions that support the front of a building.

ANTESIGNA'NI, *f.* in the Roman armies, soldiers placed before the standards to defend them, according to Lippius; but Cæsar and Livy mention the *antesigniani* as the first line, or first body, of heavy armed troops. The velites, who used to skirmish before the army, were likewise called *antesignani*.

ANTESTA'RI, *f.* in Roman antiquity, signifies to bear witness against any one who refused to make his appearance in the Roman courts of judicature, on the day appointed, and according to the tenor of his bail. The plaintiff, finding the defendant after such a breach of his engagement, was allowed to carry him into court by force, having first asked any of the persons present to bear witness. The person asked to bear witness in this case, expressed his consent by turning his right ear, which was instantly taken hold of by the plaintiff, and this was to answer the end of a subpoena.

ANTES'TATURE, *f.* in fortification, a small retrenchment made of palisadoes, of sacks of earth, with a view to dispute with an enemy the remainder of piece of ground.

ANTESTO'MACH, *f.* [from *ante*, Lat. before, and *stomach*.] A cavity which leads into the stomach.—In birds there is no mastication or comminution of the meat in the mouth; but it is immediately swallowed into a kind of *antestomach*, which I have observed in piscivorous birds. *Ray*.

ANTEUPHOR'BIUM, *f.* in botany. See **CACALIA**.

ANTHE'LION. See **CORONA** and **PARHELION**.

ANTHE'LIX, in anatomy, the inward protuberance of the external ear, most parallel to the helix.

ANTHELMIN'THIC, *f.* [ἅντι, against, and ἔλμινθος, Gr. a worm.] That which kills worms.—*Anthelminthics*, or contrary to worms, are things which are known by experience to kill them, as oils, or honey taken upon an empty stomach. *Arbutnot*.

AN'THEM, *f.* [ᾠδὴ μυσική, Gr. a hymn sung in alternate parts, and should therefore be written *anthymn*.] A holy song; a song performed as part of divine service.—There is no passion that is not finely expressed in those parts of the inspired writings, which are proper for divine songs and *anthems*. *Addison*. Anthems were first introduced into the reformed service of the English church, in the beginning of the reign of queen Elizabeth.

ANTHE'MIS, *f.* [ἄνθις, Gr. *flores*, from its abundance of]

of flowers, or from its luxuriance.] In botany, a genus of the Syngenesia polygamia superflua class, in the natural order of compositæ discoides. The generic characters are—Calyx: common hemispherical; scales linear, subequal. Corolla: compound radiate; corollules hermaphrodite, tubular, numerous in a convex disk; females more than five in the ray; proper of the hermaphrodite funnel-shaped, five-toothed, erect; of the female ligulate, lanceolate, sometimes three-toothed. Stamina: in the hermaphrodites; filaments five, capillary, very short; anthers cylindrical, tubular. Pistillum: in the hermaphrodites; germ oblong; style filiform, the length of the stamens; stigmas two reflex; in the females, germ oblong; style filiform, the length of the hermaphrodites; stigmas two, revolute. Pericarpium: none; calyx unchanged. Seeds: solitary, oblong; down margined or none. Receptaculum: chaffy, convex, or conical.—*Essential Character.* Receptaculum, chaffy; down, none; calyx, hemispherical, nearly equal; floscules of the ray more than five.

Species. 1. With a discolour or white ray. 1. *Anthemis cota*: chaffs of the flowers rigid, pungent. A native of Italy and Spain; growing in ploughed fields. Annual.

2. *Anthemis altissima*, or tall chamomile: erect, with leaves pinnate; the bases of the pinnae rough with a reflex toothlet. Annual; and grows wild in the south of France, Italy, and Spain.

3. *Anthemis maritima*, or sea chamomile: leaves pinnate, toothletted, fleshy, naked, dotted; stem prostrate; calyxes rather tomentose. The flowers have the smell of feverfew. It grows wild about Montpellier, and in Italy; and flowers in July and August.

4. *Anthemis tomentosa*, or downy chamomile: leaves pinnatifid, obtuse, flat, peduncles shaggy, leafy; calyxes tomentose. A native of Greece, Italy, and France.

5. *Anthemis mixta*, or simple-leaved chamomile: leaves simple, jagged, toothed. Annual. Grows wild in Italy and France. It was cultivated in 1731, by Mr. Miller.

6. *Anthemis alpina*, or alpine chamomile: leaves tooth-pinnate, quite entire, linear; stem villose, one-flowered; petals ovate, chaffs spiculate. Grows wild in the Tyrolese Alps, Monte Baldo, Tubingen, Piedmont, &c. Perennial.

7. *Anthemis chia*, or cut-leaved chamomile: leaves pinnatifid, jagged; peduncles naked, subvillose. It was observed by Tournefort in the isle of Chios.

8. *Anthemis nobilis*, or common or sweet chamomile: leaves pinnate-compound, linear, acute, subvillose. Root perennial. Abundant in Cornwall, and in most of the dry commons in Surrey; flowering in July and August. The leaves and flowers of common chamomile have a strong not ungrateful smell, and a very bitter nauseous taste. The latter are more bitter, and considerably more aromatic, than the leaves. The smell as well as the taste is rather improved by careful drying, and does not soon suffer any considerable diminution in keeping. An infusion of the flowers is often used as a stomachic, and as an antispasmodic. In large quantities it excites vomiting. The powdered flowers, in large doses, have cured agues, even when the bark had failed. Both the leaves and flowers possess very considerable antiseptic properties, and are therefore used in antiseptic fomentations and poultices. From their antispasmodic powers they are frequently found to relieve pain, either applied externally, or taken internally. In the London Pharmacopœia, an extract of the flowers is directed. The single flowers are ordered to be kept, and with good reason; the white florets of the ray, which are multiplied in the double flowers, being almost tasteless; notwithstanding this, double flowers only are to be found in the shops.

9. *Anthemis arvensis*, or corn chamomile: receptacles conic, chaffs bristle-shaped; seeds crown-margined; leaves thinly downed. Root biennial. It is a common weed in corn in most parts of Europe; and flowers in June and July. Linnæus thus distinguishes this from the eleventh species, or stinking mayweed. The appearance and stature

is the same in both, but the stalks are more diffused in this; the peduncles longer, with only four or five streaks or fine grooves, whereas that has about eight; the leaves are more hoary and inodorous. In plants that have so much resemblance as we find in several of this class, we can scarcely be too minute in discriminating them.

10. *Anthemis austriaca*, or Austrian chamomile: receptacles conic, chaffs oblong, mucronate, seeds naked, leaves bipinnate woolly-villose. Root annual. The leaves, but especially the flowers, have a powerful smell of *matricaria officinalis*, with something of the chamomile: the taste is bitter. Native of Austria, by way-sides and in corn-fields, sometimes covering the fallows. Flowers all the summer.

11. *Anthemis cotula*, or stinking chamomile or mayweed: receptacles conic, chaffs bristly, seeds naked, leaves smooth. Stinking chamomile or mayweed is an annual plant, the whole of which is extremely fetid and acrid, so as to blister the skin of those who handle it; the acrid matter probably resides in small glands, which are visible only with a microscope. The petals vary much in length and breadth, and it is found with double flowers. Linnæus observes, that the flowers are also sometimes profliferous; the disk being filled with smaller flowers, which are compound themselves, and have abundance of aphides among them. He adds, that it is a very grateful plant to toads; and, from Loeffelius, that it drives away fleas; is very disagreeable to bees, and is given as a medicine to sheep infested with the asthma. It has never been much in use as a medicine, nor are its effects well known. Decoctions of it are said to have been used as a bath or fomentation against hysterical suffocations, and hæmorrhoidal pains and swellings. Mr. Ray says, that it has been given internally, with success, in scrophulous cases. It is a common weed by way-sides, on dung-hills, and in corn-fields, where it sometimes abounds so much as greatly to diminish the crop. Mr. Curtis very justly observes, that farmers are not aware of the amazing increase from a single plant of this and some other weeds, which they suffer to exhaust their dunghills, in order to be dispersed afterwards over their fields. It flowers from May to August. Mr. Curtis has admirably well distinguished this plant from *matricaria chamomilla*, which it greatly resembles, by the following circumstances. The whole plant in that puts on a deep green colour, and somewhat thin appearance; this on the contrary assumes a much paler hue, and the stalk is often covered with a kind of woolly substance: the leaves in *matricaria* are nearly as fine as those of fennel, which they distantly resemble; in the *anthemis* they are almost twice as broad, and their points, which in that are simple, in this are often bifid. The radial florets of the *anthemis* are in general much broader, and somewhat shorter: the disk in this is not so prominent, but of a lighter yellow than in *matricaria*. If the heads of that are bruised, they emit a strong smell, somewhat resembling that of true chamomile, but not so pleasant; but those of *anthemis* are intolerably disagreeable; these, when handled, blister the skin, which those of *matricaria* do not. The seeds of *anthemis* are broad, truncate, wrinkled, and deep brown; those of *matricaria* are much smaller, paler, and different in shape.

12. *Anthemis pyrethrum*, or Spanish chamomile, or pellitory of Spain: stems simple, one-flowered, decumbent, leaves pinnate multifid. Root perennial, thick, running down a foot or more into the ground, about as big as a man's finger, the colour of horse-radish, white within, of an acrid biting taste. Flower large, the florets of the ray purple on the outside. Mr. Miller says, the first time he raised this plant was in 1732, from seeds picked out of raisins, and the year after the plants produced seeds, which ripened well, and the plants raised from these seeds continued several years, but did not perfect their seeds; so that, in the winter of 1753, the old roots being destroyed, he lost the species. It is a native of the Levant, and the southern parts of Europe, and was cultivated in 1570. The root, on being chewed, excites a glowing heat, and produces

produces a discharge of saliva, which relieves tooth-achs, and rheumatic affections of the face; it is recommended in lethargic complaints and paralyzes of the tongue.

11. With a concolour or yellow ray. 13. *Anthemis valentina*, or purple-stalked chamomile: stem branching, leaves pubescent, tripinnate, bristle-shaped, calyxes villose, peduncled. It grows to the height of two feet, and, when allowed room, throws out many side branches, especially in good land. This plant has been continued in most of the dispensaries for many ages, and is supposed to be the same which Dioscorides recommends as good for the jaundice, and to restore the skin to a good colour; but, of late years, it has been entirely disused in the shops: and, whenever ox-eye has been ordered, the greater ox-eye daisy (*chrysanthemum leucanthemum*) has been used. This grows naturally in Spain, Portugal, and Provence. The flowers are yellow, but there is a variety with white flowers: both are mentioned by Breynius. There is a third with naked flowers having no rays, which Linnaeus places in his genus of *anacyclus*; but all these will rise from the seeds of the same plant, and frequently both radiate and naked flowers appear on the same branch. These plants not only vary in their flowers; but the leaves are different; some being finely divided, and others having broader segments; and this from the same seeds. Mr. Miller has figured that with yellow flowers, whose leaves are not so finely divided as those of the white; and which is supposed to be the true medical ox-eye.

14. *Anthemis repanda*, or repand-leaved chamomile: leaves simple, ovate-lanceolate, repand-crenate. Native of Spain and Portugal.

15. *Anthemis trinerva*, or three-nerve-leaved chamomile: leaves ovate, serrate, three-nerved, opposite, petiolate, receptacle conic. Found in South America, by Mutis.

16. *Anthemis Americana*, or American chamomile: leaves triternate, peduncles terminal, longer than the branch. A native of America.

17. *Anthemis tinctoria*, or yellow chamomile, or ox-eye: leaves bipinnate, serrate, tomentose underneath, stem corymbd. A native of Sweden, Germany, &c. in dry open pastures. Mr. Ray found it near the river Tees, not far from Sogburn, in the bishopric of Durham. Linnaeus says, the flowers are used in Gothland in dying yellow.

18. *Anthemis Arabica*, or Arabian chamomile: stem decomposed, calyxes branch-bearing. The seeds were brought from Arabia by the late Dr. Shaw, and were distributed to many curious botanists in Italy, France, and England, where some of the plants were raised. It must have been lost afterwards, for Dr. Smith observes, (in 1792,) that it is scarcely to be met with in any garden, or even herbarium; and that his figure was drawn from a plant at the marchioness of Rockingham's, in 1790, the seed of which was received from the gardens at Carlsmith the preceding year, by Mr. Lee, of Hammer-smith. It is an ornamental plant, and merits a place among hardy annuals. Its flavour is bitter and aromatic, but far weaker than official chamomile. Annual.

19. *Anthemis odorata*, or shrubby chamomile: leaves pinnatifid at the tip, peduncles elongate, calyxes membranaceous, ray barren. Native of the Cape of Good Hope, where it was found by Mr. Francis Masson. It flowers from April to June.

Propagation and Culture. Some of these plants are annuals, and others perennials, both hardy enough, except the fifteenth and nineteenth, to bear the open air. They may be propagated by seeds sown in the spring, on poor land; and require no other culture but to thin the plants where they are too close, and to keep them clean from weeds. They flower in July; and, being generally bushy, require room. The common or sweet chamomile may be increased by slips planted in the spring a foot asunder, that they may have room to spread, and they will soon cover the ground. It was formerly planted for edges, to cover banks, and for walks. The variety with double flowers is equally hardy, and may be propagated in the

same manner. The seeds of Arabian chamomile should be sown in autumn, otherwise they are seldom perfected in England.

ANTHERA, *f.* [from *ανθος*, a flower: also *antera*.] A compound medicine used by the ancients, so called from its florid red colour. There are various compositions which had this name. They were prepared for any particular part of the body, in the form of powders, electaries, &c. and were used as collyriums, dentifrices, &c.

ANTHERÆ, or **AN'THERS**, *f.* in botany. A part of the flowers, big with pollen, or farina, a fine dust, which it emits, or explodes, when ripe; or big with granulated pollen, and that with fovilla: or it may be defined a vessel destined to produce and emit a substance for the impregnation of the germ. It forms a part of the stamen, and is placed on the top of the filament. It is the *apex* of Ray; *capsula flaminis* of Malpighi; *summit*, *semet*, *pendent*, or *tip*, of Grew, and other English writers.

ANTHERICUM, *f.* [*ανθος* *πρυον*, Gr. flower of the hedges.] In botany, a genus of the hexandria monogynia class, ranking in the natural order of coronariæ. The generic characters are—Calyx: none. Corolla: petals six, oblong, obtuse, spreading very much. Stamina: filaments subulate, erect; antheræ small, incumbent, four-furrowed. Pistillum: germ obscurely three-cornered; style simple, the length of the stamens; stigma obtuse, three-cornered. Pericarpium: capsule ovate, smooth, three-furrowed, three-celled, three-valved. Seeds: numerous, angular. Various species have woolly filaments; in others the petals are not deciduous. The character of the genus is very difficult to ascertain.—*Essential Character.* Corolla, six-petalled, expanding; capsule ovate.

Species. I. *Phalangium*; leaves channelled, filaments generally smooth. 1. *Anthericum floribundum*, or thick-spiked anthericum: leaves flat, smooth, linear-lanceolate, acute; scape simple; raceme many-flowered, cylindric, compact; petals spreading; stamens smooth. Native of the Cape of Good Hope, where it was found by Mr. Francis Masson. It flowers in March and April.

2. *Anthericum scrotinum*: leaves flattish, scape one-flowered. This is a vernal plant, appearing after the melting of the snows; and growing only on high mountains, in Switzerland, Dauphine, Piedmont, Austria, &c. and on Snowdon, &c. in Wales. Perennial, flowering in April and May.

3. *Anthericum græcum*: leaves flat, scape simple, flowers corymbd, filaments woolly. From the Levant.

4. *Anthericum planifolium*: leaves flat, scape and filaments woolly. Root thick, oblong, yellowish. A native of Portugal; flowering in April.

5. *Anthericum revolutum*, or curled-flowered anthericum: leaves flat, scape branched; corollas revolute. Roots fleshy, and composed of tubers joined at the crown. A native of the Cape of Good Hope.

6. *Anthericum ramosum*, or branching anthericum: leaves linear-subulate, flat; scape branched; peduncles solitary; corollas flat; pistils straight. Root round. A native of Sweden, the south of France, Switzerland, Austria, Carniola, &c. The flowers watch from seven in the morning to three or four in the afternoon. It was cultivated in 1597, by Gerard.

7. *Anthericum elatum*, or tall anthericum: leaves flat, scape branched, peduncles aggregate, corollas flat. Roots composed of many tubers, each about the size of a little finger at top, and diminishing gradually to the size of a straw. The flowers form a loose spike, and are white. This plant has probably been formerly in the Dutch gardens, for there are paintings of it in several flower-pieces, which are supposed to have been done above sixty years. However, it has been lost for some years in Europe, and has been lately recovered from seeds which were sent from the Cape of Good Hope to England and Holland. The first seeds received by Mr. Miller were in 1750; and the plants raised from them flowered in 1752, and perfected their seeds. When they are fully blown, which is usually

in August and September, they make a pretty variety among other exotic plants.

8. *Anthericum triflorum*, or three-flowered anthericum: leaves channelled-sword-shaped, scape simple, bractes remote, three-flowered. Native of the Cape of Good Hope. It flowers in November.

9. *Anthericum canaliculatum*, or channelled anthericum: leaves rather fleshy, hairy, sword-shaped-triangular, channelled on the narrow side; scape simple. Native of the Cape of Good Hope. It flowers in April.

10. *Anthericum albucoides*, or stripe-flowered anthericum: leaves linear, channelled, smooth, with a cartilaginous edge; scape simple. This and the foregoing were found at the Cape by Mr. Maillon. It flowers in August.

11. *Anthericum liliago*, or grass-leaved anthericum: leaves flat, scape perfectly simple, corollas flat, pistil bending down. It is a native of Italy, Switzerland, Germany, France, and Denmark.

12. *Anthericum liliastrum*, or Savoy anthericum, or spider-wort: leaves flat, scape perfectly simple, corollas bell-shaped, stamens bending down. There are two varieties of this; the *liliastrum alpinum majus*, and *liliastrum alpinum minus*, of Tournefort. The first rises with a flower-stalk more than a foot and half high; the flowers are much larger, and there is a greater number upon each stalk than in the second sort. There is no essential difference between them, but the first is by much the finest plant, though the second is what we have always observed in the gardens here; the leaves of this are somewhat like those of the spider-wort, are pretty firm, and grow upright; the flower-stalks grow about a foot and half high, and have several white flowers at top, shaped like those of the lily, which hang on each side, and have an agreeable scent; these are but of short duration, seldom continuing in beauty above three or four days; but, when the plants are strong, they will produce eight or ten flowers upon each stalk. The French call it St. Bruno's lily. It grows wild on the mountains of Switzerland and Savoy; and was cultivated in 1629.

13. *Anthericum spirale*: scape spiral. A plant without leaves. Native of the Cape of Good Hope.

II. Bulbine; leaves fleshy, filaments bearded. 14. *Anthericum frutescens*, or shrubby anthericum: leaves fleshy, columnar, stem shrubby. It differs from the fifteenth by rising into a stem and branches, by having the leaves greener, longer, and narrower, with a firmer pulp, and a viscid juice flowing copiously from them when cut, of a greenish yellow colour. In the fifteenth the leaves are paler, grow close, many together, are broader, and more translucent, soft, and pulpy; they pour out a limpid juice like the white of an egg, only when pressed, and then they are hollow, like those of an onion. The root of the fifteenth is tuberous, whereas in this it is fibrous, and not only the stem but even the branches pour out fibres, which hang down, and when they reach the ground strike root. It is a native of the Cape of Good Hope; was cultivated in the Chelsea garden in 1702; and was formerly known among the gardeners by the name of onion-leaved aloe.

15. *Anthericum alooides*, or aloe-leaved anthericum: leaves fleshy, subulate, flattish. It has broad, flat, pulpy, leaves, resembling those of some sorts of aloe, and was therefore formerly by gardeners called aloe with flowers of spiderwort. The leaves spread open; the flowers are produced on loose spikes, like the former, but are shorter; they are yellow, and appear at different seasons. This, and the next species, grow close to the ground, never rising with any stalk. A native of the Cape of Good Hope.

16. *Anthericum asphodeloides*, or glaucous-leaved anthericum: leaves fleshy, subulate, semicolumnar, upright, and stiff. The flowers are yellow, and grow on long loose spikes, as the former; these appear at different seasons: those of the spring and summer are succeeded by seeds in great plenty, which ripen very well. A native of the Cape of Good Hope.

17. *Anthericum agnatum*, or annual anthericum: leaves

fleshy, subulate, columnar, scape subracemed. This is a low annual plant, growing close to the ground, having pretty long succulent leaves which are taper, but flattened on their upper side; the flowers grow in loose spikes, which are shorter than either of the other sorts. They are yellow, and succeeded by round seed-vessels, like those of the former sorts; the plants perish soon after their seeds ripen. A native of the Cape of Good Hope.

18. *Anthericum hispidum*, or hairy-leaved anthericum: leaves fleshy, compressed, hispid. A native of the Cape of Good Hope.

III. *Narthecium*; leaves sword-shaped. 19. *Anthericum ossifragum*, or Lancashire anthericum, or asphodel: leaves sword-shaped, filaments woolly. It grows wild in the northern countries of Europe on bogs; in Lancashire, and other northern counties; in Cambridgeshire, Norfolk, on Putney-heath, &c. flowering in July and August.

20. *Anthericum calyculatum*: leaves sword-shaped, perianthium three-lobed, filaments smooth, flowers three-pistilled. An extraordinary liliaceous plant with a perianthium; the agreement in appearance with the last species forbids us to make a different genus of it, though it differs totally in the fructification; having naked filaments, three stigmas without styles, a subglobose pericarpium, and a three-valved perianthium. It grows wild on the mountains of Lapland, Sweden, Denmark, Siberia, Switzerland, &c. and in several places in Scotland.

21. *Anthericum japonicum*: leaves sword-shaped, convolute, smooth; scape branching, angled, flowers racemed, nodding. A native of Japan, China, and Java.

22. *Anthericum filiforme*, or thread-leaved anthericum: leaves filiform, rather cylindric, rough; filaments smooth, petals lanceolate. It is perennial. A native of the Cape of Good Hope; was discovered there by Mr. F. Maillon, and introduced in 1774. It flowers in April.

23. *Anthericum flexifolium*: leaves subulate, smooth, flexuose; stem branching. 24. *Anthericum muricatum*: leaves fleshy, compressed, muricated, streaked. 25. *Anthericum latifolium*: leaves fleshy, wide-sword-shaped, smooth; raceme very long; stem simple. 26. *Anthericum cauda-felis*: leaves channel-sword-shaped, scape simple, raceme oblong. 27. *Anthericum triquetrum*: leaves filiform, triquetrous, shorter than the simple scape; raceme ovate. 28. *Anthericum ciliatum*: leaves sword-shaped, fleshy-subtriquetrous, ciliate; scape simple; raceme very long. 29. *Anthericum falcatum*: leaves fleshy, sword-shaped-sickled, smooth; stem branching, racemed. 30. *Anthericum contortum*: leaves flat, sword-shaped; stem branching, flowers very remote. 31. *Anthericum scabrum*: leaves triquetrous, serrulate, stem branching, rugged; fruit-bearing peduncles recurved. 32. *Anthericum squameum*: scape imbricate, with membranous tunid scales. Natives of the Cape of Good Hope; where all but the last were found by Thunberg.

33. *Anthericum cirratum*: leaves lanceolate, flattish; scape paniced, leaves bearded, bicirrate. A native of New Zealand.

34. *Anthericum adenantha*: leaves linear-ensiform, connate at the base; a gland between the filament and antheræ. A native of New Caledonia.

Propagation and Culture. All these, except the seventeenth, are perennial plants, and may in general be increased by offsets or suckers, taken off during the summer or autumn; and the species which do not throw out these freely, may be propagated by seeds, sown in the spring or autumn, on a bed of light sandy earth, in a warm situation. In autumn, when the leaves decay, they should be carefully taken up, and transplanted into a bed of light earth, at the distance of a foot from each other. If the winter should prove severe, the bed must be covered with straw, pease-haulm, or such light covering, to keep out the frost; or some old tan from a hot-bed may be spread over the ground. In this bed they may remain one year; by which time they will be strong enough to flower; therefore the following autumn they should be carefully taken

up, so as not to break their roots, and planted in the borders of the flower-garden, where they will last several years, if they are not killed by frost; to prevent which, some rotten tan may be laid over the roots in winter. The species which come from the Cape of Good Hope require of course some shelter in winter; although some of them will live through a mild season in a warm situation.

ANTHERMUS, a Chian sculptor, son of Micciades, and grandson to Malas. He and his brother Bupalus made a statue of the poet Hipponax, which caused universal laughter, on account of the deformity of its countenance. The poet was so incensed upon this, and inveighed with so much bitterness against the statuary, that they hung themselves. *Pliny*.

ANTHERYLUM, *f.* in botany, a genus of the class icofandria, order monogynia. Generic essential characters—Calyx inferior, four-parted; petals four; capsule one-celled, three-valved, many-seeded.

Antherylum Rohrii, a single species. It is a tree with ovate entire slightly emarginate leaves; a short prickles on each side the petiole; peduncles axillary, one-flowered; stamina 12—16. Inhabits St. Thomas's.

ANTHESPHORIA, *f.* in antiquity, a Sicilian festival instituted in honour of Proserpine. The word is derived from the Greek *ανθος*, a flower, and *φερω*, I carry; because that goddess was forced away by Pluto when she was gathering flowers in the fields. It seems to be the same thing with the *florifertum* of the Latins; and answers to the harvest-home among us.

ANTHESTERIA, *f.* in antiquity, a feast celebrated by the Athenians in honour of Bacchus. The word is from the Greek *ανθος*, a flower; it being the custom at this feast to offer garlands of flowers to Bacchus.

ANTHESTERIA, *f.* [from the Athenian festival, observed in honour of Bacchus, on the 11th, 12th, and 13th, days of the month Anthesterion, as mentioned in the preceding article.] In botany, a genus of the class polygamia, order monoecia, natural order of gramina or grasses. The generic characters are—Calyx: glume four-valved, three or four flowered; valves equal, oblong, flat, blunt, leathery, erect-expanding; hermaphrodite floscule sessile; males pedicelled, very like the hermaphrodite. Corolla: glume two-valved: valves lanceolate, acute, awnless; the outer larger. Stamina: filaments three, short, filiform; antheræ oblong, erect. Pistillum, in the hermaphrodite: germ oblong; from the base a twisted awn; styles two; stigmas club-shaped, hairy. Pericarpium: none except the closed calyx. Seed: oblong, smooth, marked with a furrow. It is distinguished from all the known genera of grasses by its four-valved calyx.—*Essential Character*. Calyx, cleft at the base into four equal divisions.

There is only one species, called *Antheateria ciliata*. The root is annual; culms many, a foot high, branched, jointed, smooth, nodding a little: leaves several, alternate, smooth, except that they are scabrous about the edge, and ciliate towards the sheath; which is compressed, striated, keeled, and ciliate, on the upper edge. Raceme terminating, leafy, decomposed, nodding. Partial racemes also leafy, ciliate. Peduncles lateral, in pairs, straight, filiform.

ANTHESTERION, *f.* in ancient chronology, the sixth month of the Athenian year. It contained twenty-nine days; and answered to the latter part of our November and beginning of December. The Macedonians called it *desion* or *desion*. It had its name from the festival *antheateria* kept in it.

ANTHIAS, *f.* [Greek; from *αγος*, and *θεος*, divine.] The SACRED FISH, or GRUNTLING; in ichthyology, a genus of fishes formed by Bloch, being a division from the genera of *labrus*, *lutjanus*, *perca*, and *sciaenæ*; but, as Dr. Gmelin, in his new edition of Linnæus's *Système Naturel*, does not adopt this genus, we must refer for the species to the genera above-mentioned.

ANTHISTERIA, *f.* in botany. See **ANTHESTERIA**.

ANTHINE, *adj.* Medicated with the flowers of plants.

ANTHOCEROS, *f.* in botany, a genus among the algæ, in the class cryptogamia. In the male flower the ca-

lyx is sessile, cylindrical, entire; anther very long, subulate, two-valved; in the female, the calyx is cut into six divisions, and contains three seeds.

Species. 1. *A. punctatus*, with the fronds undivided, indented, dotted; a native of Britain, growing on heaths and moist shady places. 2. *A. laevis*, with smooth, undivided, indented, fronds. 3. *A. multifidus*, with bipinnated linear fronds. See Hedwig's *Figures*, and *Flor. Dan.* 396.

ANTHOLOGION, *f.* The title of the service-book used in the Greek church. It is divided into twelve months, containing the offices sung throughout the year, on the festivals of our Saviour, the Virgin, and other remarkable saints.

ANTHOLOGY, *f.* [*ανθολογια*, from *ανθος*, a flower, and *λεγω*, to gather.] A collection of flowers. A collection of devotions in the Greek church. A collection of poems.

ANTHOLOMA, *f.* in botany, a genus of the class polyandria, order monogynia. Generic essential characters—Calyx two to four leaved; corolla cup-shaped; capsule four-celled, many-seeded.

Antholoma montana, a single species. It is a branched shrub: leaves ovate, obtuse, very entire, erect, at the ends of the branches; flowers terminal, corymbed. Native of New Caledonia.

ANTHOLYZA, *f.* [*ανθος*, a flower, and *λυσσα*, madness.] In botany, a genus of the class triandria, order monogynia, natural order of *ensæte*. The generic characters are—Calyx: spathes two-valved, alternate, imbricated, permanent. Corolla: petal one, gradually dilated from the tube into a compressed ringent throat; upper lip straight, slender, very long, furnished with two short divisions at the base; under lip shorter, trifid. Stamina: filaments long, slender, under the upper lip; antheræ acute. Pistillum: germ inferior; style filiform; stigma trifid, capillary, reflex. Pericarpium: capsule roundish, three-cornered, three-celled, three-valved. Seeds: many, triangular.—*Essential Character*. Corolla, tubular irregular, recurved. Capsule, inferior.

Species. 1. *Antholyza ringens*, or narrow-leaved *antholyza*: lids of the corolla divaricated, throat compressed. This rises two feet high, is hairy, and has several flowers coming out on each side. These are of one leaf, cut into six unequal parts at the top; one of these segments is stretched out much beyond the others, standing erect; the margins are waved, and closed together. The flowers are red, and appear in June; and the seeds ripen in September.

2. *Antholyza plicata*, or plaited-leaved *antholyza*: leaves plaited, stem branching hirsute; corolla, ringent, shorter than the stamina. It was found at the Cape of Good Hope, by Thunberg and Mañon.

3. *Antholyza cunonia*, or scarlet-flowered *antholyza*: corollas straight, the two outer lobes of the five-parted lip broader and ascending. This flower is of a beautiful scarlet colour, and makes a fine appearance about the latter end of April, or beginning of May, which is the season of its flowering. After the flowers decay, the germ becomes an oval smooth capsule, opening in three cells, which are filled with flat bordered seeds. At the Cape of Good Hope it grows naturally.

4. *Antholyza Ethiopica*, or broad-leaved *antholyza*: corollas incurvate, the two alternate lobes of the five-parted lip spreading, larger, and lanceolate. Flowers in May and June.

5. *Antholyza Meriana*, or red-flowered *antholyza*: corollas funnel-shaped, leaves linear. Root bulbous, compressed, shaped like a kidney, covered with a fibrous brown skin. Leaves sword-shaped, about a foot long, and an inch broad, ending in points; the two sides have sharp edges, but the middle is thicker, and has a prominent midrib; they are of a dark green colour, and rise immediately from the root. The stalk comes out from the root between the leaves, and rises a foot and a half high towards the upper part. Dr. Trew named this plant *Meriana*, in

honour of Sybilla Merian, the celebrated female Dutch botanist.

6. *Antholyza Merianella*, or dwarf antholyza: corollas funnel-shaped, leaves linear. It is of humbler growth than the fifth; the leaves are rarely more than six inches long, but full as broad as those of the fifth, and of a lighter green.

7. *Antholyza lucidor*: radical leaves with filiform base, broad-awled, furrowed at top; stem simple, leafy, spiked. All the species of *antholyza* are natives of the Cape of Good Hope.

Propagation and Culture. The antholyzas are propagated by offsets, which the bulbous roots send forth in great plenty; or by seeds, which are sometimes perfected in Europe. These seeds should be sown soon after they are ripe; for, if they are kept out of the ground till the following spring, they often miscarry, or at least remain a year in the ground before they grow. If the seeds are sown in pots of light earth, and plunged into an old bed of tan, which has lost its heat, and shaded in the middle of the day in hot weather, the seeds will come up the following winter; therefore they must be kept covered with glasses to screen them from cold, otherwise the young plants will be destroyed. These may remain in the pots two years, if the plants are not too close, by which time they will have strength enough to be planted each into a separate small pot filled with light earth. The time for transplanting is in July or August, when their leaves are decayed. In summer, the pots may be placed in the open air, but in winter they must be removed, and placed under a hot-bed frame, for they are not very tender; but, where any damp arises, it is very apt to occasion a mouldiness upon their leaves. The roots shoot up in autumn, and the flowers begin to appear in May; the seeds ripen in August, and soon after their leaves and stalks decay: the roots may then be taken up, and kept six weeks or two months out of the ground, so that they may be easily transported from one country to another at that time. These flowers are ornamental when they appear, and, being plants which require little culture, deserve a place in every good garden.

ANTHOMANIA, *f.* [from the Greek *ανθος*, a flower, and *μανια*, madness.] An extravagant fondness for curious flowers.

ANTHONY, [*ανθος*, Gr. a flower.] A proper name of men.

ANTHONY (St.) was born in Egypt in 251, and inherited a large fortune, which he distributed among his neighbours and the poor, retired into solitude, founded a religious order, built many monasteries, and died anno 356. Many legendary tales are told of his conflicts with evil spirits, and of his miracles. There are seven epistles extant attributed to him. St. Anthony is sometimes represented with a fire by his side, signifying that he relieves persons from the inflammation called after his name; but always accompanied by a hog, on account of his having been a swine-herd, and curing all disorders in that animal.

ANTHONY (Knights of St.), a military order, instituted by Albert, duke of Bavaria, Holland, and Zealand, when he designed to make war against the Turks in 1382. The knights wore a collar of gold made in form of a hermit's girdle, from which hung a stick cut like a crutch, with a little bell, as they are represented in St. Anthony's pictures. St. Anthony also was the denomination of an order of religious founded in France about the year 1095, to take care of those afflicted with St. Anthony's fire.

ANTHONY'S FALLS, a beautiful cataract in the river Mississippi, ten miles north-west of the mouth of St. Pierre river, which joins the Mississippi from the west, and are situated in about lat. 44. 50. N. and were so named by father Louis Hennipin, who travelled into these parts about the year 1680, and was the first European ever seen by the natives there. These falls are peculiarly situated, as they are approachable without the least obstruction from any intervening hill or precipice; which cannot be said, perhaps, of any other considerable fall in the world. The scene

around is exceedingly beautiful. It is not an uninterrupted plain where the eye finds no relief, but composed of many gentle ascents, which, in the spring and summer, are covered with verdure, and interspersed with little groves, that give a pleasing variety to the prospect. At a little distance below the falls is a small island, about an acre and a half, on which grow a great number of oak-trees, all the branches of which, able to bear the weight, are, in the season of incubation, loaded with eagles' nests. Their instinctive wisdom has taught them to choose this place, as it is secure, on account of the rapids above, from the attacks either of man or beast.

ANTHONY'S FIRE, a name popularly given to the erysipelas. Apparently it took this denomination from those afflicted with it having made their peculiar application to St. Anthony for a cure. It is well known, that anciently particular diseases had their peculiar saints; thus, in the ophthalmia, persons had recourse to St. Lucia; in the tooth-ach, to St. Appollonia; in the hydrophobia, to St. Hubert, &c.

ANTHONY'S NOSE, a point of land in the Highlands of North America, on Hudson River, in the state of New York, from which, to Fort Montgomery on the opposite side, a large boom and chain was extended in the American war, which cost not less than 70,000l. sterling. It was partly destroyed, and partly carried away, by general sir Henry Clinton, in October 1777.—Also the name given to the point of a mountain on the north bank of Mohawk River, about thirty miles above Schenectady.

ANTHONY, Mark. See *ANTONIUS*.

ANTHORA, *f.* in botany, the trivial name of a species of aconitum. See *ACONITUM*.

ANTHORIS'MUS, *f.* in rhetoric, denotes a contrary description or definition of a thing from that given by the adverse party. Thus, if the plaintiff urge, that to take any thing away from another without his knowledge or consent, is a theft; this is called *opos*, or definition. If the defendant reply, that to take a thing away from another without his knowledge or consent, provided it be done with design to return it to him again, is not theft; this is an *ανθορισμος*.

ANTHOS, *f.* [Greek, a flower.] Hippocrates used this word to signify flowers in general; and, if Galen is right in his comment, Hippocrates includes the seeds with the flowers. It is also used for *æris flos*. And when used alone signifies the flowers of rosemary; and is sometimes taken for the plant, but improperly.

ANTHOSPERMUM, *f.* [*ανθος*, and *σπερμα*, Gr. flower-feed.] In botany, a genus of the polygamia dioecia, or rather dioecia tetrandria, class, ranking in the natural order of stellatæ. The generic characters are—I. Male. Calyx: perianthium one-leaved, conical, quadrifid beyond the middle; divisions ovate-oblong, revolute, obtuse, a little coloured. Corolla: none, unless you so name the calyx. Stamina: filaments four, capillary, erect, the length of the calyx, inserted into the receptacle; antheræ twin, oblong, four-cornered, obtuse, erect. II. Female. Calyx and corolla: as in the male. Pistillum: germ inferior, ovate, four-cornered; styles two, recurved; stigma simple.—*Essential Character.* Calyx, four-parted; corolla, none; stamina, four; pistillum, two; germ inferior. Male and female in the same or a distinct plant.

Species. 1. *Anthospermum Æthiopicum*, or amber-tree: leaves polished. The male flowers are on one plant, and the hermaphrodite flowers on another. The beauty of this shrub is in its small evergreen leaves, which grow as close as heath; and, being bruised between the fingers, emit a very fragrant odour.

2. *Anthospermum ciliare*: leaves ciliated along the keel and edge. Root perennial, woody. Many branches scarcely dividing. Leaves narrow, lanceolate. Flowers axillary, sessile. Calyxes four-parted. Stamens four.

3. *Anthospermum herbaceum*: leaves six, polished; stem herbaceous. Flowers axillary. All these plants are natives of the Cape of Good Hope. Thunberg observes, that

that all the anthospermums are dioecous without any hermaphrodite; which is expressly contrary to Linnæus's and Miller's observations on the first species.

Propagation and Culture. These plants may easily be propagated by cuttings during any of the summer months, in a border of light earth; they will take root in six weeks time, provided they are watered and shaded as the season may require: or, if these cuttings are planted in pots, and plunged into a very moderate hot-bed, they will take root sooner, and there will be a greater certainty of their growing. Afterwards they should be taken up, with a ball of earth to their roots, and planted into pots filled with light sandy earth, and may be exposed to the open air until October; at which time they should be removed into the conservatory.

ANTHOXAN'THON, *f.* in botany. See RUMEX MARITIMUS.

ANTHOXAN'THUM, *f.* [*ανθος* and *ξανθος*, Gr. yellow flower.] In botany, VERNAL GRASS; a genus of the class diandria, order digynia, natural order of gramina or grasses. The generic characters are—Calyx: glume one-flowered, two-valved; valves ovate, acuminate, concave, the inner one larger. Corolla: glume one-flowered, two-valved, the length of the greater valve in the calyx, each valve emitting an awn from the lower part of the back, one of them jointed; nectary two-leaved, very slender, cylindric; leaflets fubovate, embracing. Stamina: filaments two, capillary, very long; antheræ oblong, forked at both ends. Pistillum: germ oblong; styles two, filiform; stigmas simple. Pericarpium: glume of the corolla grows to the seed. Seed: one, acuminate at both ends, roundish.—*Essential Character.* Calyx, glume two-valved, one-flowered; corolla, glume two-valved, acuminate; seed one.

Species. 1. *Anthoxanthum odoratum*, or sweet vernal grass: spike oblong ovate; flowers longer than the awn, on short peduncles. This is easily distinguished from all our wild grasses; for, besides its having only two stamina, in common with others of the genus, and each spicule containing only one flower; one valve of the calyx is small and membranous, the other large, inclosing the fructification, both pointed, and smooth, or sometimes having soft white hairs scattered over them; they are also sprinkled over with minute yellow dots, similar to those of black currants, whence possibly its peculiar scent. Haller makes the *anthoxanthum* one of his two-flowered *avenas*; but Dr. Stokes observes, that it is a genus truly distinct; that it has the awn of *avena*, the corolla of *poa*, and the double one of *phalaris*; and that in a natural arrangement it should stand between *poa* and *avena*. The usual colour of the spike is a pale yellow, whence its generic name *anthoxanthum*. From the sweetness both of the flowers and leaves, which it imparts to new-mown hay, it has derived its specific or trivial name *odoratum*, or sweet-scented. From the earliness of its flowering, it has acquired its other English name of *vernal* or *spring grass*. It grows on almost any kind of soil, but it seems to prefer that which is moderately dry. It is common in pastures; and also in woods, where the spikes are usually slender and loose. Towards the middle of May it is in full bloom; and about the middle of June the seed is ripe, and may easily be separated by rubbing. Mr. Stillingfleet remarks, that from its being found on such pastures as sheep are fond of, and whence excellent mutton comes, it is most likely to be a good grass for sheep-pastures; that he has found it on all grounds, from the most sandy and dry to the most stiff and moist, and even in bogs; that it is very plentiful in the best meadows about London, as about Hampstead and Hendon.

2. *Anthoxanthum indicum*: spike linear, flowers sessile shorter than the awn. Native of the East Indies.

3. *Anthoxanthum crinitum*: panicle spike-form cylindrical awned, the awns long, spreading loose. Native of New Zealand. For the propagation and culture, see GRASS.

ANTHOXAN'THUM ACULEA'TUM, in botany. See CRYPsis.

ANTHOXAN'THUM PANICULA'TUM, in botany. See FESTUCA SPADICEA.

ANTHERACOSIS, [from *ανθραξ*, a hot coal.] A scaly corrosive tumour of the eye, attended with a defluxion.

AN'THRAX, *f.* [*ανθραξ*, Gr. a burning coal.] A scab or blotch that is made by a corrosive humour, which burns the skin, and occasions sharp pricking pains; a carbuncle.

ANTHRE'NUS, *f.* in entomology, a genus of insects belonging to the order of coleoptera; the characters of which are—Antennæ clavate, the club solid: feelers unequal filiform: jaws membranaceous, linear, bifid: lip entire: head retractile under the thorax. Thirteen species of this little insect are now ascertained; three of which, the *scrophularia*, *muscorum*, and *verbasci*, are natives of England.

1. *Anthrenus pimpinellæ*: black; shells with a white band, the tip ferruginous with a white blotch. Thorax black spotted with white and ferruginous. Inhabits Europe.

2. *Anthrenus histrio*: black; shells with two marginal white spots and a white blotch behind. The shells have two transverse white spots on the outer edge, and a dot or two in the middle; body whitish; abdomen with marginal black dots. Inhabits Germany; size of the last.

3. *Anthrenus scrophularius*: so named from its scurfy appearance. It is of an oval shape, and black with white spots formed by scales; the future of the elytra red. This insect is met with frequently and in great numbers upon flowers of most kinds, and especially upon those of the elder and of fruit-trees; but they frequent houses also, and other places where they find nourishment suited to their larvæ; seeking a convenient situation for their eggs. It is very small, not more than a line and three quarters long, and one line wide, so that the body is oval or nearly round. It is flattened above, convex beneath, contrary to most insects which have elytra. The head, corselet, and elytra, are shining black above, marked with small white spots and dots, especially at the angles of the corselet; the whole under part of the body is a brown grey, which colour is also produced by scales on a black ground. This little insect, when touched, will counterfeits death; bringing the head under the corselet in which it is partly inserted, and clinging the feet close to the body, where there are cavities to receive the thighs: what is still more remarkable, there is on each side of the corselet underneath a deep cavity to receive the antennæ completely; so that the insect, when it thus shrinks from the touch, appears to have neither legs nor horns. The larva has six scaly legs; it is of a blackish brown, and very hairy. It is met with among furs and skins, which it feeds upon, as also upon dead insects, dried birds, &c. like the *Dermestes lardarius*. This insect is represented of its natural size on the annexed Plate, at fig. 1, beneath which is a magnified under-view of the head and part of the corselet, taken at the moment the insect was contracting its legs, as mentioned above: *t*, the head; *c, c*, the corselet; *p, p*, the two front legs; *a, a*, the antennæ lodged in the cavities left in the corselet to receive them. On the right-hand side of fig. 4 is shown one of the antennæ of the same insect magnified; *a*, the first articulation, larger than the following which join the antennæ to the head; *b, c*, the stem, made up of rounded articulations; *d, e, f*, the round knob at the end, really divided in three parts, though closely pressed together.

4. *Anthrenus muscorum*: clouded; shells faintly clouded. Found principally in books and museums.

5. *Anthrenus verbasci*: black; shells with three-waved white bands. Inhabits Europe, on the *verbasum*.

6. *Anthrenus varius*: thorax and shells variegated with brown and cinereous: body cinereous. Inhabits Paris; size of the former ones.

7. *Anthrenus*

7. *Anthrenus pubescens*: thorax and shells grey, pubescent. Inhabits Germany.

8. *Anthrenus hirtus*: black; thorax and shells pubescent. Inhabits Germany.

9. *Anthrenus glaber*: smooth, black; shells, legs, and antennæ, brown. Inhabits Berlin.

10. *Anthrenus vagus*: cinereous; shells with three black obsolete bands. Inhabits Sweden; is perhaps not of this genus.

11. *Anthrenus fuscus*: brown, clothed with fine yellow down pale at the tip. Inhabits Europe.

12. *Anthrenus ferraticornis*: black, spotted with white; antennæ yellow, the club elongated ferrate. Head cinereous; shells black varied with white, and rufous at the base, three white spots in the middle, and two-waved white streaks on the tip. Inhabits the island of Santa Cruz.

13. *Anthrenus denticornis*: black; thorax yellowish at the edge; shells spotted with white; antennæ yellow, the club elongated, ferrate. Head black; shells black speckled with white; body black; legs yellowish. Inhabits the island of Santa Cruz.

ANTHRIS'CUS, *f.* in botany. See *CHÆROPHYLLUM* and *SCANDIX*.

ANTHROPOGLOT'TUS, *f.* among zoologists, an appellation given to such animals as have tongues resembling that of mankind, particularly to the parrot kind.

ANTHROPOG'RAPHY, *f.* [from the Greek *ανθρωπος*, a man, and *γραφη*, description.] The anatomical description of the human body.

ANTHROPOLA'TRÆ, in church-history, an appellation given to the Nestorians, on account of their worshipping Christ, notwithstanding that they believed him to be a mere man.

ANTHROPOLA'TRIA, *f.* The act of paying divine honours to man; supposed to be the most ancient kind of idolatry.

ANTHROPOLI'THUS, *f.* in mineralogy, petrifications of the human body. See *MINERALOGY*.

ANTHROPOL'OGY, *f.* [from *ανθρωπος*, man, and *λογω*, Gr. to discourse.] The doctrine of anatomy; the doctrine of the form and structure of the body of man. Among divines, it denotes that manner of expression by which the inspired writers attribute human parts and passions to God.

ANTHROPOM'ANCY, *f.* A species of divination performed by inspecting the entrails of a human creature.

ANTHROPOMOR'PHA, *f.* A term formerly given to the *primates*, or that class of animals which have the greatest resemblance to the human kind.

ANTHROPOMOR'PHISM, *f.* among ecclesiastical writers, denotes the heresy or error of the *Anthropomorphites*.

ANTHROPOMOR'PHITES, *f.* [*anthropomorphita*, Lat. *ανθρωπομορφισται*, Gr. of *ανθρωπος*, a man, and *μορφη*, form.] A sect of ancient heretics, who, taking every thing spoken of God in Scripture in a literal sense, particularly that passage of Genesis, in which it is said, *God made man after his own image*, maintained that God had a human shape. They are likewise called *Audeans*, from Audeus their leader. —Christians as well as Turks have had whole sects contending that the Deity was corporeal and of human shape; though few profess themselves *anthropomorphites*, yet we may find many amongst the ignorant of that opinion. *Locke*.

ANTHROPOMOR'PHOUS, *adj.* Something that bears the figure or resemblance of a man. Naturalists give instances of anthropomorphous plants, anthropomorphous minerals, &c. These come under the class of *lusus naturæ*.

ANTHROP'ATHY, *f.* [*ανθρωπος*, man, and *παθος*, Gr. passion.] The sensibility of man; the passions of man.

ANTHROP'AGI, *f.* [*ανθρωπος*, man, and *φαγω*, Gr. to eat.] Man-eaters; cannibals; those who eat human flesh. It is never used in the singular:

The cannibals that each other eat,
The *anthropophagi*, and men whose heads
Do grow beneath their shoulders. *Shakespeare*.

The Cyclops, the Lestrygons, and Scylla, are all repre-

sented in Homer as anthropophagi, or man-eaters; and, the female phantoms, Circe and the Syrens, first bewitched with a show of pleasure, and then destroyed. This, like the other parts of Homer's poetry, had a foundation in the manner of the times preceding his own. It was still, in many places, the age spoken of by Orpheus:

When men devour'd each other like the beasts,
Gorging on human flesh.

Some remains of the usage subsisted much longer, even among the most civilized nations, in the practice of offering human sacrifices.

History gives us divers instances of persons driven by excess of hunger to eat their own relations. Others commence anthropophagi out of revenge and hatred; there are many instances of soldiers, who in the heat of battle have been carried to such excess of rage, as to tear their enemies with their teeth. The violence of love has sometimes produced the same effect as the excess of hatred. The Tapuii eat the bodies of their friends and nearest relations to preserve them from worms and putrefaction, thinking they do not only hereby afford them an honourable grave, but even a new life, a kind of revivification in themselves. Artemisia did something like this, when she swallowed the ashes of her dead husband Mausolus.

According to Herodotus, among the Etesdonians, when a man's father died, the neighbours brought several beasts, which they killed, mixed up their flesh with that of the deceased, and made a feast. Among the Massagete, when any person grew old, they killed him, and ate his flesh; but, if he died of sickness, they buried him, esteeming him unhappy. The same author also assures us, that several nations in the Indies killed all their old people and their sick, to feed on their flesh: he adds, that persons in health were sometimes accused of being sick, to afford a pretence for devouring them. According to Sextus Empiricus, the first laws that were made, were for the prevention of this barbarous practice, which the Greek writers represent as universal before the time of Orpheus. Of the practice of anthropophagy in later times, we have the testimonies of all the Romish missionaries who have visited the internal parts of Africa, and even some parts of Asia. Herrera speaks of great markets in China, furnished wholly with human flesh. Marcus Paulus speaks of the like in his time, in the kingdom of Concha towards Quinsay, and the island of Zapengit; others of the great Java: Barbosa, of the kingdom of Siam and the island of Sumatra; others, of the islands in the gulf of Bengal, of the country of the Samogitians, &c.

When America was first discovered, this practice was represented, by the Portuguese and Spanish authors, to be almost universal; it also appears from Dr. Hawkesworth's Account of the Voyages to the South Seas, that the inhabitants of the island of New Zealand sacrifice and eat the bodies of their enemies. Mr. Marsden also informs us, that this horrid custom is practised by the Battas, a people in the island of Sumatra: "They do not eat human flesh (says he) as a means of satisfying the cravings of nature, owing to a deficiency of other food; nor is it sought after as a gluttonous delicacy; they eat it as a species of ceremony; as a mode of showing their detestation of crimes, by an ignominious punishment; and as an indication of revenge and insult to their unfortunate enemies. The objects of this barbarous repast are the prisoners taken in war, and offenders convicted and condemned for capital crimes. Persons of the former description may be ransomed or exchanged, for which they often wait a considerable time; and the latter suffer only when their friends cannot redeem them, by the customary fine of twenty benchangs, or eighty dollars. These are tried by the people of the tribe where the fact was committed, but cannot be executed till their own particular raja or chief has been acquainted with the sentence; who, when he acknowledges the justice of the intended punishment, sends a cloth to cover the delinquent's head, together with a large

1. *Anthrenus scrophularius*, with the Parts magnified. 2. *Antipathes spiralis*.
3. *Antipathes cupressus*. 4. *Antipathes oricalcea*.

large dish of salt and lemons. The unhappy object is then tied to a stake: the people assembled throw their lances at him from a certain distance; and, when mortally wounded, they run up to him, as if in a transport of passion; cut pieces from the body with their knives; dip them in the dish of salt and lemon-juice; slightly broil them over a fire prepared for the purpose; and swallow the morsels with a degree of enthusiasm. Sometimes, (perhaps according to the degree of their animosity and resentment,) the whole is devoured; and instances have been known, where, with barbarity still aggravated, they tear the flesh from the carcase with their mouths. To such a depth of depravity may man be plunged, when neither religion nor philosophy enlighten his steps! All that can be said in extenuation of the horror of this diabolical ceremony is, that no view appears to be entertained of torturing the sufferers; of increasing or lengthening out the pangs of death; the whole fury is directed against the corse; warm indeed with the remains of life, but past the sensation of pain. A difference of opinion however prevails, in regard to their eating the bodies of their enemies slain in battle. Some persons long resident there, and acquainted with their proceedings, assert that it is not customary; but, as one or two particular instances have been given by other people, it is just to conclude, that it is a ceremony that sometimes takes place, though not generally. It was supposed to be with this intent that raja Neabin maintained a long conflict for the body of Mr. Nairne, a most respectable gentleman and valuable servant of the India company, who fell in an attack upon the campong of that chief in the year 1775."

It was said by the conquerors of Mexico, that Montezuma sacrificed every year 20,000 infants; that human victims were offered in all the temples of the city, of which there were, according to Antonio Solis, 2000 in that capital. The truth is, that there was but one chapel, built in the form of an amphitheatre, in the whole place. It is evident, that Solis meant not so much to inform posterity, as to palliate the atrocious cruelty of the Spanish conquerors. It was on the same principle, that Livy, with a view to prejudice his readers against the enemies of Rome, asserts seriously, that Hannibal distributed human flesh for food to his soldiers, in order to render them more fierce in battle. Much of misrepresentation, and much of the marvellous, has indeed been and said written on this subject; and yet it appears, that the Scythians, Egyptians, Chinese, Indians, Phœnicians, Persians, Greeks, Romans, Arabians, Gauls, Germans, Britons, Spaniards, Negroes, and Jews, were in early times in the habit of sacrificing enemies. If it is not possible to prove that they were all anthropophagi in this state of barbarism, it is probably because that state hath preceded the records of history.

In the account of China, published by the abbé Renaudot, it is said, that there were anthropophagi in this empire so late as the ninth century, which is hardly to be believed; yet Marc Paolo, who had never read this account written by the Arabians, relates, that the inhabitants of the provinces of Xandu and Concha eat their prisoners. "The barbarity of the Chinese (says M. Pauw) with respect to the infants whom they will not rear, and of whom they destroy every year throughout the empire not fewer than 30,000, by smothering them in tubs of hot water, or exposing them in the streets and highways, is likewise hardly to be believed, and yet it is true." The Peruvians, who had gone before the other nations of America in civilization, did not, when first discovered, sacrifice human victims; they were content to draw from the frontal vein or from the nose of a child a certain portion of blood, which, being mixed with flour, was made into cakes, and distributed to all the subjects of the empire on a certain annual solemnity. This clearly proves that the Peruvians had been originally eaters of human flesh; it is, at the same time, a manifest mitigation of a barbarous species of worship; their manners and habits had been in some degree softened, and religion followed the revolution in their moral character. Happy had it

been for more civilized nations, that this correspondence had been carefully preserved; and that good sense in religious matters had kept pace with their advances in science, and a polish in their manners!

ANTHROPOPHAGY, *f.* [*ανθρωπος*, a man, and *φαγω*, Gr. to eat.] The quality of eating human flesh, or man-eating.—Upon slender foundations was raised the *anthropophagy* of Diomedes his horses. *Brown*.

The annals of Milan furnish an extraordinary instance of anthropophagy. A Milanese woman, named Elizabeth, from a depraved appetite, like that which some women with child, and those whose menses are obstructed, frequently experience, had an invincible inclination to human flesh, of which she made provision by enticing children into her house, where she killed and salted them; a discovery of which having been made, she was broken on the wheel and burnt in 1519.

ANTHROPOSCOPIA, *f.* [*ανθρωπος*, and *σκοπεω*, Gr. I consider.] The art of judging or discovering a man's character, disposition, passions, and inclinations, from the lineaments of his body. In which sense, anthroposcopia seems of somewhat greater extent than physiognomy or metoposcopy. Otto has published an *Anthroposcopia, sive judicium hominis de homine ex lineamentis externis*.

ANTROPO'SOPHY, *f.* [*ανθρωπος*, man, and *σοφια*, Gr. wisdom.] The knowledge of the nature of man.

ANTHROPTHY'SIA, *f.* the inhuman practice of offering human sacrifices. See **SACRIFICE**.

AN'THUS, *f.* in ornithology, a synonyme of a species of loxia. See **LOXIA**.

ANTHYLLIS, *f.* [*ανθυλλια*, Gr. a downy flower.] In botany, a genus of the diadelphia decandria class, ranking in the natural order of papilionaceæ or leguminosæ. The generic characters are—Calyx: perianthium one-leaved, ovate-oblong, swelling, villose; the mouth five-toothed, unequal, permanent. Corolla: papilionaceous; banner longer, the sides reflex, claw the length of the calyx; wings oblong, shorter than the banner; keel compressed, the length of the wings, and similar to them. Stamina: filaments connate, rising; antheræ simple. Pistillum: germ oblong; style simple, ascending; stigma obtuse. Pericarpium: legume roundish, concealed within the calyx, very small, bivalve. Seeds: one or two.—*Essential Character*. Calyx swelling; legume roundish, concealed.

Species. I. Herbaceous. 1. *Anthyllis tetraphylla*, or four-leaved anthyllis or kidney-vetch: leaves pinnate with four lobes, flowers lateral. This is an annual plant with trailing branches, which spread flat on the ground. The leaves grow by fours at each joint; or rather, as Linnæus expresses it, they are pinnate with four leaflets instead of five, the lowest leaflet wanting its opposite. The flowers come out in clusters on the sides of the stalks, having large swelling calyxes, out of which the extreme parts of the petals do but just appear; these are of a yellow colour, and are succeeded by short pods inclosed within the calyx. This species has the stamens really diadelphous, and not all connate, as in most of the others. It is a native of the south of France, Spain, Portugal, Italy, and Sicily, where it is a weed in their arable land. It flowers with us in July, and ripens its seeds in September. It was cultivated in 1640, by Parkinson; but, the flowers having little beauty, this plant is seldom permitted to have a place, except in botanic gardens.

2. *Anthyllis vulneraria*, or common ladies' finger or kidney-vetch: leaves pinnate, unequal; head double. Linnæus observes, that in Oeland, where the soil is a red calcareous clay, the flowers of *anthyllis vulneraria* are red; but that, in Gothland, where the soil is white, the flowers also are white: ours are yellow. Mr. Miller affirms, that, having cultivated them many years, he found that they never altered from seeds: that the leaves of the yellow-flowering kidney-vetch are much narrower than those of the red, and have generally one or two pairs of leaflets more in each; that the heads of flowers are single in this, whereas the red has double heads; and that the root

is perennial in our wild fort, whereas the other seldom lasts longer in gardens than two years, although on poor land it will sometimes continue three years. It is a native of most parts of Europe, and flowers from May to July. The scarlet-flowering kidney-vetch, which is a variety of this species, is also found wild in several parts of Europe. Mr. Miller received the seeds from Spain and Portugal; Mr. Ray says it is common in Italy; and we have it in Wales, both in Pembrokeshire, where it was first found by Edward Llwyd, and the isle of Anglesea, where Dillenius observed it; also in the isle of Man. The anthyllis vulneraria is recommended as an excellent pasturage for sheep; and Mr. Young informs us, that it abounds greatly in the best meadows of the Pyrenees: at the same time he says, that the produce is not large. With us the whole plant is dry, and looked upon as astringent. This, however, is owing to its affecting dry calcareous soils: cultivated in a rich soil, it would be doubtless become more succulent, though it would probably never rival several other leguminous plants.

3. *Anthyllis montana*, or mountain anthyllis or kidney-vetch: leaves pinnate, equal; head terminal, one-ranked, flowers oblique. Legume smooth, the length of the calyx, containing few seeds, of which only one ripens, in July. Native of the south of France, Switzerland, Austria, Carniola, Italy, and Spain.

4. *Anthyllis cornicina*: leaves pinnate, unequal; heads solitary. According to Miller, when it flowers early in the summer, it commonly decays soon after the seeds are ripe, whereas those plants which flower later in the season, and do not perfect their seeds, will abide another year. It is a native of Spain.

5. *Anthyllis lotoides*: leaves three-parted; calyxes prismatic, fascicled, the length of the legumes. Native of Spain. Annual.

6. *Anthyllis Gerardi*: leaves pinnate, unequal, peduncles lateral, longer than the leaf, heads leafless. Annual. Grows wild on the sea-shores of Provence.

7. *Anthyllis quinqueflora*, or five-flowered anthyllis: leaves ternate, linear; head five-flowered. A native of the Cape of Good Hope.

8. *Anthyllis involucreta*: sub-herbaceous; leaves ternate, petiolate, stipuled, sword-shaped; flowers in a head. Native of the Cape of Good Hope.

II. Shrubby. 9. *Anthyllis linifolia*: leaves ternate, sessile, sword-shaped; flowers in a head. Stem eight feet high, shrubby, round, equal; branchlets hoary; the flowers are yellow.

10. *Anthyllis barba Jovis*, or silvery anthyllis or Jupiter's beard: leaves pinnate, equal, tomentose; flowers in a head. This species is a shrub which often grows ten or twelve feet high, and divides into many lateral branches, with winged leaves, composed of an equal number of narrow leaflets, which are very white and hairy; the flowers are produced at the extremities of the branches, collected into small heads: these are of a bright yellow colour, and appear in June; sometimes they are succeeded by short woolly pods, containing two or three kidney-shaped seeds; which, except the season proves warm, do not ripen in this country. A native of the south of France, Spain, Portugal, Italy, and the East.

11. *Anthyllis heterophylla*: leaves pinnate, the floral leaves ternate. Grows naturally in Portugal and Spain.

12. *Anthyllis visciflora*: leaves digitate-pinnate, calyxes flaggy. Observed at the Cape by Sparrman.

13. *Anthyllis cytisoides*, or downy-leaved anthyllis: leaves ternate, unequal; calyxes woolly, lateral. This is a low shrub, seldom rising above two feet high, but sends out many slender branches, with hoary leaves, which are sometimes single, but generally have three oval leaflets, the middle one being longer than the other two; the flowers are yellow, and come out from the side of the branches, three or four joined together, having woolly calyxes; but these are rarely succeeded by seeds in England. Native of Spain and about Montpellier.

14. *Anthyllis hermannike*, or lavender-leaved anthyllis: leaves ternate, sub-peduncled; calyxes naked. This species is a shrub which grows five or six feet high; the branches are garnished with oblong ternate leaves; the flowers, which are yellow, are produced in small clusters on the side of the branches; these appear in July and August, but are not succeeded by seeds in this country. Grows naturally in Greece, Crete, and also in Palestine: this was formerly in some of the English gardens, but the severe winter of 1739-40 destroyed most if not all the plants in this country.

15. *Anthyllis erinacea*, or prickly anthyllis: spinose, leaves simple. The height of this shrub is nine or ten feet. It grows naturally in Spain and Portugal.

16. *Anthyllis tragacanthoides*: shrubby; leaves pinnate tomentose, petioles spinose, flowers in racemes. Native of Mount Lebanon.

17. *Anthyllis Indica*: shrubby; leaves pinnate equal smooth; racemes oblong subterminating. A large shrub, with an upright stem, and scanty unarmed branches. Native of the mountains of Cochinchina.

Propagation and Culture. The seeds should be sown on a bed of light earth in April, where the plants are to remain, and will require no other care, but to thin them to the distance of two feet, and to keep them clean from weeds. Or, if they are permitted to scatter on the ground, they will come up with the first warmth of spring. The tenth, and several other of the shrubby sorts may be propagated either by seeds or cuttings; if by seeds, they should be sown in the autumn, in pots filled with light earth, and placed under a frame in winter, to protect them from frost. The following spring the plants will rise, and, when they are strong enough to remove, they should be each planted in a small pot, filled with light earth, and placed in the shade, till they have taken new root; after which, they may be put along with other hardy exotic plants, in a sheltered situation, till October, when they must be removed into shelter. These plants are always housed in winter, yet some of them will live abroad three or four years, when they are planted against a wall, with a south-west aspect. They may also be propagated by cuttings, which may be planted during any of the summer months, observing to water and shade them till they have taken root; when they should be planted in pots, and treated in the same manner as those which are raised from seed. See *ARENARIA*, *ASPALATHUS*, *CAMPHOROSMA*, *CRESSA*, *EBENUS*, *POLYCARPON*, *POLYCNEMUM*, *SALSOLA*, and *TEUCRIUM*. *ANTHYLLIS VALENTINA*, *f.* in botany. See *FRANKENIA*.

ANTHYLLOIDES, *f.* in botany. See *SALSOLA*.

ANTHYPNOTIC, *adj.* [from *αντι*, against, and *υπνος*, Gr. sleep.] That which has the power of preventing sleep; that which is efficacious against a lethargy.

ANTHYPOCONDRIACS, *f.* [from *αντι*, against, and *υποχονδρια*, Gr. the hypochondria.] Medicines against the disorders of the hypochondria.

ANTHYPOPHORA, *f.* [*αντι* *υποφορα*, Gr.] A figure in rhetoric, which signifies a contrary illation, or inference, and is when an objection is refuted or disproved by the opposition of a contrary sentence.

ANTHYSTERICA, *f.* [from *αντι*, against, and *υστερα*, the uterus.] Medicines against the hystERIC passion. These medicines might be called *uterines*, for many of them remove the disorders of the uterus, that produce hystERIC fits.

ANTI, [*αντι*, Gr.] A particle much used in composition with words derived from the Greek, and signifies *contrary to*; as, *Anti-monarchical*, opposite to monarchy.

ANTI, in matters of literature, is a title given to divers pieces written by way of answer to others, whose names are usually annexed to the anti. See the *Anti* of M. Baillet; and the *Anti-Baillet* of M. Menage: there are also *Anti-Menagiani*, &c. Cæsar the dictator wrote two books by way of answer to what had been objected to him by Cato, which he called *Anti-Catones*; these are mentioned by

by Juvenal, Cicero, &c. Vives assures us, he had seen Cæsar's Anti-Catones in an ancient library.

ANTIA'CID, *adj.* [from *ἄντι*, Gr. and *aciaus*, Lat. four.] Contrary to fourness; alkalis.—Oils are *antiacids*, so far as they blunt acrimony; but, as they are hard of digestion, they produce acrimony of another sort. *Arbutus*.

ANTI'ADES, *f.* [*αντιαδες*, Gr.] The glandules and kernels, commonly called the almonds, of the ears; also an inflammation in those parts.

ANTI'AGRI, *f.* [from *αντιαδες*, the tonsils, and *αγρα*, Gr. a prey.] Tumours of the tonsils.

ANTIBAC'CHIUS, *f.* in ancient poetry, a foot consisting of three syllables, the two first long, and the last one short; such is the word "ἀμβίρε."

ANTI'BES, a sea-port town in the department of Var, and late province of Provence in France. It is opposite to Nice, in the Mediterranean. Lat. 43. 35. N. lon. 7. 13. E.

AN'TIC, *adj.* [probably from *antiquus*, Lat. ancient, as things out of use appear old.] Odd; ridiculously wild; buffoon in gesticulation:

Of all our *antic* fights, and pageantry,
Which English idiots run in crowds to see. *Dryden.*

—The prize was to be conferred upon the whistler, that could go through his tune without laughing, though provoked by the *antic* postures of a merry Andrew, who was to play tricks. *Addison.*

ANTIC, *f.* He that plays antics; he that uses odd gesticulation; a buffoon:

Within the hollow crown,
That rounds the mortal temples of a king,
Keeps death his court; and there the *antic* fits,
Scoffing his state. *Shakespeare.*

To **ANTIC**, *v. a.* To make antic:

Mine own tongue
Splits what it speaks; the wild disguise hath almost
Antic'd us all. *Shakespeare.*

ANTICAR'DIUM, *f.* [of *αντικαρδιον*, Gr. of *αντι*, against, and *καρδια*, the heart.] The pit of the stomach, or heart-pit.

ANTICAUSO'TICS, *f.* [from *αντι*, against, and *καυσος*, Gr. a burning fever.] Remedies against burning fevers.

ANTICHACHE'C'TIC, *adj.* [from *αντι*, against, and *καχεξια*, Gr. a bad habit.] Things adapted to the cure of a bad constitution.

ANTICHAM'BER, *f.* This word is corruptly written for **ANTECHAMBER**, which see.

ANTICHOLE'RICA, *f.* in botany. See **SOPHORA**.

ANTICHO'LICS, *f.* [of *αντι*, and *χολικον*, Gr. cholic.] Remedies against the cholic.

ANTICHO'RUS, *f.* [In the accented catalogus of names given by the Lichfield Society, the accent is placed on the antepenultima, as if it were derived from *χουρος*; but, if it be derived from *χουρος*, then it should be placed on the penultima.] In botany, a genus of the octandria monogynia class, ranking in the natural order of columniferæ. The generic characters are—Calyx: perianthium four-leaved, very much expanded; leaflets lanceolate, acuminate, deciduous. Corolla: petals four, obovate, obtuse, the length of the calyx. Stamina: filaments setaceous, erect, shorter than the corolla; antheræ roundish. Pistillum: germ superior, ovate; style cylindric, the length of the filaments; stigma obtuse. Pericarpium: capsule subulate, four-celled, four-valved. Seeds: very many, truncate, placed over each other in four rows.—*Essential Character.* Calyx, four-leaved; petals, four; capsule, superior, subulate, four-celled, four-valved. Seeds, very many.

There is only one species, called *antichorus depressus*. It resembles the *corydalis*, and is a small procumbent annual plant. Stem round, three or four inches long, alternately branching, growing close to the ground. Leaves alternate, petioled, oval, grossly serrate, smooth, somewhat

plaited. Stipules subulate. Flowers axillary, two together, opposite, on very short thickish peduncles, yellow. Bractæ two, on the upper side of the peduncle. Fruits nodding, closely reflected under the stem. A native of Arabia.

ANTICHRIST, *f.* [*antichristus*, Lat. of *αντιχριστος*, Gr. of *αντι*, against, and *χριστος*, Christ.] Among ecclesiastical writers, denotes a great adversary of Christianity, who is to appear upon the earth towards the end of the world. We have demonstrations, disputations, and proofs, in great and order number, both that the pope is, and that he is not, Antichrist. F. Calmet is very large in describing the father and mother of Antichrist, his tribe and pedigree, his wars and conquests, his achievements against Gog, Magog, &c. Some place his capital at Constantinople, others at Jerusalem, others at Moscow, and some few at London; but the generality at Rome, though these last are divided. Grotius and some others suppose Rome Pagan to have been the seat of Antichrist: most of the Lutheran and reformed doctors contend earnestly for Rome Christian under the papal hierarchy. In fact, the point having been maturely debated at the council of Gap, held in 1603, a resolution was taken thereupon, to insert an article in the confession of faith, whereby the pope is formally declared to be Antichrist. Pope Clement VIII. was stung to the quick with this decision; and even king Henry IV. of France was not a little mortified, to be thus declared, as he said, "an imp of Antichrist."

M. le Clerc holds, that the rebel Jews and their leader Simon, whose history is given by Josephus, are to be reputed as the true Antichrist. Lightfoot and Vanderhart rather apply this character to the Jewish sanhedrim. Hippolitus and others held that the devil himself was the true Antichrist; that he was to be incarnate, and make his appearance in human shape before the consummation of all things.

Father Malvenda, a Jesuit, hath published a large work intitled *Antichristo*, in which this subject is amply discussed. It consists of thirteen books. In the first he relates all the opinions of the fathers with regard to Antichrist. In the second, he speaks of the times when he shall appear; and shews, that all the fathers who supposed Antichrist to be near at hand, judged the world was near its period. In the third he discourses of his origin and nation; and shews that he is to be a Jew, of the tribe of Dan: this he founds on the authority of the fathers; on the passage in Genesis xlix. 17. *Dan shall be a serpent by the way*, &c. on that of Jeremy viii. 16. where it is said, *The armies of Dan shall devour the earth*; and on Rev. vii. where St. John, enumerating all the tribes of Israel, makes no mention of that of Dan. In the fourth and fifth books he treats of the signs of Antichrist. In the sixth, of his reign and wars. In the seventh, of his vices. In the eighth, of his doctrine and miracles. In the ninth, of his persecutions: and, in the rest, of the coming of Enoch and Elias, the conversion of the Jews, the reign of Jesus Christ, and the death of Antichrist, after he has reigned three years and an half. See also *Lowman on the Revelation*.

Upon the whole, the Antichrist mentioned by the apostle John, 1 Eph. ii. 18. and more particularly described in the book of Revelation, seems evidently to be the same with the *Man of Sin*, &c. characterised by St. Paul in his second Epistle to the Thessalonians, ch. ii. Had the right of private judgment, says an excellent writer, been always adopted and maintained, Antichrist could never have been; and, when the sacred right comes to be universally asserted, and men follow the voice of their own reason and consciences, Antichrist can be no more.

ANTICHRISTIAN, *adj.* [from *αντι*, against, and *χριστιανος*, Gr.] Opposite to Christianity.—That despised, abject, oppressed, sort of men, the ministers, whom the world would make *antichristian*, and so deprive them of heaven. *South.*

ANTICHRISTIANISM, *f.* Opposition or contrariety to Christianity.—Have we not seen many, whose opinions have

have fastened upon one another the brand of *antichristianism*? *Decay of Piety.*

ANTICHRISTIANITY, *f.* Contrary to Christianity.

ANTICHRISTIANS, *f.* are more particularly those who set up or believe a false Christ, or Messiah.

ANTI'CHRONISM, *f.* [*αντι*, against, and *χρονος*, Gr. time.] Deviation from the right order or account of time.

ANTICHTHONES, *f.* in ancient geography, an appellation given to the inhabitants of opposite hemispheres.

To **ANTICIPATE**, *v. a.* [*anticipo*, Lat.] To take something sooner than another, so as to prevent him that comes after; to take first possession.—God hath taken care to *anticipate* and prevent every man, to draw him early into his church; to give piety the prepossession, and so to engage him in holiness. *Hammond.*—To take up before the time at which any thing might be regularly had.—I find I have *anticipated* already, and taken up from Boccace, before I come to him; but I am of the temper of kings, who are for present money, no matter how they pay it. *Dryden.*—To foretaste, or take an impression of something, which is not yet, as if it really was.—The life of the desperate equals the anxiety of death, who but act the life of the damned, and *anticipate* the desolations of hell. *Brown.*

Why should we

Anticipate our sorrows; 'tis like those
That die for fear of death.

Denham.

To prevent any thing by crowding in before it; to preclude.—I am far from pretending to instruct the profession, or *anticipating* their directions to such as are under their government. *Arbutnot.*

ANTICIPATION, *f.* The act of taking up something before its time.—It is not enough to be miserable when the time comes, unless we make ourselves so beforehand, and by *anticipation*. *L'Estrange.*—Foretaste.—If we really live under the hope of future happiness, we shall taste it by way of *anticipation* and forethought; an image of it will meet our minds often, and stay there, as all pleasing expectations do. *Atterbury.*—Opinion implanted before the reasons of that opinion can be known.—The east and west, the north and south, have the same *anticipation* concerning one supreme disposer of things. *Stillington.*—What nation is there, that, without any teaching, have not a kind of *anticipation*, or pre-conceived notion, of a Deity? *Derham.*

ANTICIPANS, *f.* The Greeks express this by *πινυμενοι*; it is applied to diseases whose succeeding paroxysms anticipate the time of the preceding fit, that is, each of whose fits begins somewhat sooner than the preceding. If the catamenia arrive before their ordinary period, they are said to anticipate.

ARTICLE'A, the mother of Ulysses. It is said that she was ravished by Sisyphus, and was pregnant of Ulysses when the married Laertes; and that she killed herself when she heard a false report of her son's death.

ANTICLIMAX, *f.* [*from αντι and κλιμαξ*, Gr.] A sentence in which the last part expresses something lower than the first.—A certain figure, which was unknown to the ancients, is called by some an *anticlimax*. *Addison.*—This distich is frequently mentioned as an example:

Next comes Dalhoussey, the great god of war,
Lieutenant colonel to the earl of Mar.

ANTICLY, *adv.* In an antic manner; with odd postures; wild gesticulations, or fanciful appearance:

Scrambling, out-facing, fashion-mongring, boys,
That lye, and cog, and flout, deprave, and slander,
Go *anticly*, and shew an outward hideousness,
And speak of half a dozen dangerous words. *Shakespeare.*

ANTICONVULSIVE, *adj.* [*from αντι*, Gr. against, and *convulsive*.] Good against convulsions.—Whatever produces an inflammatory disposition in the blood, produces the asthma, as *anticonvulsive* medicines. *Floyer.*

ANTICOR, *f.* [*from αντι*, Gr. against, and *cor*, Lat. the

heart.] A preternatural swelling of a round figure, occasioned by a sanguine and bilious humour, and appearing in a horse's breast, opposite to his heart. An anticor may kill a horse, unless it be brought to a suppuration by good remedies.

ANTICOS'TE, a barren island lying in the mouth of the river St. Laurence, in North America. Lat. from 49° to 53° N. lon. 64. 16. W.

ANTICOURTIER, *f.* [*from αντι*, Gr. against, and *courtier*.] One that opposes the court.

ANTICYRA, anciently a town of Phocis, on the Corinthian bay, opposite to Cirrha. The Phocceans seizing the temple of Apollo at Delphi, a war, called the *sacred*, commenced, and lasted ten years; when Philip, father of Alexander the Great, avenged the god by destroying many of the cities of the pillagers. Anticyra was one of the number. It was again taken and subverted by Antilius a Roman general in the war with the Macedonians. It afterwards became famous for its hellebore. That drug was the chief produce of the rocky mountains above the city, and of two kinds; the black, which had a purgative quality; and the white, which was an emetic. Sick persons resorted to Anticyra to take the medicine, which was prepared there by a peculiar and very excellent recipe: hence the adage, *Naviget Anticyram*. By the port was a temple of Neptune, built with selected stones, and the inside white-washed; the statue of brass. The walls and other edifices at Anticyra were probably erected, like the temple of Neptune, with stones or pebbles. The site is now called *Asprospitia*, or the "white houses;" and some traces of the buildings from which it was so named remain. The port is land-locked, and frequented by vessels for corn.

ANTIDES'MA, *f.* [*αντι*, *pro*, and *δεσμευ*, *vinculum*; excellent for making ropes.] In botany, a genus of the dioecia pentandria class. The generic characters are—1. Male. Calyx: perianthium five-leaved; leaflets oblongish, concave. Stamina: filaments five, capillary, longer than the calyx, equal; antheræ roundish, semibifid. 11. Female. Calyx: as in the male, permanent. Pistillum: germ superior, ovate; style none; stigmas five, obtuse. Pericarpium: drupe roundish, one-celled, crowned with the stigmas, and having a furrowed shell. Seed: none.—*Essential Character.* Male. Calyx, five-leaved; corolla, none; antheræ, semibifid. Female. Calyx, five-leaved; corolla, none; stigmas, five; berry cylindric, one-seeded.

Species. 1. *Antidesma alexiteria*. It is a middle-sized tree, with leaves resembling those of the lemon. Flowers in racemes. Fruit red, and acid like the barberry. Common in Malabar, is an evergreen, and continues to bear fruit to the age of seventy years; the fruit is esteemed for its pleasant cooling qualities. A decoction of the leaves is reputed to be an antidote against the bite of serpents. The bark is used for making ropes.

2. *Antidesma acida*: leaves obovate, spikes solitary. A native of the East Indies.

3. *Antidesma scandens*: leaves palmate serrate, stem climbing. Native of China near Canton.

ANTIDICOMARIANITES, ancient heretics, who pretended that the holy virgin did not preserve a perpetual virginity, but that she had several children by Joseph after our Saviour's birth. Their opinion was grounded on some expressions of our Saviour, wherein he mentions his brothers and his sisters; and of St. Matthew, where he says, that Joseph knew not Mary till she had brought forth her first-born son. The Antidicomarianites were disciples of Helvidius and Jovinian, who appeared in Rome toward the close of the fourth century.

ANTIDIPNICA, *f.* [*from αντι*, against, and *διψω*, circumgyration.] Medicines against a vertigo.

ANTIDORON, *f.* a name given by the Greeks to the consecrated bread, out of which the middle part, marked with the cross, wherein the consecration resides, being taken away by the priest, the remainder is distributed after
mass

mass to the poor. The antidoron is also called *panis præ-sanctificatus*.

ANTIDO'SIS, *f.* in antiquity, denotes an exchange of estates, practised by the Greeks on certain occasions with peculiar ceremonies, and first instituted by Solon. When a person was nominated to an office, the expence of which he was not able to support, he had recourse to the antidosis; that is, he was to seek some other citizen of better substance than himself, who was free from this and other offices; in which case the former was excused. In case the person thus substituted denied himself to be the richest, they were to exchange estates, after this manner: the doors of their houses were close shut up and sealed, that nothing might be conveyed away; then both took an oath to make a faithful discovery of all their effects, and within three days an exchange of estates was made.

ANTIDO'TAL, *adj.* That which has the quality of an antidote, or the power of counteracting poison.—Animals that can innocuously digest these poisons, become *antidotals* to the poison digested. *Brown*.

ANTIDOTE, *f.* [ἀντίδοτον, Gr. *antidotus*, Lat. a thing given in opposition to something else.] A medicine given to expel the mischiefs of another, as of poison:

Trust not the physician;
His *antidotes* are poison, and he slays
More than you rob.

Shakespeare.

ANTIDYSENTE'RIC, *adj.* [from ἀντί, Gr. against, and *dyenteria*, Lat. a bloody flux.] Good against the bloody flux.

AN'TIENT. See **ANCIENT**.

ANTI-EPILEPTICS, *f.* [from ἀντί, against, ἐπιληψία, Gr. *the epilepsy*.] Remedies against an epilepsy and other convulsive disorders.—That bezoar is antidotal, lapis judaicus diuretical, coral *antepileptical*, we will not deny. *Brown*.

ANTIFE'BRILE, *adj.* [from ἀντί, Gr. against, and *febris*, Lat. a fever.] Good against fevers.—*Antifebrile* medicines check the ebullition. *Floyer*.

ANTI'GONE, in fabulous history, a daughter of Oedipus king of Thebes, by his mother Jocasta. She buried by night her brother Polyneices, contrary to the orders of Creon, who, when he heard it, ordered her to be buried alive: she however strangled herself; and Æmon, who was to have married her, killed himself on her grave. Also a daughter of Laomedon, and sister of Priam; who was changed into a stork for comparing herself to Juno.

ANTIGONE'A, or **ANTIGO'NIA**, anciently a town of Bithynia, so called from Antigonus, the son of Philip, and afterwards called *Nicaa*. Another of Epirus, to the north of the Montes Ceraunii, opposite to the city of Oricum. A third of Arcadia, namely *Mantineia*, so called in honour of king Antigonus. A fourth in Macedonia, in the territory of Mygdonia. A fifth in the territory of Chalcidice, in Macedonia, on the east side of the Sinus Thermaicus. A sixth of Syria, built by Antigonus, not far from Antioch, on the Orontes; but soon after destroyed by Seleucus, who removed the inhabitants to Seleucia. A seventh of Troas, called Alexandria in Pliny's time.

ANTI'GONUS, one of Alexander's commanders, to whom Asia fell. He conquered Eumenes, and expelled Seleucus out of Syria; who flying to Ptolemy Lagus in Egypt, a bloody war commenced betwixt him, Cassander, and Antigonus, wherein, by the help of his son Demetrius, Antigonus prevailed, and built the city Antigonía. Afterward Cassander, Seleucus, and Lyfimachus, uniting, overthrew him, in league with king Pyrrhus, and slew him near Epirus, 301 years before Christ.

ANTIGONUS, king of the Jews, was the son of Aristobulus. He entered into an alliance with the king of the Parthians, and besieged Jerusalem. He cut off his uncle Hircanus's ears, to incapacitate him for the high-priesthood; and put Josephus, Herod's brother, to death. At length, Herod took him and sent him to Marc Antony; who, to gratify Herod, cut off his head, and thereby ex-

tinguished the Asmonians, who had reigned 126 years. This happened 36 years before Christ.

ANTIGRA'PHUS, in antiquity, an officer of Athens, who kept a counterpart of the apodecti, or chief treasurer's accounts, to prevent mistakes, and keep them from being falsified.

ANTI'GRAPHUS, in middle-age writers, was a secretary or chancellor. He is thus called, according to the old glossarists, on account of his writing answers to the letters sent to his master. The antigraphus is sometimes also called *archigraphus*; and his dignity *antigraphia*, or *archigraphia*.

ANTI'GRAPHUS is also used in Isidorus for one of the notes of sentences which is placed with a dot to denote a diversity of sense in translations.

ANTI'GRAPHUS, in ecclesiastical writers, is an abbreviator of the papal letters. In which sense the word is used by pope Gregory the Great in his register. Of late days the office of antigraphus consists in making minutes of bulls from the petitions agreed to by his holiness, and renewing the bulls after engrossing.

ANTI'GUA, one of the Antilles, or Caribbees, is situated about twenty leagues east of St. Christopher's, in lon. 62. 5. W. and lat. 17. 30. N. It is about fifty miles in circumference, and is reckoned the largest of all the British Leeward islands. It is remarkable that it has neither stream nor spring of fresh water; this inconvenience, which rendered it uninhabitable to the Caribbees, deterred for some time Europeans from attempting a permanent establishment upon it; but few, if any, are the obstacles of nature, which civilised man will not overcome, more especially when interest spurs him on. The soil of Antigua was found to be fertile, and it soon presented itself to the view of enterprising genius, that by means of cisterns the necessity of springs and streams might be superseded. Hence, as early as 1632, a son of Sir Thomas Warner, and a number of other Englishmen, settled there, and began the cultivation of tobacco. In 1674, colonel Codrington, of Barbadoes, removed to this island, and succeeded so well in the culture of sugar, that, animated by his example, and aided by his experience, many others engaged in the same line of business. Mr. Codrington dying in 1691, was succeeded by his son Christopher, who, pursuing his father's steps, held the government till 1704, when he was superseded by Sir William Matthews, who died soon after his arrival. Queen Anne then bestowed the government on Daniel Park, Esq. a man who for debauchery, villany, despotism, though he may have been equalled, was certainly never excelled. His government lasted till December 1710, when his oppressions roused the inhabitants to resistance: he was seized by the enraged multitude and torn to pieces, and his reeking limbs scattered about the streets. An inquiry was instituted with respect to the perpetration of this act; the people of England were divided, some looking upon his death as an act of rebellion, others viewing it as a just sacrifice to liberty. The government, however, after a full enquiry, were so fully satisfied of Park's guilty and illegal conduct, that, much to their honour, they issued a general pardon for all persons concerned in his death.

The principal article produced in this island is sugar; besides which, cotton-wool and tobacco is raised in considerable quantities, and likewise provisions to a considerable amount in favourable years. The crops, in general, are very unequal; in 1779, there was shipped 3382 hogheads, and 579 tierces, of sugar; in 1782, the crop was 15102 hogheads, and 1603 tierces; in 1770, 1773, and 1778, there were no crops of any kind, owing to the long-continued drought.

The island is divided into six parishes and eleven districts, and contains six towns and villages. St. John's, (the capital,) Parham, Falmouth, Willoughby-bay, Old-road, and James's Fort; the two first are the legal ports of entry. The island has many excellent harbours, particularly English-harbour and St. John's, at the former of

which there is a dock-yard and arsenal established by the English government. The military establishment here is two regiments of infantry and two of militia, besides which there is a squadron of dragoons and a battalion of artillery raised in the island. The governor, or captain-general, of the Leeward islands, though directed by his instructions to visit each island within his government, is generally stationary at Antigua: in hearing the causes from the other islands he sits alone, but in causes arising within the island he is assisted by a council; and by an act of assembly sanctioned by the crown, the president, and a majority of the council, may hear and determine chancery causes during the absence of the governor-general; besides this court, there is a court of king's bench, a court of common pleas, and a court of exchequer. The legislature of Antigua consists of the commander in chief, a council of twelve members, and an assembly of twenty-five. This island set the first example of a melioration of the criminal law respecting negro-slaves, by allowing them a trial by jury, &c. And the inhabitants, still more to their honour, have encouraged the propagation of the gospel among their slaves.

ANTI'GUG'LER, *f.* is a crooked tube of metal, so bent as easily to be introduced into the necks of bottles, and used in decanting liquors, without disturbing them. For this purpose the bottle should be a little inclined, and about half a spoonful of the liquor poured out, so as to admit an equal quantity of air; let one end of the bent tube be stopped with the finger, whilst the other is thrust into the body of the liquor near to the bubble of air already admitted. When the finger is taken off, the bottle will have vent, and the liquor will run out steadily and undisturbed.

ANTIHEC'TICS, *f.* in pharmacy, medicines good in hectic fevers. The *antiheticum poterii* was a medicine formerly much celebrated.

ANTILIBANUS, a mountain of Cœlosyria, which bounds it on the south, running parallel with Libanus: they both begin a little above the sea, Libanus near Tripolis, Antilibanus at Sidon: and both terminate near the mountains of Arabia, which run to the north of Damascus. The Scripture, making no distinction between Libanus and Antilibanus, calls them by the common name of *Lebanon*.

ANTI'LES, the French name for the **CARIBBEE ISLANDS**.

ANTI'LOCHUS, a son of Nestor and Eurydice, who accompanied his father to the siege of Troy, and was killed by Menon, in parrying the blow that was aimed at his father.

ANTILOGARITHM, *f.* [from *anti* and *logarithm*.] The complement of the logarithm of a sine, tangent, or secant; or the difference of that logarithm from the logarithm of ninety degrees.

ANTI'LOGY, *f.* [*αντιλογία*, Gr.] A contradiction between any words and passages in an author.

ANTI'LOQUIST, *f.* [from *anti*, and *loquor*, Lat. to speak.] A contradicter.

ANTILYS'SUS, *f.* [from *αντι*, against, and *λυσσα*, Gr. the madness caused by the bite of a mad dog.] It is the name of any medicine for the cure of the hydrophobia.

ANTIMACHUS, a Greek poet of Ionia, reckoned the next to Homer in excellence. He wrote a poem upon the Theban war; and, before he had brought his heroes to the city of Thebes, he had filled twenty-four volumes. Also a son of Hercules by one of the Thetiades.

ANTIMEN'SIUM, *f.* a kind of consecrated table-cloth, occasionally used in the Greek church, in places where there is no proper altar. It answers to the *altare portabile*, or portable altar, in the Latin church. They are both of late invention, though Habertus would have them as old as St. Basil.

ANTIMENSIA is also applied to other tables, used in offices of religion, besides those whereon the eucharist is administered: such, for example, are those whereon the host is exposed, &c. The origin of the antimensia is described by Meursius: when the bishop had consecrated a church,

the cloth, which had been spread on the ground and over the communion-table, was torn in pieces, and distributed among the priests, who carried each a fragment away, to serve to cover the tables in their churches and chapels. Not that it was necessary that such cloths should be laid on all tables; but only on those which either were not consecrated, or at least whose consecration was doubted of.

ANTIME'RIA, *f.* in grammar, a figure whereby one part of speech is used for another: e. g. *velle suam cuique est*, for *voluntas sua cuique est*; also, *populus late rex*, for *populus late regnans*. In a more restrained sense, antimeria is a figure where the noun is repeated instead of the pronoun. The antimeria is frequent in the Hebrew, and is sometimes retained in our version of the Old Testament: *Hear my voice, ye wives of Lamech, for my wives*, Gen. iv. 23.

ANTIMETABOLE, *f.* [of *αντι*, against, and *μεταβολη*, from *μεταβαλλω*, Gr. I shift or transfer; a shifting or setting two things over-against each other.] In rhetoric, a figure which sets two things in opposition to each other. This figure is twice exemplified in an apophthegm of Mufonius; which, on account of its excellence, is called *aureum monitum*, the "golden maxim or precept:"

Αν τι πράξης καλον μετα πονε, ο μεν πονος οίχεται, το δε καλον μενει.

Αν τι ποιήσης αισχρον μετα ηδους, το μεν ηδυ οίχεται, το δε αισχρον μενει.

Thus translated: "Allowing the performance of an honourable action to be attended with labour; the labour is soon over, but the honour immortal: whereas, should even pleasure wait on the commission of what is dishonourable, the pleasure is soon gone, but the dishonour eternal."

ANTIMETATHE'SIS, *f.* in rhetoric, is the inversion of the parts or members of an *antithesis*. Such is that of Cicero, in Verrem, lib. iv. cap. 52. "Compare this peace with that war; the arrival of this governor with the victory of that general; his profligate troops with the invincible army of the other; the luxury of the former with the temperance of the latter: you will say that Syracuse was founded by him who took it; and taken by him, who held it when founded."

ANTIMONAR'CHICAL, *adj.* [from *αντι*, against, and *μοναρχια*, Gr. government by a single person.] Against government by a single person.—When he spied the statue of king Charles in the middle of the crowd, and most of the kings ranged over their heads, he concluded that an *antimonarchical* assembly could never choose such a place. *Addison*.

ANTIMONAR'CHICALNESS, *f.* The quality of being an enemy to regal power.

ANTIMO'NIAL, *adj.* Made of antimony; having the qualities of antimony; relating to antimony:

Though *antimonial* cups, prepar'd with art,
Their force to wine through ages should impart,
This dissipation, this profuse expence,
Nor shrinks their size, nor wastes their stores immense.

Blackmore.

ANTIMONY, *f.* [The stibium of the ancients, by the Greeks called *σμμι*. The reason of its modern denomination is referred to Basil Valentine, a German monk; who, as the tradition relates, having thrown some of it to the hogs, observed that, after it had purged them heartily, they immediately fattened; and therefore he imagined his fellow monks would be the better for a like dose. The experiment, however, succeeded so ill, that they all died of it; and the medicine was thenceforward called *antimoine*, *antimohk*.] Antimony is a mineral substance, of a metalline nature, having all the seeming characters of a real metal, except malleability; and may be called a femetall, being a fossil glebe of some undetermined metal, combined with a sulphureous and stony substance. Mines of all metals afford it; that in gold mines is reckoned best. It has also its own mines in Hungary, Germany, and France. Its texture is full of little shining veins or threads, like needles; brittle as glass. Sometimes veins of a red or golden

golden colour are intermixed, which is called *male antimony*; that without them being denominated *female antimony*. It fuses in the fire, though with some difficulty; and dissolves more easily in water. It destroys and dissipates all metals fused with it, except gold; and is therefore useful in refining. It is a common ingredient in speculums, or burning concaves; serving to give them a finer polish. It makes a part in bell-metal; and renders the sound more clear. It is mingled with tin, to make it more hard, white, and sound; and with lead, in the casting of printers' types, to render them more smooth and firm. It is a general help in the melting of metals, and especially in casting of cannon ball. Antimony found its way into medical practice with great difficulty; the ancients considered it as a poison, and only fit for external uses. Basil Valentine, in the fifteenth century, first brought it into vogue as an internal medicine, published a work called *Currus triumphalis Antimonii*; but it soon lost its reputation, until Paracelsus raised its credit again, after which it was received and rejected several times, until, by the success of empyrics, it acquired an established place in regular practice; and is now justly ranked with the most valuable part of the *materia medica*. In its crude state, notwithstanding what has been said by many authors of its efficacy in rheumatic, cancerous, and other cases, it appears from repeated trials to be an inert substance with regard to the human body; yet it is ordered by some physicians to be taken from one scruple to a dram, two or three times a day, in cutaneous and leprous disorders, in its levigated state. Its preparations are, in general, used both as alteratives and evacuants, and hardly any article in the *materia medica* will admit of so extensive a use in acute diseases, as well as chronic; some of them are equally a principal in the cure, the varieties of these complaints requiring some difference in their adjuncts. In fevers of the inflammatory and putrid kinds, antimonials are alike the proper remedy; and in chronic diseases, whether from the rigid or lax habit, they may be depended on. They promote all the secretions and excretions, particularly those of the skin, intestines, urinary passages, and salivary ducts, by gently irritating the whole nervous and vascular compages. If given in small doses, gradually increasing them, yet keeping to that proportion which excites no sensible discharge, they are efficacious in regenerating a healthy state of the blood; for this purpose their effects are not so speedy as those of iron, but they are more lasting. Thus it is easy to perceive how justly it is asserted that antimonials are curative in so many disorders, and those too of opposite natures. As auxiliary to other medicines, on which the cure more directly depends, their efficacy is no less to be admired; they quicken their action and increase their powers, particularly those by which any evacuation is to be promoted; mixed in under-doses with such medicines, their operation is generally more easy too; as an expectorate, some of its preparations excel; and provoke the salivary discharge in the same manner as when mercury hath been freely taken; but that made by antimony is ropy, whereas that with mercury is very thin. If any preparation of antimony is too free in its operation upwards, it may be carried through the intestines by taking a little common salt in any small drink made warm, or it is restrained by a draught of water acidulated with the acidum vitrioli dilutum. The preparations of this drug are very numerous, for which see *CHEMISTRY, PHARMACY, &c.*

The virtues of antimony in the diseases of the horse and other animals are also justly extolled. The virtues of this drug in fattening cattle have been thought imaginary, but experiment proves it to be a real truth. A horse that is lean and scabby, and not to be fatted by any other means, will become fat by taking a dose of antimony every morning for about two months. If to a boar fed for brawn an ounce of antimony be given every morning, he will become fat a fortnight sooner than others fed in the same manner, but without the antimony.

ANTINEPHRETIC, *f.* [from *anti*, and *νεφρις*, a pain

in the kidneys.] Remedies against disorders of the reins and the kidneys.

ANTIN'OE, a city of Egypt. See *ENFINE*.

ANTINOETIA, *f.* in antiquity, annual sacrifices, and quinquennial games, in memory of Antinous the Bithynian. They were instituted at the command of Adrian the Roman emperor, at Mantinea in Arcadia, where Antinous was honoured with a temple and divine worship.

ANTINO'MIANS, *f.* [*αντινομια*, of *anti*, against, and *νομος*, the law, Gr.] In ecclesiastical history, certain heretics who maintain the law of no use or obligation under the gospel-dispensation, or who hold doctrines that clearly supersede the necessity of good works and a virtuous life. The antinomians took their origin from John Agricola about the year 1538; who taught, that the law is no ways necessary under the gospel; that good works do not promote our salvation, nor ill ones hinder it; that repentance is not to be preached from the decalogue, but only from the gospel. Luther, Rutherford, Schlusfeldburg, Sedgwick, Gataker, Witius, Bull, Williams, &c. have written refutations; Crisp, Richardson, Saltmarsh, &c. defences, of the antinomians; Wigandus, a comparison between ancient and modern antinomians. The moderns held, that the keeping of Moses's law was unprofitable under the gospel, and that children are born without sin; and that good works do not further, nor evil hinder, but that faith alone is sufficient for salvation.

AN'TINOMY, *f.* [from *anti* and *νομος*.] A contradiction between two laws, or two articles of the same law.—*Antinomies* are almost unavoidable in such variety of opinions and answers. *Baker*.

ANTINOUS, the favourite of Adrian, was born at Bithynus in Bithynia. His beauty engaged the heart of Adrian in such a manner, that there never was a more boundless and extravagant passion than that of this emperor towards this youth. After his death the emperor ordered divine honours to be paid to him; and he also erected a city to his honour, calling it Antinopolis, and in it a magnificent temple.—The name of one of Penelope's suitors, who advised his companions to destroy Telemachus; and even struck Ulysses, when he came to the palace in a beggar's dress, imploring for bread.

ANTI'NOUS, in astronomy, a part of the constellation *aquilo*, or the eagle.

AN'TIOCH, a city of Syria in Asia, situated on the river Orontes, in lat. 36. 20. N. lon. 37. 5. E. It was built by Seleucus Nicator, founder of the Syro-Macedonian empire, who made it his capital. It stood on the above-mentioned river, about twenty miles from the place where it empties itself into the Mediterranean; being equally distant from Constantinople and Alexandria in Egypt, that is, about 700 miles from each. Seleucus called it *Antioch*, from his father's name, according to some; or from that of his son, according to others. He built sixteen other cities bearing the same name; of which one, situated in Pisidia, is probably that where the name of *Christians* was first given to the followers of Jesus Christ. But that situated on the Orontes, by far eclipsed, not only all others of this name, but all the cities built by Seleucus. Antigonus, not long before, had founded a city in that neighbourhood, which from his own name he called *Antigonia*, and designed it for the capital of his empire; but it was raised to the ground by Seleucus, who employed the materials in building his metropolis, and also transplanted the inhabitants thither.

The city of Antioch was afterwards known by the name of *Tetrapolis*, being divided as it were into four cities, each of them being surrounded with its proper wall, besides a common one which enclosed them all. The first was built by Seleucus Nicator, already mentioned; the second by those who flocked thither on its being made the capital of the Cyro-Macedonian empire; the third by Seleucus Callinicus; and the fourth by Antiochus Epiphanes.—About four or five miles distant, stood a place called *Daphne*, which was reckoned a suburb of Antioch. Here Seleucus

cus planted a grove, and in the middle of it built a temple which he consecrated to Apollo and Diana, making the whole an asylum. To this place the inhabitants of Antioch resorted for their pleasures and diversions; whereby it became at last so infamous, that "to live after the manner of Daphne" was used as a proverb to express the most voluptuous and dissolute life. Here Lucius Verus, the colleague of M. Aurelius, chose to take up his residence, instead of marching against the Parthians; while his general Cassius forbade by proclamation any of his soldiers to enter or even go near the place. In short, so remarkable was Daphne of old, that the metropolis itself was distinguished by it, and called *Antioch near Daphne*.

Though Antioch continued to be, as Pliny calls it, the queen of the East, for near 1600 years; yet scarce any city hath undergone such calamities, both from the attacks of its enemies, and its visitation by earthquakes.—The first disaster that befel the Antiochians happened about 145 years before Christ. Being very much disaffected to the person and government of Demetrius their king, they were continually raising tumults and seditions; inso-much that he found himself at last obliged to solicit assistance from the Jews; and was furnished by Jonathan, one of the Maccabees, with 3000 men; by which reinforcement, believing himself sufficiently strong to reduce the mutineers by force, he ordered them immediately to deliver up their arms. This unexpected order caused a great uproar in the city. The inhabitants ran to arms, and invested the king's palace, to the number of 120,000, with a design to put him to death. All the Jews hastened to his relief, fell upon the rebels, killed 100,000 of them, and set fire to the city. On the destruction of the Syrian empire by the Romans, Antioch submitted to them as well as the other cities of that kingdom, and continued for a long time under their dominion. About the year 115, in the reign of the emperor Trajan, it was almost entirely ruined by one of the most dreadful earthquakes mentioned in history. Trajan himself happened to be there, just returned from an expedition against the Parthians; so that the city was full of troops, and strangers had come from all quarters, either out of curiosity, or upon business and embassies: the calamity was therefore felt almost in every province of the Roman empire. The earthquake was preceded by violent thunder, unusual winds, and a dreadful noise under ground. The shock was so terrible, that numbers of houses were overturned, and others tossed to and fro like a ship at sea. Those who happened to be in their houses were for the most part buried under their ruins: those who were walking in the streets or in the squares, were, by the violence of the shock, dashed against each other, and most of them either killed or maimed. This earthquake continued, with some small intermission, for many days and nights; so that vast numbers perished. The most violent shock, according to St. Ignatius, was on a Sunday, December 23. By this Trajan was much hurt, but escaped through a window. Dio Cassius says, that mount Lison, which stood at a small distance from the city, bowed its head and threatened to fall down upon it; that other mountains fell; that new rivers appeared, and others that had flowed before forsook their course and vanished. When the earthquake ceased, a woman was heard crying under the ruins; which being immediately removed, she was found with a living child in her arms. Search was made for others; but none was found alive except one child, which continued sucking its dead mother.

No doubt, Trajan, who was an eye witness of this calamity, contributed largely towards the re-establishment of Antioch in its ancient splendour. Its good fortune, however, did not continue long; for in 135, it was almost entirely destroyed by fire; it was again restored by Antoninus Pius. In 176 or 177, the inhabitants having sided with Cassius, the Roman general who had revolted from M. Aurelius, that emperor published a severe edict against them, deprived them of all their privileges, suppressed their public assemblies, and took from them

the shows and spectacles to which they were so much addicted: but, his anger being appeased, he restored them to their former splendour, and even condescended to visit their city. In 194, having sided with Niger against Severus, the latter again deprived them of their privileges, and subjected Antioch as a mere village to Laodicea; he however pardoned them the next year, at the intreaties of his eldest son, then a child.

When the Roman empire began to decline, Antioch became a bone of contention between them and the eastern nations; and accordingly, on the breaking out of a Persian war, it was continually liable to suffer. In 242, it was taken and plundered by Sapor; and, though he was defeated by Gordian, it underwent the same misfortune in the time of Valerian, about 18 years after; and, on the defeat and captivity of Valerian, being taken by the Persian monarch a third time, he not only plundered it, but levelled the public buildings with the ground. The Persians, however, being soon driven out, the city continued free from any remarkable calamity, till the division of the Roman empire by Constantine in 331. It was then afflicted with so grievous a famine, that a bushel of wheat was sold for 400 pieces of silver. During this distress, Constantine sent to the bishop 30,000 bushels of corn; besides an incredible quantity of all kinds of provisions, to be distributed among the ecclesiastics, widows, orphans, &c. In the year 347, Constantine II. caused an harbour to be made at Seleucia, for the convenience of Antioch. This was effected at an immense expence, the mouth of the Orontes being full of sands and rocks. When the emperor Julian set out on his expedition against the Persians, he made a long stay at Antioch; the Roman provinces being then afflicted with a famine, which raged more violently at Antioch than in other places. Under a mistaken view of remedying this evil, Julian fixed the prices of corn to a certain standard, by which means the famine was still increased, the merchants conveying their corn privately to other places, so that this metropolis was reduced to a most deplorable situation. In 381, in the reign of Theodosius the Great, Antioch was again visited by famine, accompanied with a grievous plague. The latter soon ceased: but, the famine still continuing, the bishop, Libanius, applied to Icarus, count of the East, requesting him to relieve the poor, who flocked from all parts to the metropolis, and were daily perishing in the streets; but to this Icarus gave no other answer, than that they were abhorred and justly punished by the gods. This inhuman treatment raised great disturbances; which, however, were terminated without bloodshed. In 387, Theodosius finding his exchequer quite drained, and being obliged to be at an extraordinary expence in celebrating the fifth year of the reign of his son Arcadius, and the tenth of his own, an extraordinary tax was laid upon the whole empire. Most of the cities submitted willingly, but the people of Antioch, complaining of it as an unreasonable oppression, crowded to the forum; and would have torn the governor in pieces, had not the guard kept back the enraged multitude till he made his escape. Upon this, they broke some of the emperor's statues, and dragged others through the city, uttering the most abusive expressions against him. They were, however, dispersed by a body of archers, who, by wounding only two of the rabble, struck terror into the rest. The governor proceeded against the offenders with the utmost cruelty; exposing some to wild beasts in the theatre, and burning others alive. Theodosius, on hearing of this tumult, was so much enraged, that he commanded the city to be destroyed, and the inhabitants to be put to the sword without distinction. On this occasion, St. Chyrosostom and the hermits, who were very numerous in the neighbourhood, exerted all their eloquence in behalf of the unhappy people, and, being joined by Flavianus, they obtained a general pardon, and the city was restored to its former privileges.

In the year 458, Antioch was again almost destroyed by an earthquake, which happened on the 14th of September; scarcely

scarcely a single house being left standing in the most beautiful and opulent part of the city. The like misfortune again happened in 525, during the reign of the emperor Justin; and fifteen years after, being taken by Cosroes king of Persia, that haughty monarch gave it up for plunder to his soldiers, who put all they met to the sword. The king himself seized on the gold and silver vessels belonging to the churches; and caused all the valuable statues, pictures, &c. to be conveyed into Persia, while his soldiers carried off every thing else, and then set fire to the city. Such of the inhabitants as escaped the sword were carried into Persia, and sold as slaves. Notwithstanding these calamities, the city of Antioch soon recovered its wonted splendour; and as suddenly underwent its usual fate, being almost entirely destroyed by an earthquake in 587, by which 30,000 persons lost their lives. In 634 it fell into the hands of the Saracens, who kept possession of it till the year 858, when it was surprised by Burtas, and again annexed to the Roman empire. The Romans now continued masters of it until the civil dissensions in that empire gave the Turks an opportunity of seizing upon it, as well as of the whole kingdom of Syria. From them it was again taken by the crusaders in 1098. In 1262 it was taken by Bybaris sultan of Egypt, who put a final period to its glory.

Antioch is now no more than a ruinous town, whose houses, built with mud and straw, and narrow and miry streets, exhibit every appearance of misery and wretchedness. These houses are situated on the southern bank of the Orontes, at the extremity of an old decayed bridge: they are covered to the south by a mountain, upon the slope of which is a wall, built by the crusaders. Notwithstanding the unpolished manners of its inhabitants, Antioch was better calculated than Aleppo to be the emporium of the Europeans. By clearing the mouth of the Orontes, which is six leagues lower down, boats might have been towed up that river, though they could not have sailed up, as Pococke has asserted, its current being too rapid. The natives, who never knew the name Orontes, call it, on account of the swiftness of its stream, *El-aasi*, the rebel. It is to be remembered, we now no longer hear at Antioch, either the Grove, or of Daphne, or of the voluptuous scenes of which it was the theatre.

ANTIO'CHE (Pertuis d'), a channel in the Atlantic, on the French coast, near the northern part of the island of Oleron, and on the southern of the isle of Rhé.

ANTIOCHET'TA, a town of Asiatic Turkey, on the sea-coast of Caramania: eighty-eight miles south of Cogni.

ANTIO'CHIA, in the ancient geography, a town of Assyria, situated between the rivers Tigris and Tormadotus.—Another of Caria, on the Meander; called also *Pythopolis*, *Athymbra*, and *Nysa*.—A third of Cilicia Trachea, on Mount Cragus.—A fourth, called *Epidaphnes*, capital of Syria, distinguished from cities of the same name, either by its situation on the Orontes, by which it was divided, or by its proximity to Daphne (See ANTIOCH).—A fifth Antiochia, a town of Comagene, on the Euphrates.—A sixth, of Lydia, *Tralles*, so called.—A seventh, of Margiana, on the river Margus, taking its name from Antiochus, son of Seleucus, who rebuilt it, and walled it round, being before called *Alexandria*, from Alexander the founder, and surnamed *Syria*; in compass seventy stadia; whither Orodes carried the Romans after the defeat of Crassus.—An eighth in Mesopotamia, on the lake Calirrhoe, the old name of Edeffa.—A ninth on the river Mygdonius, in Mesopotamia, situate at the foot of Mount Masius, and is the same with Nisibis. It was the bulwark and frontier-town of the Romans against the Parthian and Persians, till given up to the Persians, by Jovian, by an ignominious peace.—A tenth in the north of Pisidia; it was a Roman colony, with the appellation of *Cæsarea*.—There is also an Antiochia at Mount Taurus, mentioned by Ptolemy, but by no other author.

ANTIO'CHIA, a town of South America, in the kingdom of Popayan.

ANTIO'CHIAN, *adj.* Belonging to Antioch.
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ANTIO'CHIAN, *f.* An inhabitant or native of Antioch.

ANTIO'CHIAN SECT, or ACADEMY, a name given to the fifth academy, or branch of academics. It took its name from being founded by Antiochus, a philosopher contemporary with Cicero; and it succeeded the Philonian academy. Though Antiochus was really a stoic, and only nominally an academic.

ANTIO'CHIAN EPOCHA, a method of computing time from the proclamation of liberty granted to the city of Antioch, about the time of the battle of Pharsalia.

ANTI'OCHIS, the name of a woman. 2 *Mac.* iv. 30.

ANTI'OCHUS, the name of several kings of Syria.—Also the name of a celebrated philosopher, the disciple of Philo of Larissa, the master of Cicero, and the friend of Lucullus and Brutus. He was founder of a fifth academy; but, instead of attacking other sects, he set himself down to reconcile them together, particularly the sect of the stoics with that of the ancient academy.—The name of a man. 1 *Mac.* i. 10.

ANTI'OPE, the daughter of Nycteus king of Thebes, who was carried away by Epopeus king of Sicyon. After the death of her father, she was recovered by her uncle Lycus, who married her, but soon divorced her to marry Dirce. Soon after her repudiation she became pregnant by Jupiter, who enjoyed her in the likeness of a satyr; and Dirce, suspecting that her husband still kept the company of Antiope, confined her in a prison, from whence she escaped to Mount Cytheron, and was there delivered of Zethus and Amphion, who afterwards avenged her wrongs upon Lycus and Dirce.—A daughter of Mars, queen of the Amazons, who married Theseus, and had a son by him called Hippolytus. She is also called Hippolyte.

ANTIPÆDOBAPTISTS, *f.* [from *anti*, against, *παῖς*, child; and *βαπτίζω*, to baptize.] A denomination given to those who object to the baptism of infants; because they say infants are incapable of being intrusted, and of making that profession of faith which entitles them to this ordinance and an admission into church-communion.

ANTIPAGMENTS, *f.* in architecture, the garnishing of posts and pillars.

ANTIPAPIS'TICAL, *adj.* [from *anti*, Gr. and *papa*, Lat.] Averse to popery.—It is pleasant to see, how the most *antipapistical* poets are inclined to canonize their friends. *Jortin on Milton's Lycidas.*

ANTIPARALYTIC, or ANTIPARALYTICAL, *adj.* Good against the palsy.

ANTIPARASIASIS, *f.* in rhetoric, a figure which admits the position of the adversary, but turns it directly against him.

ANTIPARASTASIS, *f.* in rhetoric, a figure that admits the position of the adversary, but denies the inference.

ANTIPA'ROS, one of the Greek islands in the Archipelago, opposite to Paros, from which it is separated by a strait about seven miles over. It is the *Oleas* mentioned by Strabo, Pliny, Virgil, &c. and was, according to Heracles Ponticus, first peopled by a Phœnician colony from Sidon. According to Mr. Tournefort, it is about sixteen miles in circumference, producing a little wine and cotton, with as much corn as is necessary for the maintenance of sixty or seventy families, who live together in a village at one end of the island, and are mostly Maltese and French corsairs.

This island is remarkable for a subterraneous cavern or grotto, accounted one of the greatest natural curiosities in the world. It was discovered in the last century by one Magni, an Italian traveller; but the best account of it we have met with is in a periodical publication called the Zoological Magazine; which, as it seems to bear sufficient marks of authenticity, we shall here insert. "Its entrance lies in the side of a rock, about two miles from the sea-shore; and is a spacious and very large arch, formed of rough craggy rocks, overhung with brambles and a great many climbing plants, that give it a gloominess

which is very awful and agreeable. Our surgeon, myself, and four passengers, attended by six guides with lighted torches, entered this cavern about eight o'clock in the morning, in the middle of August. We had not gone twenty yards in this cavity when we lost all light of daylight: but, our guides going before us with lights, we entered into a low narrow kind of alley, surrounded every way with stones, all glittering like diamonds by the light of our torches; the whole being covered and lined throughout with small crystals, which gave a thousand various colours by their different reflections. This alley grows lower and narrower, till at length one can scarcely get along it. At the end of this passage we were each of us presented with a rope to tie about our middles; which, when we had done, our guides led us to the brink of a most horrible precipice. The descent was quite steep, and the place dark and gloomy. We could see nothing, in short, but some of our guides with torches in a miserable dark place, at a vast distance below us. The dreadful depth of this place, and the horror of the descent through a miserable darkness into it, made me look back to the lane of diamonds, if I may so call it, through which we had just passed; and I could not but think I was leaving heaven, to descend into the infernal regions. The hope of something fine at my journey's end, tempted me, however, to trust myself to the rope, and to let myself down. After about two minutes dangling in this posture, not without much pain as well as terror, I found myself safe at the bottom; and our friends all followed the example. When we had congratulated each other on our safe descent, I was inquiring where the grotto, as they called it, was. Our guides, shaking their heads, told us, we had a great way to that yet; and led us forward about thirty yards under a roof of ragged rocks, in a scene of terrible darkness, and at a vast depth from the surface of the earth, to the brink of another precipice, much deeper and more terrible than the former. Two of the guides went down here with their torches first; and by their light we could see, that this passage was not so perpendicular indeed as the other, but lay in a very steep slant, with a slippery rock for the bottom; vast pieces of rough rugged rocks jutting out in many places on the right hand, in the descent, and forcing the guides sometimes to climb over, sometimes to creep under, and sometimes to go round them; and on the left, a thousand dark caverns, like so many monstrous wells, ready, if a foot should slip, to swallow them up for ever. We stood on the edge to see these people descend before us; and were amazed and terrified to see them continue descending till they appeared at a monstrous and frightful depth. When they were at the bottom, they called out to us; and we, trembling and quaking, began to descend after them. We had not gone thirty feet down, when we came to a place where the rock was perfectly perpendicular; and a vast cavern seemed to open its mouth to swallow us up on one side, while a wall of rugged rock threatened to tear us to pieces on the other. I was quite disheartened at this terrible prospect, and declared I would go back; but our guides assured us there was no danger; and, the rest of the company resolving to see the bottom now they were come so far, I would not leave them: so on we went to a corner where was placed an old slippery and rotten ladder, which hung down close to the rock; and down this, one after another, we at length all descended. When we reached the bottom, we found ourselves at the entrance of another passage, which was terrible enough indeed; but in this there was not wanting something of beauty. This was a wide and gradual descent; at the entrance of which one of our guides seated himself on his breech, and began to slide down, telling us we must do the same. We could discover, by the light of his torch, that this passage was one of the noblest vaults in the world. It is about nine feet high, seven wide; and has for its bottom a fine green glossy marble. The walls and arch of the roof being as smooth in most places as if wrought by art, and made of

a fine glittering red-and-white granite, supported here and there with columns of a deep blood-red shining porphyry, made, with the reflection of the lights, an appearance not to be conceived. This passage is at least forty yards long, and of a steep descent. Our guides could here keep on each side of us; and, what with the prodigious grandeur and beauty of the place, our easy travelling through it, and the diversion of now and then running over one another whether we would or not, made this the pleasantest part of our journey. When we had entered this passage, I imagined we should at the bottom join the two guides we had first sent down: but, alas! when we were got there we found ourselves only at the mouth of another precipice, down which we descended a second ladder not much better than the former. I could have admired this place also, would my terror have suffered me; but the dread of falling kept all my thoughts employed during my descent. I could not but observe, however, as my companions were coming down after me, that the wall, if I may so call it, which the ladder hung by, was one mass of blood-red marble, covered with white sprigs of rock-crystal as long as my finger, and making, with the glow of the purple from behind, one continued immense sheet of amethysts. From the foot of this ladder we slid on our bellies through another shallow vault of polished green-and-white marble, about twenty feet; and, at the bottom of this, joined our guides. Here we all got together once again, and drank some rum, to give us courage before we proceeded any further. After this short refreshment, we proceeded by a straight but slanting passage, of a rough, hard, and somewhat coarse, stone, full of a thousand strange figures of snakes rolled round, and looking as if alive; but in reality as cold and hard as the rest of the stone, and nothing but some of the stone itself in that shape. We walked easily along this descent for near 200 yards, when we saw two pillars seemingly made to support the roof from falling in: but in reality it was no such thing; for they were very brittle, and made of a fine glittering yellow marble. When we had passed these about 200 yards, we found ourselves at the brink of another very terrible precipice: but this our guides assured us was the last; and, there being a very good ladder to go down by, we readily ventured. At the bottom of this steep wall, as I may call it, we found ourselves for some way upon plain even ground; but, after about forty yards walking, were presented by our guides with ropes again, which we fastened about our middles, though not to be swung down by, but only for fear of danger, as there are lakes and deep waters all the way from hence on the left hand. With this precaution we entered the last alley; and horrible work it was indeed to get through it. All was perfectly horrid and dismal here: the sides and roof of the passage were of black stone; and the rocks in our way were in some places so steep, that we were forced to lie all along on our backs, and slide down; and so rough, that they cut our clothes and bruised us in passing. Over our heads, there was nothing but ragged black rocks, some of them looking as if they were every moment ready to fall in upon us; and on our left hand the light of our torches showed us continually the surfaces of dirty and miserably-looking lakes of water. If I had heartily repented of my expedition before, here I was all in a cold sweat, and fairly gave myself over for lost; heartily cursing all the travellers that had written of this place; that they had described it so as to tempt people to see it, and never told us of the horrors that lay in the way. In the midst of these reflections, and in the very dullest part of the cavern, on a sudden we had lost four of our six guides. What was my terror on this occasion! The place was a thousand times darker and more terrible for want of their torches; and I expected no other but every moment to follow them into some of these lakes, into which I doubted not but they were fallen. The remaining two guides said all they could, indeed, to cheer us up; and told us we should see the other four again soon, and that we were near the end of

of our journey. I do not know what effect this might have upon the rest of my companions; but I believed no part of the speech but the last, which I expected every moment to find fulfilled in some pond or precipice. Our passage was by this time become very narrow, and we were obliged to crawl on all-fours over rugged rocks; when in an instant, and in the midst of these melancholy apprehensions, I heard a little hissing noise, and found myself in utter and undescribable darkness. Our guides called indeed cheerfully to us, and told us that they had accidentally dropped their torches into a puddle of water, but we should soon come to the rest of them, and they would light them again; and told us there was no danger, and we had nothing to do but to crawl forward. I cannot say but I was amazed at the courage of these people; who were in a place where, I thought, four of them had already perished, and from whence we could none of us ever escape; and determined to lie down and die where I was. Words cannot describe the horror or extreme gloominess of the place. One of our guides, perceiving that I did not advance, came up to me; and, clapping his hand firmly over my eyes, dragged me a few paces forward. While I was in this strange condition, expecting every moment death in a thousand shapes, and trembling to think what the guide meant by this rough proceeding, he lifted me at once over a great stone, set me down on my feet, and took his hand from before my eyes. What words can describe at that instant my astonishment and transport! Instead of darkness and despair, all was splendour and magnificence before me: our guides all appeared about us; the place was illuminated by fifty torches, and the guides all welcomed me into the grotto of Antiparos. The four that were first missing, I now found had only given us the slip, to get the torches lighted up before we came; and the other two had put out their lights on purpose to make us enter out of utter darkness into this pavilion of splendour and glory.

"The people told us, the depth of this place was 485 yards; the grotto, in which we now were, is a cavern of 120 yards wide and 113 long, and seems about 60 yards high in most places. Imagine, then, an immense arch like this, almost entirely lined with fine bright crystallized white marble; and the mind will then acquire some faint idea of the place I had the pleasure to spend three hours in. This, however, is but a faint description of its beauties. The roof, which is a fine vaulted arch, is hung all over with icicles of white shining marble, some of them ten feet long, and as thick as one's middle at the root; and among these there hang at least a thousand festoons of leaves and flowers, of the same substance; but so very glittering, that there is no bearing to look up at them. The sides of the arch are planted with seeming trees of the same white crystal, rising in rows one above another, and often inclosing the points of the icicles. From these trees are also hung festoons, tied as it were from one to another in vast quantities: and in some places among them there seem rivers of marble winding through them in a thousand meanders. All these things are only made, in a long course of years, from the dropping of water, but really look like trees and brooks turned into marble. The floor we trod upon was rough and uneven, with crystals of all colours growing irregularly out of it, red, blue, green, and some of a pale yellow. These were all shaped like pieces of saltpetre; but so hard that they cut our shoes; among these, here and there, are placed icicles of the same white shining marble with those above, seeming to have fallen down from the roof and fixed there. Our guides had tied torches two or three to a pillar, and kept continually beating them to make them burn bright; imagine, then, what a glare of splendour and beauty must be the effect of this illumination, among such rocks and columns of marble! All round the lower part of the sides of the arch are a thousand white masses of crystal, in the shape of oak-trees, which are large enough to inclose, in many places, a piece of ground big enough for a bed-chamber. One of these chambers has a fair white curtain, whiter than

satin, of the same marble, stretched all over the front of it. In this we cut our names, and the date of the year; and then returned highly gratified with our arduous perambulation."

ANTIPAS (Herod), the son of Herod the Great by Cleopatra. Herod, in his first will, appointed Antipas his successor in the kingdom; but afterwards, altering that will, he named his son Archelaus his successor, giving to Antipas the title only of tetrarch of Galilee and Peræa. Antipas married the daughter of Aretas king of Arabia, whom he divorced about the year of Christ 33, to marry his sister-in-law Herodias, wife to his brother Philip, who was still living. St. John the Baptist, exclaiming against this incest, was taken into custody by order of Antipas, imprisoned in the castle of Machærus, and afterwards beheaded, as related in Matth. xiv. 3-12. Aretas, king of Arabia, to revenge the affront which Herod had offered to his daughter, declared war against him, and overcame him in a very obstinate engagement. Herod, being afterwards detected as a party in Sejanus's conspiracy, was banished by the emperor Caius into Lyons in Gaul; whether Herodias accompanied him. This Antipas is the Herod who, being at Jerusalem at the time of our Saviour's passion, (Luke xxiii. 11.) ridiculed him, by dressing him in a white robe, and directing him to be conducted back to Pilate, as a mock king, whose ambition gave him no umbrage.

ANTIPATER, [ἀντί, against, and πατήρ, father, Gr. i. e. instead of, or against, a father.] A proper name of men.

ANTIPATER, the disciple of Aristotle, and one of Alexander the Great's generals, was a man of great abilities, and a lover of the sciences; but was accused of poisoning Alexander. He subdued the revolted Thracians, relieved Megalopolis, and overthrew the Spartans there. He died 321 years before the Christian æra.

ANTIPATER, an Idumean of illustrious birth, and possessed of great riches and abilities, taking advantage of the confusion into which the two brothers Hyrcanus and Aristobulus plunged Judea by their contest for the office of high-priest, took such measures as to gain Hyrcanus that office, and under his government to obtain the absolute direction of all affairs; while his great abilities and application to business made him so considerable, that he was honoured as much as if he had been invested with the royal authority in form: but he was at last poisoned by a Jew, named Malachus, forty-three years before the Christian æra. He left, among his other children, the famous Herod, king of the Jews.

ANTIPATER (Cælius), a Roman historian, who wrote a history of the Punic war, much valued by Cicero. The emperor Adrian preferred him to Sallust.

ANTIPATER, of Sidon, a stoic philosopher, and likewise a poet, commended by Cicero and Seneca. He flourished about the 171st Olympiad. We have several of his epigrams in the *Anthologia*.

ANTIPATER, or CAPHAR SABA, a seaport town of Syria, at the mouth of a river which runs into the Mediterranean: six leagues south-south-west of Jaffa.

ANTIPATHES, *f.* [from a superstitious notion among the ancients that this coral, as well as many stones and gems, had a power to drive away enchantments.] The DARK CORAL; in helminthology, it is a genus of worms of the order of zoophyta. The generic characters are—Animal growing in the form of a plant; stem expanded at the base, internally horny beset with small spines, externally covered with a gelatinous flesh beset with numerous polype-bearing tubercles.

Species. 1. *Antipathes spiralis*, or spiral antipathes: with a very simple spiral rough stem. Inhabits the Indian, Mediterranean, and North Seas: of a hard horny black substance exceedingly brittle, very long and variously twisted, and about the size of a writing-pen. See Plate of ANTHREUS, fig. 2. The fleshy part that covers the spiny surface of the bone is full of little gelatinous wart-like figures. When we have soaked these warts for some time in warm water, they appear like polypes with fixed claws.

claws surrounding a cup in the centre, which probably is their mouth. This species spreads itself with a broad base on a coral rock. The bone, or hard part, when broke obliquely, horizontally shows that the internal as well as external layers are full of little spines. It is of a hard horny black shining substance, brittle almost as glass.

2. *Antipathes ulex*, or furze-like antipathes: very much branched, with scattered spreading very rough subulate branches. Inhabits the Indian Ocean; deep black, with irregularly disposed and variously directed ovate cavities dispersed about the branches of a brownish-yellow colour, and supposed to be the ovaries. See *Helminthology* Plate V. fig. 5.

3. *Antipathes alopecurioides*, or fox-tail antipathes: with spinous fetaceous closely-panicled branches. Inhabits South Carolina, about two feet high, and rises from a broad spread base, dividing into several large branches flat on one side with a groove along the middle; it then subdivides into smaller branches, forming close panicles not unlike the fox-tail grass; the outside greyish, the inside black and very brittle.

4. *Antipathes cupressus*, or cypress antipathes: growing in the form of a simple rough panicle, with recurved branches; about two feet long, and covered with a brownish down, under which it is deep black. Linnæus classed this elegant sea-production under his genus *Gorgonia*, to which it is very nearly allied; but the flesh of this tribe is so remarkably gelatinous, and the whole bone, or hard part, is so covered with spines, which even are to be distinguished in the interior laminæ, that there is sufficient reason for making it of another genus, which has been done by Gmelin. There is a most elegant specimen in the British Museum, and very good figures of it in Rumphius and Seba, from the latter of which our design, fig. 3, is taken. It grows in the East-Indian Ocean, among the Spice Islands.

5. *Antipathes orichalcea*, or brassy antipathes: of a horny substance, and in colour a bright brown, like brass. Stems a foot long, straight, with small alternate knots or knobs, and each terminating in a brush-like appearance, as in the preceding. Inhabits the Indian Ocean; also England and Scotland. See fig. 4.

6. *Antipathes subpinnata*: branched, pinnate, rough, with fetaceous alternate subdivisions, and a few others proceeding transversely from them. Inhabits the Mediterranean; cinereous, with amber spines.

7. *Antipathes myriophylla*: with numerous incurved pinnate branches, the subdivisions with other smaller pinules on the upper side. Inhabits the Indian Ocean, and has the appearance of a fine shady shrub; very rough, and yellowish-brown.

8. *Antipathes dichotoma*: very long, dichotomous, and upright. Inhabits the Mediterranean; two feet high, round, dusky.

9. *Antipathes clathrata*: very much branched, intricate, with confused subdivisions every-where coalescing, the younger ones fetaceous. Inhabits the Indian Ocean; a foot long, and black within.

10. *Antipathes flabellum*: dilated, very much branched and subdivided, the subdivisions branching both ways, and cohering together in a reticulate manner. Inhabits the Indian Ocean; half a foot wide, black, rough.

11. *Antipathes pennacea*: branched, somewhat incurved, the branches with fetaceous very-crowded rough subdivisions. Inhabits the Indian Ocean; about a foot high, and nearly as thick at the stem; grey, within black.

12. *Antipathes ericoides*: very much branched, very rough, black, with scattered branches covered every-where with subulate divisions. Inhabits the Indian Ocean; a foot high, black.

ANTIPATHETICAL, *adj.* Having a natural contrariety to any thing.—The soil is fat and luxurious, and antipathetical to all venomous creatures. *Howell*.

ANTIPATHETICALNESS, *f.* The quality or state of having a natural contrariety to any thing.

ANTIP'ATHY, [from *anti*, against, and *πάθος*, feeling, Gr. *antipathie*, Fr.] A natural contrariety to any thing, so as to shun it voluntarily; aversion; dislike. It is opposed to *sympathy*. It has sometimes the particle *against* before the object of antipathy.—I had a mortal antipathy against standing armies in times of peace; because I took armies to be hired by the master of the family to keep his children in slavery. *Swift*.—Sometimes to:

Ask you, what provocation I have had?

The strong antipathy of good to bad.

When truth, or virtue, an affront endures,

Th' affront is mine, my friend, and should be your's. *Pope*.

Formerly *with*; but improperly.—Tangible bodies have an antipathy with air: and any liquid body, that is more dense, they will draw, condense, and, in effect, incorporate. *Bacon*.

With respect to the doctrine of antipathies, physically considered, it is defined to be, "a natural horror and detestation, an insuperable hatred, an involuntary aversion, which a sensitive being feels for some other object, whatever it is, though the person who feels this abhorrence is entirely ignorant of its cause, and can by no means account for it." Such is, they say, the natural and reciprocal hostility between the salamander and the tortoise; between the toad and the weasel; or between sheep and wolves. Such is the invincible aversion of particular persons against cats, mice, spiders, &c. a prepossession which is sometimes so violent, as to make them faint at the sight of these animals. Of these, and a thousand other antipathies, the ancient naturalists, the schoolmen, and the vulgar, form so many legends; and relate them as certain facts, that they may demand an explication of them from the philosophers. But these sages begin with investigating whether such antipathies actually exist or not.

To explore the matter without prejudice, we shall find it necessary to abstract from the subjects of this disquisition, 1. All such antipathies as are not ascertained; as that which is supposed to be felt by hens at the sound of an harp whose strings are made of a fox's bowels, between the salamander and the tortoise, and between the weasel and the toad. Nothing is less confirmed, or rather nothing is more false, than these facts, with which vulgar credulity and astonishment are amused and actuated: and, though some of these antipathies should be ascertained, this would be no proof that the animals which feel them are not acquainted with their causes, according to their mode and proportion of knowledge; in which case it will be no longer the antipathy which we have defined.

2. We must abstract those antipathies which can be extinguished or resumed at pleasure; those fictitious aversions, which certain persons feel, or pretend to feel, with affected airs, that they may appear more precise and finical, or singularly and prodigiously elegant; that they may seem to have qualities so exquisitely fine, as require to be treated with peculiar delicacy. One who bestows any attention on the subject, would be astonished to find how many of these chimerical aversions there are, which are pretended, and passed upon the world by those who affect them as natural and unconquerable.

3. When we abstract those aversions the causes of which are known and evident, we shall be surprised to find how small, how inconsiderable, is the quantity of those which are conformable to our definition. Will any one pretend to call by the name of antipathy, those real, innate, and incontestible, aversions which prevail between sheep and wolves? Their cause is obvious; the wolf devours the sheep, and subsists upon its victims; and every animal naturally flies with terror from pain or destruction: sheep ought therefore to regard wolves with horror, which for their nutrition tear and mangle the unresisting prey. From principles similar to this, arises that aversion which numbers of people feel against serpents; against small animals, such as reptiles in general, and the greatest number of insects.

sects. During the credulous and susceptible period of infancy, pains have been taken to impress on our minds the frightful idea that they are venomous; that their bite is mortal; that their sting is dangerous, productive of tormenting inflammations or tumours, and sometimes fatal. These horrible prepossessions are industriously inculcated from our infancy; and often supported by dismal tales, which are greedily imbibed, and indelibly engraven on our memories. Is it then wonderful, if these false impressions have neither been corrected by future reflections nor experiments, that we should entertain, during our whole lives, an aversion for such objects, even when we have forgot the admonitions, the conversations, and examples, which have taught us to believe and to regard them as noxious beings? The frightful stories of dogs and cats, which have gone mad, and killed their masters, or which have given them mortal wounds, are more than sufficient to inspire a timorous person with an aversion for these animals; and, if the olfactory nerves of such a person be delicate, he will immediately discover the smell of them in his chamber: disturbed by the apprehension which these effluvia excite in his mind, he gives himself up to the most violent uneasiness, which is tranquillized when he is assured that the animal is no longer in the room. All this is nothing but the effect of a childish fear, founded on certain confused and exaggerated ideas of the hazard which one may run with these animals. The antipathy which some people entertain against eels, though they are eaten by others with avidity, arises from nothing but the fear of serpents, to which these fishes are in some degree similar. There are likewise other antipathies which do not originate in the imagination, but arise from some natural incongruity; such as we often remark in children, for particular kinds of viands, with which their taste is not offended, but which their stomachs cannot digest, and are therefore thrown up as soon as swallowed.

To what then are those antipathies, of which we have heard so much, reducible? Either to legendary tales, or to aversions against objects which we believe dangerous; or to a childish terror of imaginary perils; or to a dislike, of which the cause is disguised; or to a ridiculous affectation of delicacy; or to an infirmity of the stomach; in a word, to a real or pretended reluctance for things which are either invested, or supposed to be invested, with qualities hurtful to us. Too much care cannot be taken in preventing, or regulating, the antipathies of children; in familiarising them with objects of every kind; in discovering to them, without emotion, such as are dangerous; in teaching them the means of defence and security, or the methods of escaping their noxious influence: and, when the rational powers are matured by age, in reflecting on the nature of those objects which we fear, in ascertaining what has been told concerning their qualities, or in vigorously operating upon our own dispositions to overcome those vain repugnancies which we may feel.

ANTIPATHY, in ethics, hatred, aversion, repugnancy. *Hatred* is entertained against persons; *aversion*, and *antipathy*, indiscriminately against persons or things; and *repugnancy*, against actions alone. Hatred is more voluntary than aversion, antipathy, or repugnancy. These last have greater affinity with the animal constitution. The causes of antipathy are less known than those of aversion. Repugnancy is less permanent than either the one or the other. We hate a vicious character, we feel aversion to its exertions: we are affected with antipathy for certain persons at first sight; there are some affairs which we transact with repugnancy; hatred calumniates; aversion keeps us at a distance from certain persons: antipathy makes us detest them; repugnancy hinders us from imitating them.

ANTI'PATRIS, a town of Palestine, anciently called *Caphar-Saba*, according to Josephus, but named *Antipatris* by Herod the Great, in honour of his father Antipater. It was situated in a pleasant valley, in the way from Jerusalem to Cæsarea.

ANTIPELAG'IA, *f.* among the ancients, a law, Vol. I. No. 49.

whereby children are obliged to furnish necessaries to their aged parents. The ciconia, or stork, is a bird famous for the care it takes of its parents when grown old. Hence, in some Latin writers, this is rendered *lex ciconiaria*, or the stork's law.

ANTIPERISTA'SIS, *f.* [from *αντιπεριστασις*, formed of *αντι*, and *περιστασις*, Gr. to stand round.] The opposition of a contrary quality, by which the quality it opposes becomes heightened or intended; or the action by which a body, attacked by another, collects itself, and becomes stronger by such opposition; or an intention of the activity of one quality caused by the opposition of another. Thus quicklime is set on fire by the affusion of cold water; so water becomes warmer in winter than in summer; and thunder and lightning are excited in the middle region of the air, which is continually cold, and all by *antiperistasis*. This is an exploded principle in the Peripatetic philosophy.—The riotous prodigal detests covetousness; yet let him find the springs grow dry which feed his luxury, covetousness shall be called in: and so, by a strange *antiperistasis*, prodigality shall beget rapine. *Decay of Piety*.

ANTIPESTILENTIAL, *adj.* [from *anti*, and *pestilential*.] Efficacious against the infection of the plague.—Perfumes correct the air before it is attracted by the lungs; or, rather, *antipestilential* unguents, to anoint the nostrils with. *Harvey*.

ANTI'PHATES, king of the Læstrigones, who were said to be cannibals. Ulysses, returning from Troy, came upon his coasts, and sent three men to examine the country. Antiphates devoured one of them, and pursued the others, and sunk the fleet of Ulysses with stones, except the ship in which Ulysses was.

ANTI'PHLOGIS'TICS, *f.* [*αντι*, against, and *φλογισις*, inflammation.] Medicines or remedies suited to resist, diminish, or cure, inflammation, or an inflammatory diathesis of the constitution. Under which head may be classed all watery diluents, cooling saline aperients, diaphoretics, and diuretics; antimonials in small doses; but particularly *bleeding*, general and topical. Besides living on watery cooling vegetables, drinking copiously of simple watery liquids, and abstaining totally from all animal food and stimulating diet, may be classed not amongst the weakest of the materials proper for promoting the desired intent, under circumstances where antiphlogistics are required.

ANTI'PHONARY, or ANTI'PHONA'RIVM, *f.* a service-book, which contained all the inventories, responses, collects, and whatever else was sung or said in the choir, except the lessons. This is otherwise called *responsorium*, from the responses therein contained. The author of the Roman *Antiphonary* was pope Gregory the Great. By the provincial constitutions of archbishop Winchelsey, made at Merton, A.D. 1305, it is required, that one of these should be found in every church within the province of Canterbury. The use of them was forbidden by the 3d and 4th of Edward VI. c. 10.

ANTI'PHONY, *f.* the answer made by one choir to another, when the psalm or anthem is sung between two. It also sometimes denotes a species of psalmody, wherein the congregation, being divided into two parts, repeat the psalms, verse for verse, alternately. In this sense antiphony stands contradistinguished from symphony, where the whole congregation sing together. Antiphony differs from responsorium, because in this latter, the verse is only spoken by one person; whereas in the former, the verses are sung by the two choirs alternately.

ANTI'PHONY, is also used to denote the words given out at the beginning of the psalm, to which both the choirs are to accommodate their singing.

ANTI'PHONY, in a more modern sense, denotes a kind of composition made of several verses extracted out of different psalms, adapted to express the mystery solemnized on the occasion.

ANTI'PHRA'SIS, *f.* [from *αντι*, against, and *φρασις*, 9 L

a form of speech.] The use of words in a sense opposite to their proper meaning.—You now find no cause to repent, that you never dipt your hands in the bloody high courts of justice, so called only by *antiphrasis*. *South*.

ANTIPHTHISICS, *f.* [from *αντι*, against, and *φθισις*, a kind of consumption.] Remedies against a consumption.

ANTIPHTHO'RA, *f.* [from *αντι*, against, and *φθορα*, corruption.] A species of wolf's-bane, which resists corruption.

ANTIPHY'SICS, *f.* [from *αντι*, against, and *φυσας*, to blow.] Remedies against wind.

ANTIPLEURITICS, *f.* [from *αντι*, against, and *πλευριτις*, a pleurisy.] A remedy against a pleurisy.

ANTIPODAL, *adj.* Relating to the countries inhabited by the antipodes.—The Americans are *antipodal* unto the Indians. *Brown*.

ANTIPODES, *f.* [from *αντι*, against, and *ποδες*, feet.] Those people who, living on the other side of the globe, have their feet directly opposite to ours. It has no singular:

So shines the sun, though hence remov'd, as clear,
When his beams warm th' *antipodes*, as here. *Waller*.

ANTIPODES, in geography, are the inhabitants of two places on the earth which lie diametrically opposite to each other, or that walk feet to feet; that is, if a line be continued down from our feet, quite through the centre of the earth, till it arrive at the surface on the other side, it will fall on the feet of our antipodes, and *vice versa*. Antipodes are 180 degrees distant from each other every way on the surface of the globe; they have equal latitudes, the one north and the other south, but they differ by 180 degrees of longitude: they have therefore the same climates or degrees of heat and cold, with the same seasons and length of days and nights; but all of these at contrary times, it being day to the one when it is night to the other; summer to the one, when it is winter to the other, &c. they have also the same horizon, the one being as far distant on the one side as the other on the other side; and therefore, when the sun, &c. rises to the one, it sets to the other. The antipodes to London are a part a little S. of New Zealand. It has been said that Plato first started the notion of antipodes, and gave them the name; which is likely enough, as he conceived that the earth was of a globular figure: but there have been great disputes upon this point, and the fathers of the church have greatly opposed it, especially Lactantius and Augustine, who laughed at it, and were greatly perplexed to think how men and trees should hang pendulous in the air with their feet uppermost, as he thought they must do in the other hemisphere.

ANTI'POLIS, now ANTIBES, on the coast of Provence, a colony of the Massilians, near the river Verus, in Gallia Narbonensis, three leagues to the west of Nice. Lat. 43. 40. lon. 7. 0. E.

ANTIPOPE, *f.* [from *anti*, against, and *pope*.] He that usurps the popedom, in opposition to the right pope.—This house is famous in history, for the retreat of an antipope, who calls himself Felix V. *Addison*.

ANTIP'TOSIS, *f.* [from *αντιπρωσις*, of *αντι*, against, or for, and *πρωσις*, a case, Gr.] Medicines which temper and allay too much heat in fevers, as acids do; also a figure in grammar, when one case is put for another.

ANTIQUA'RE, *f.* among Roman lawyers, properly denotes the rejecting of a new law, or refusing to pass it. In which sense, *antiquating* differs from *abrogating*; as the latter imports the annulling an old law, the former the rejecting a new one. Antiquare is also used for a law's growing obsolete, or into disuse, either by age or non-ob servance.

ANTIQUA'RIL, *f.* a name given to copiers of old books. After the decline of learning amongst the Romans, and when many religious houses were erected, learning was chiefly in the hands of the clergy; the greatest number of whom were regulars, and lived in monasteries. In these houses were many industrious men, who were continually

employed in making new copies of old books, either for the use of the monastery, or for their own emolument. These writing monks were distinguished by the name of *antiquarii*. They deprived the poor librarii, or common scribes, of great part of their business, so that these found it difficult to gain a subsistence for themselves and families. This put them upon finding out more expeditious methods of transcribing books. They formed the letters smaller, and made use of more jugations and abbreviations than had been usual. They proceeded in this manner till the letters became exceedingly small; the abbreviations were very numerous, and extremely difficult to be read. This in some measure accounts for the great variety of hands in the species of writing called *Modern Gothic*. When a number of copies were to be made of the same work, it was usual to employ several persons at the same time in writing it; each person, except him who wrote the first skin, began where his assistant was to leave off.

ANTIQUARY, *f.* [*antiquarius*, Lat.] A man studious of antiquity; a collector of ancient things.—All arts, rarities, and inventions, are but the reliques of an intellect defaced with sin. We admire it now, only as *antiquaries* do a piece of old coin, for the stamp it once bore. *South*. In the chief cities of Greece and Italy, there were persons of distinction called *antiquaries*, whose business it was to shew strangers the antiquities of the place, to explain the ancient inscriptions, and to give them all the assistance they could in this way of learning. Pausanias calls these antiquaries *Εξρηγται*. The Sicilians call them *myslogogi*. There was an ancient college of antiquaries erected in Ireland by Ollamh Fodhla, 700 years before Christ, for composing a history of that country: and to this, say the Irish historians, it is owing, that the histories and antiquities of that kingdom may be traced back beyond those of most other nations. There is a society of antiquaries in London, and another in Edinburgh, incorporated by the king's charter. Henry VIII. gave John Leland the title of his antiquary; a title which, says the author of his life, no body ever enjoyed besides himself. The kings of Sweden have been at great expence to illustrate the antiquity of their country, having established an academy of antiquaries with this single view. The office of the ancient Irish antiquaries was to preserve the genealogies of the kings of Ireland, to correct the regal tables of succession, and deliver down the pedigree of every collateral branch of the royal family.

To ANTIQUATE, *v. a.* [*antiquo*, Lat.] To put out of use; to make obsolete.—Milton's *Paradise Lost* is admirable. But cannot I admire the height of his invention, and the strength of his expression, without defending his *antiquated* words, and the perpetual harshness of their sound? *Dryden*.

ANTIQUATEDNESS, *f.* The state of being antiquated, worn out of use, or obsolete.

ANTI'QUE, *adj.* [*antique*, Fr. *antiquus*, Lat. It was formerly pronounced according to the English analogy, with the accent on the first syllable; but now after the French, with the accent on the last, at least in prose; the poets use it variously.] Ancient; old; not modern:

Such truth in love as th' *antique* world did know,
In such a style as courts may boast of now. *Waller*.

Of genuine antiquity.—The seals which we have remaining of Julius Cæsar, which we know to be *antique*, have the star of Venus over them. *Dryden*. Of old fashion. Odd; wild; antic:

And sooner may a gulling weather-spy,
By drawing forth heav'n's scheme, tell certainly
What fashion'd hats, or ruffs, or suits, next year
Our giddy-headed *antique* youth will wear. *Donne*.

ANTI'QUE, *f.* An antiquity; a remain of ancient times; an ancient rarity.—I leave to Edward, now earl of Oxford, my seal of Julius Cæsar; as also another seal, supposed to be a young Hercules; both very choice *antiques*, and set in gold. *Swift*.

1. The dark flowered Toadflax. 2 and 3. Plant-lice. 4. The Chinese Bee. 5. The Virginian Bee. 6. The Surinam Bee. 7. The New York Bee. 8. *Apalus bimaculatus*. 9. the Head & Corselet of the same magnified.

ANTIQUE is sometimes contradistinguished from *ancient*, which signifies a less degree of antiquity. Thus antique architecture is frequently distinguished from ancient architecture.

ANTIQUENESS, *f.* The quality of being antique; an appearance of antiquity.—We may discover something venerable in the *antiqueness* of the work; but we would see the design enlarged. *Addison*.

ANTIQUITY, *f.* [*antiquitas*, Lat.] Old times; time past long ago.—I mention Aristotle, Polybius, and Cicero, the greatest philosopher, the most impartial historian, and the most consummate statesman, of all *antiquity*. *Addison*.—The people of old times; the ancients.—That such pillars were raised by Seth, all *antiquity* has avowed. *Raleigh*.—The works or remains of old times.—As for the observation of Machiavel, traducing Gregory the Great, that he did what in him lay to extinguish all heathen *antiquities*: I do not find that those zeals last long; as it appeared in the succession of Sabinian, who did revive the former *antiquities*. *Bacon*.—Old age; a ludicrous sense.—Is not your voice broken? your wind short? your chin double? your wit single? and every part about you blasted with *antiquity*? and will you yet call yourself young? *Shakespeare*.—Ancientness; as, This ring is valuable for its *antiquity*.

Antiquities form a very extensive science, which is indispensable to the theologian; who ought to be thoroughly acquainted with the antiquities of the Jews, to enable him properly to explain numberless passages in the Old and New Testaments: to the lawyer; who, without the knowledge of the antiquities of Greece and Rome, can never well understand and properly apply the greatest part of the Roman laws: to the physician and the philosopher, that they may have a complete knowledge of the history and principles of the physic and philosophy of the ancients: to the critic, that he may be able to understand and interpret ancient authors: to the orator and poet, who will be thereby enabled to ornament their writings with the most elevated images, allusions, comparisons, &c.

Antiquities are divided into sacred and profane, into public and private, universal and particular, &c. hence it is easy to conceive that they form a species of study equally extensive and complicated, and with which only a very small acquaintance could have been attainable by any one man, if our predecessors had not prepared the way, by leaving us such inestimable works as those of Gronovius, Grævius, Montfaucon, Count Caylus, Winckelman, the Hebraic antiquities of D. Iken of Bremen, the Grecian antiquities of Brunings, the Roman antiquities of Nieupoort, Bibliographia Antiquaria Joh. Alberti Fabricii professor at Hamburg, &c. &c. Nor must we omit to mention that valuable work of Mr. Robert Wood, entitled, The Ruins of Palmyra, and those of Balbec. Also Stuart and Revett's Antiquities of Athens; the last remains of which, in that land of elegance, must be deemed of importance in the present day, when we consider, that, in addition to the mouldering decay of all-devouring time, the present possessors of that country are converting those beautiful remains into lime, and to other uses of no higher estimation!

ANTIRRHEA, *f.* in botany. See CUNNINGHAMIA.

ANTIRRHINUM, *f.* [*antirrhinos*, *aqualis*, and *en*, *nasus*.] In botany, snap-dragon, calves-snout, or toad-flax. This is a genus of the didynamia angiospermia class, ranking in the natural order of personate. The generic characters are—Calyx: perianthium five-parted, permanent; divisions oblong, the two lower more gaping. Corolla: monapetalous, ringent; tube oblong, gibbous; limb bilabiate; upper lip bifid, reflex on the sides; lower trifid, obtuse; palate convex, usually closed by a prominence between the lips, produced from the under lip; the throat being concave beneath; nectary at the base of the corolla produced downwards, prominent. Stamina: filaments four inclosed under the upper lip, nearly of the same length with the corolla, yet two are shorter; anthers converging.

Pistillum: germ roundish; style simple, of the length and in the situation of the stamens; stigma obtuse. **Pericarpium**: capsule roundish, obtuse, two-celled, of different form and aperture in the different species. Seeds: very many; receptacles reniform, solitary, affixed to the partition.—*Essential Character*. Calyx, five-leaved; corolla, with the base produced downwards and nectariferous; capsule, two-celled.

Species. I. Leaves angular. 1. *Antirrhimum cymbalaria*, or ivy-leaved toad-flax: leaves heart-shaped, five-lobed, alternate; stalks procumbent. Root perennial, fibrose, inserting itself so into the crevices of walls and rocks as scarcely to be eradicated. Stalks numerous, growing in a tuft, creeping at bottom, branched, round, purplish, and stringy. Leaves roundish, thinning; somewhat fleshy, some opposite, others alternate, frequently purplish: lobes of the lower ones blunt, upper acute, the smallest only three-lobed. Seeds black, roundish, wrinkled like the nut of the walnut. The whole plant is smooth, and has a disagreeable smell. It varies with a white flower. Linnæus has a fancy that this plant might be produced from the impregnation of antirrhimum elatine by the pollen of campanula hederasfolia. It grows wild on old walls at Basil, Baden, and many other towns of Switzerland, where, however, Haller says, it was unknown in the time of Cherler. In Germany, as at Heidelberg; Haerlem in Holland; also about Paris, and most of the towns in the south of France. It is a native of Italy; from whence it came to us, according to Miller, and is now common on the walls in and near London, that are within reach of the Thames; as on the Temple walls, &c. and on those of the physic-garden at Chelsea; whence it probably originated about London. Dr. Richardson remarked it in the quarries about Darford in Yorkshire: and it has long grown upon the walls about the old manor-house, at Dry Drayton, in Cambridgeshire; also at Burleigh, by Stamford, &c. Johnson (in Gerard) calls it *Italian bastard navel-wort*, and does not hint at its being wild in his time. Parkinson, a few years after says, that it groweth naturally in divers places of our land. It is one of the plants adapted to the ornament of rock-work, which it will cover, if moist, with a thick tapestry; and flowers from June to October.

2. *Antirrhimum pilosum*, or hairy-leaved toad-flax: leaves kidney-shaped, very hairy, alternate; stalks procumbent. This species is found on the Alps, and is of the same size with the foregoing.

3. *Antirrhimum elatine*, or sharp-pointed toad-flax or fluellin: leaves hastate, alternate; stalks procumbent. It is more bitter than the other sorts, and the expressed juice of the plant, or the distilled water, is affirmed to check foul-ulcers. It varies with blue flowers. This grows wild in corn-fields, in Italy, Carniola, Switzerland, France, Germany, and England; flowering with us from July to October.

4. *Antirrhimum spurium*, or round-leaved toad-flax or fluellin: leaves ovate, alternate; stalks procumbent. This differs from the last, in having all the leaves ovate, or roundish, sometimes slightly toothed; and the spur shorter than the body of the corolla. It is rather a larger plant; the stems are more branched, and the leaves are more hairy. It is found among corn, and flowers at the same season with the foregoing. It grows wild in the fields of Germany, England, France, and Italy.

5. *Antirrhimum cirrhosum*, or tendrilled toad-flax: leaves hastate, alternate; stems spreading; petioles every where tendrilled. Native of Egypt. Annual.

6. *Antirrhimum Ægyptiacum*, or Egyptian toad-flax: leaves hastate, alternate; stem erect, very branching; peduncles stiffish. This resembles the third species; and is an Egyptian plant, as its name implies.

II. Leaves opposite. 7. *Antirrhimum triphyllum*, or three-leaved toad-flax: leaves ternate, ovate. This is an annual plant, which rises with an upright branching stalk near a foot and a half high, with oval smooth grey leaves, placed often by threes, and sometimes by pairs opposite.

at the joints; the flowers grow in short spikes at the top of the stalks; they are shaped like those of the common fort, but have not such long tubes: they are yellow, with saffron-coloured chaps. This fort flowers in July and August, the seeds ripen in the autumn, and the plants soon after decay. It grows naturally about Valetia and in Sicily. There is a variety of this, whose flowers have a purple standard and spur, which make a pretty appearance in a garden. The leaves of this are longer than those of the yellow. Mr. Miller also mentions a third variety, which he makes a distinct species, under the name of *linaria lusitanica*. It has spear-shaped smooth leaves, placed sometimes by fours round the stalk, and at others by opposite pairs; the stalks are terminated by large purple flowers with long spurs, standing upon foot-stalks. This grows naturally in Spain and Portugal. It flowers in July, but seldom ripens seeds in England. This species was cultivated in 1640.

8. *Antirrhinum triornithophorum*: leaves in fours, lanceolate; stem erect, branching; flowers peduncled. Flowers purple, and very large. A native of Portugal and America.

9. *Antirrhinum purpureum*, or purple toad-flax: leaves quaternate, linear; flower-bearing stem erect, spiked. Root perennial. Stem two feet high, round, smooth. Native of Italy. Ray remarked it about Naples, and particularly at the foot of Vesuvius. It was cultivated in 1648, in the Oxford garden, and flowers from July to September.

10. *Antirrhinum versicolor*, or spiked-flowered toad-flax: leaves linear-lanceolate; the lower ones ternate; stem erect, spiked. It resembles common toad-flax (No. 33), but the stems are narrower. A native of the southern countries of Europe.

11. *Antirrhinum repens*, or creeping toad-flax: leaves linear, crowded, below quaternate; calyxes equalling the capsule. This has a perennial root, from which arise several stalks near two feet high, which branch out on every side, with narrow leaves growing in clusters towards the bottom, but upwards they are sometimes by pairs, and at others single. The flowers are produced in loose spikes at the end of the stalks; they are of a pale blue colour, appear in June and July, and the seeds ripen in autumn. The flowers have no scent. According to Allioni, this differs but little from the next. The flower of that is rather less, and besides two bearded yellow lines, which run along the throat on the lower lip, it has two distinct yellow spots at the origin of the beard. In this, the flower is every where striated with purple lines: the branches are also more wand-like and crowded. The leaves are rather less in the following species. A native of Italy, France, and England: as in Hertfordshire, and about Henley in Oxfordshire.

12. *Antirrhinum Monpeffulanum*, or Montpellier toad-flax: leaves linear-filiform succulent, scattered, crowded; stem erect; spur shorter than the calyx. This has a perennial root, from which arise many branching stalks near two feet high, with very narrow leaves growing in clusters, and of a greyish colour. The flowers are produced in loose spikes at the end of the branches; they are of a pale blue, and have a sweet smell. These appear in June; and there is often a succession of flowers on the plants till winter. Hudson thinks this does not differ specifically from the foregoing. It grows wild about Montpellier, and other places in the south of France; and near Penryn in Cornwall.

13. *Antirrhinum sparteum*, or branching toad-flax: leaves awl-shaped, channelled, fleshy; the lower ones ternate; stem panicled, and corollas very smooth. It differs from the next species in having pedunculate flowers, three times greater; and in the whole plant being much larger. According to Mr. Curtis, it is a hardy annual of small stature, flowering most part of the summer: and deserves to be more generally cultivated. Some regard it as a biennial; but, as the seeds of it sown in the spring flower in the ensuing summer, and as the plant dies when it has

ripened its seeds, there appears more propriety in considering it as an annual. It will flower earlier if the seeds are sown in autumn. The upper part of the stalk, as well as the leaves of the calyx, are beset with viscous hairs, in which respect it does not perfectly accord with Linnaeus's description. Cavanilles however affirms, that the stems and the whole plant are smooth. Found in Spain, by Loeßling; very common about Madrid, in a dry sandy soil, flowering in May and June. Introduced in 1772, by M. Richard.

14. *Antirrhinum bipunctatum*, or dotted-flowered toad-flax: leaves linear, smooth; the lower ones quaternate; stem erect, panicled; flowers spike-headed. It grows wild in the corn-fields of France, Spain, and Italy; flowering in May and June. Annual.

15. *Antirrhinum triste*, or dark-flowered toad-flax: leaves linear, scattered, the inferior ones opposite; nectaries awl-shaped; flowers subsessile. A native of Spain. Introduced in 1727, by Sir Charles Wager, from Gibraltar seeds. It flowers during most of the summer months.

16. *Antirrhinum supinum*, or procumbent toad-flax: leaves subquaternate, linear; stalk diffused; flowers racemed, spur straight. A native of France and Spain, growing in sandy grounds.

17. *Antirrhinum arvense*, or yellow corn toad-flax: leaves sublinear, the lower ones quaternate; calyxes hairy, viscid; flowers spiked, stem erect. Grows wild in the sandy corn-fields of Italy, France, Germany, and England: annual; flowering with us in July and August. It varies in the colour of its flowers, blue and yellow.

18. *Antirrhinum pelisserianum*, or violet-coloured toad-flax: stem-leaves linear, alternate; root-leaves lanceolate, ternate; flowers corymbed. A native of France and Italy. Cultivated in 1640.

19. *Antirrhinum saxatile*, or rock toad-flax: leaves lanceolate-linear, scattered, villose, the inferior quaternate; stem decumbent; flowers spiked. Native of Spain.

20. *Antirrhinum viscosum*, or clammy snap-dragon: root-leaves quaternate, lanceolate; stem-leaves linear, alternate; calyxes villose, approximating the stem. An erect plant the stature of No. 18, but the flowers the size of No. 33. A native of Spain. Annual.

21. *Antirrhinum multicaule*, or many-stalked toad-flax: leaves quinate, linear, fleshy; flowers headed. This is an annual plant, from whose root arise many stalks which are lax, rushy, very slender, and about a foot high: on their lower part, they have five very narrow, linear, obtuse, leaves at each joint; but upwards they are sometimes by pairs, and sometimes single: the stalks are divided into many small branches, with little yellow flowers coming out singly, at a distance from each other; these appear in July, and the seeds ripen in August. There are two varieties, one with a deep yellow, and the other with a sulphur-coloured, flower. A native of Sicily, and the Levant.

22. *Antirrhinum glaucum*: leaves quaternate, awl-shaped, fleshy; stems erect; flowers spiked. An annual plant. Native of the south of Europe and the Levant.

23. *Antirrhinum Alpinum*, or Alpine toad-flax: leaves quaternate, linear-lanceolate, sea-green; stem diffuse; flowers racemed, with a straight spur. Root perennial. Stems slender, branching at bottom, growing thicker towards the top, from two to seven inches long, ascending, round, and smooth. Leaves quite entire, without veins, and thick; the lowest smaller, and in fours; the upper ones solitary, or two opposite, or sometimes three. Flowers very elegant, of a fine violet purple colour, with a rich gold-colour in the middle; and are in blow most part of the summer. Native of the Alps in moist rocky places. It has a bitter disagreeable taste.

24. *Antirrhinum bicorn*, or horned toad-flax: leaves opposite, ovate-oblong, serrate; stem erect, flowers racemed, capsules two-horned. Annual. A native of the Cape of Good Hope.

25. *Antirrhinum villosium*: all the leaves opposite, ovate, villose; stems simple; flowers opposite, lateral. Observed in Spain by Alstroemer. Perennial.

26. *Antirrhinum*

26. *Antirrhinum origanifolium*: leaves mostly opposite, oblong; flowers alternate. Annual; growing wild on the Pyrenees, and near Marfeilles.

27. *Antirrhinum pinnatum*: leaves opposite, pinnatifid; stem erect, flowers racemed. Found at the Cape by Thunberg.

III. Leaves alternate. 28. *Antirrhinum minus*, or smaller toad-flax: leaves mostly alternate, lanceolate, obtuse; stem very much branched, diffuse. Annual; growing wild in corn-fields, dry-pastures, on walls, &c. in most parts of Europe, and flowering from June to September.

29. *Antirrhinum dalmaticum*: leaves alternate, heart-shaped, stem-clasping. This rises with a strong woody stalk, three feet high, having smooth spear-shaped leaves, placed alternately, and sitting close to the stalk. The flowers are produced at the end of the branches in short loose spikes; these are of a deep yellow colour, much larger than those of the common sort, and stand upon short foot-stalks. It flowers in July, but the seeds very rarely ripen in England, so that the plants are seldom seen in any gardens here. According to Linnaeus, the flowers proceed from the axils of the leaves, are solitary and peduncled. A native of Crete, also of Armenia, whence it was known to Caspar Bauhin, in 1594.

30. *Antirrhinum hirtum*, or hairy toad-flax: leaves lanceolate, shaggy; flowers spiked, the upper leaf of the calyx largest. This is an annual plant, which rises with a single stalk, about a foot and a half high, with hairy spear-shaped leaves, sitting close to the stalk, and placed alternately. The flowers grow on the top of the stalks in loose spikes; they are of a pale yellow colour, with a few dark stripes, and the chaps are of a gold colour; the upper segment of the calyx is much larger than the lower. The flowers are as large as those of the common sort; they appear in July, and the seeds will in warm seasons ripen in autumn in England. Native of Spain.

31. *Antirrhinum genitifolium*, or broom-leaved toad-flax: leaves lanceolate, acuminate; panicle wand-like, flexuose. It is a native of Siberia, Lower Austria, Switzerland, Dauphiné, and Piedmont.

32. *Antirrhinum junceum*, or rush-stalked toad-flax: leaves linear, alternate; stem paniced, wand-like; flowers racemed. Height half a yard. Found in Spain by Loe-fling. Introduced in 1780 by M. Thouin.

33. *Antirrhinum linaria*, or common yellow toad-flax: leaves lanceolate-linear, crowded; stem erect; spikes terminal, sessile; flowers imbricate. Root perennial, hard, woody, creeping. Stems several, from one to two feet high, full of leaves, round and smooth. Leaves pointed, smooth, bluish, growing without order. Flowers yellow, with the palate orange, villose; in a thick terminal spike. It grows wild in Europe on banks by road-sides, and in dry pastures; flowering from June to August. In Worcester-shire it is called *butter-and-eggs*. Gerard names it *wild-flaxe*, *toad-flaxe*, and *flaxe-weede*. It has these appellations from the similitude of the leaves to those of flax. It abounds in an acrid oil, that is almost empyreumatic. Given inwardly, it excites a nausea, purges, and provokes urine. It is recommended in hydropical cases, but Haller and others do not much approve of it. The juice, mixed with milk, is a poison to flies. The distilled water or juice of the plant, put into the eyes, is said to take away inflammations: but it is most approved, used as a cataplasm, with lard, in the piles.

34. *Antirrhinum linifolium*: leaves lanceolate, three-nerved, flowers racemed, peduncles distant shorter than the bracte. This species is found on the sea-coasts of Italy. Perennial.

35. *Antirrhinum chalapense*, or white-flowered toad-flax: leaves linear-lanceolate, alternate; flowers in racemes; calyxes longer than the corolla; stem erect. This is an annual plant, which rises with a branching stalk, two feet high, having very narrow lanceolate leaves placed alternately. The flowers are small, white, and have very long spurs. This flowers in July, and the seeds ripen in

autumn. Grows naturally in Sicily, Italy, and near Montpellier. It was cultivated in 1680, in the Oxford garden.

36. *Antirrhinum reflexum*: leaves ovate, smooth; peduncles axillary, fruit-bearing, elongate, recurved; stem procumbent. Root annual. Common in vineyards and gardens about Messina, flowering in May and June; and was found in Barbary by Bander.

37. *Antirrhinum pedunculatum*: leaves linear, remote; flowers paniced; peduncles longer than the leaf, stiff and upright. Observed in Spain by Alstromer.

38. *Antirrhinum lagopodioides*: leaves scattered, soft, recurved at the tip; spikes ovate, villose. A native of Siberia.

IV. Leaves none. 39. *Antirrhinum aphyllum*: a capillary scape. This is a very singular plant, and has no appearance of an herb, but would rather be taken for a kind of moss, and is not bigger than that. It has not even any radical leaves. Found near the Cape by Thunberg.

V. Corollas gaping or tailfe. 40. *Antirrhinum majus*, or great toad-flax or snap-dragon: corollas tailfe, flowers in spikes, calyxes rounded. There are several varieties of this species. The differences in the colour of the flowers are endless: the most known are red, yellow purple, white; red with white or yellow mouths, white and red, yellow and red, yellow and white, purple and white, purple with yellow mouths, scarlet dotted with gold colour, &c. The flowers are also sometimes double; and there is a variety with variegated leaves. Native of the southern countries of Europe, in hedges and on rocks and ruins. With us on walls, on Dover cliffs, between Northfleet and Gravesend, &c. but not originally of this country. It flowers in June and July. In Russia they express an oil from the seeds, little inferior to oil of olives.

41. *Antirrhinum orontium*, or small toad-flax or calves-snout: corollas tailfe, flowers subspiked, calyxes longer than the corolla. This resembles the great snap-dragon in many respects. It is a poisonous plant: and is sufficiently distinguished from the great snap-dragon in being smaller and annual, and by having long pointed leaves to the calyx. A native of England, and most parts of Europe, growing in corn-fields and vineyards, especially in a light soil. Flowers in July and August.

42. *Antirrhinum papilionaceum*: corollas tailfe, flowers axillary, calyxes papilionaceous, leaves fleshy. Native of Persia.

43. *Antirrhinum asarina*, or heart-leaved toad-flax: corollas tailfe, leaves opposite, heart-shaped, crenate; stems procumbent. This is a low, trailing, annual, plant; the branches extend little more than a foot each way, and are weak, so that, unless they are supported, they lie on the ground; these have leaves like those of ground-ivy, which grow by pairs: at the wings of the leaves the flowers come out singly on each side the stalk; they are shaped like those of snap-dragon, but have a long tube; are of a worn-out purple colour at the top, but below of an herbaceous colour. These come out in June, and the seeds ripen in September. It is a native of Italy and the south of France, and was cultivated in 1699 by Jacob Bobart.

44. *Antirrhinum molle*, or woolly-leaved toad-flax or snap-dragon: corollas tailfe, leaves opposite, ovate, tomentose, stems procumbent. Native of Spain.

45. *Antirrhinum unilabiatum*: corollas tailfe, with two calluses; leaves alternate, pinnate; stem paniced. Found near the Cape by Thunberg.

VI. Corollas gaping. 46. *Antirrhinum bellidifolium*, or daisy-leaved toad-flax: root-leaves tongue-shaped, toothed, marked with lines; stem-leaves parted, quite entire. This is a biennial, or at most a triennial, plant, which frequently perishes soon after the seeds are ripe. A native of Spain, Italy, and the south of France: also found near Geneva by M. de Saussure. It was cultivated in 1629.

47. *Antirrhinum Canadense*, or Canada toad-flax: leaves linear, alternate, lower lip spreading out flat. Root fibrose, annual. Native of Virginia and Canada.

New species. 48. *Antirrhinum micranthum*, or small flowered

flowered toad-flax: stem herbaceous upright, lower leaves in fours, upper ones alternate, flowers very small, spur short interior. Root annual. Native of Spain near Madrid; flowering there in March and April.

49. *Antirrhinum reticulatum*, or reticulate toad-flax: leaves linear channelled scattered, those on the radical shoots generally in fives, calyx hairy, flower-stalks shorter than the bractes. Root perennial, branched. It was discovered in Algiers by professor Desfontaines, of Paris, who sent it to the royal garden, whence the seeds were communicated to Dr. Smith, by M. Thouin.

50. *Antirrhinum pygmaeum*, or dwarf toad-flax: leaves sagittate, peduncles capillaceous. This has the appearance of *convolvulus arvensis*, but is much smaller.

51. *Antirrhinum ærugineum*: lower leaves in fours linear, flowers in racemes, the upper leaflet of the calyx twice as long as the rest. This is an annual plant. Native of Spain.

52. *Antirrhinum hexandrum*: leaves opposite cordate-ovate serrate, peduncles axillary one-flowered. Native of the island of Otaheite in the South Seas.

Propagation and Culture. Ivy-leaved toad-flax will thrive in any soil or situation, so that, where it is once established, it will be difficult to root it out, for the seeds will get into any joints of walls, &c. and there grow and propagate themselves plentifully. The stalks also put out roots at their joints, and thus spread themselves to a great distance. The seeds of the third and fourth sorts ripen in autumn, and should be sown, or permitted to scatter, at that time: if they are sown in the spring, they seldom grow the same year. They are weeds in corn-fields, but are rarely seen among spring-sown corn, in those lands where they commonly grow. If some of the seeds of the three-leaved toad-flax are sown in autumn upon a warm dry border, the plants will live through the winter, unless the frost proves very severe; and will grow larger, flower earlier, and afford good seeds. Such of the plants as are not natives of Britain may be easily propagated, for they require but little care, except the fifteenth and twenty-ninth sorts; which should be placed under a common hot-bed frame during the winter, letting them enjoy as much free air as possible in mild weather: the twenty-third also succeeds best in a pot or on rock-work; and it is apt to be lost, like other small Alpine plants, for want of proper treatment and care. Common toad-flax is seldom cultivated in gardens; for it is a very troublesome plant to keep within bounds, the roots being very apt to spread. The flowers however make a pretty appearance; a few plants therefore might be allowed a place, especially if the roots were confined in pots. All the varieties of snapdragon are raised from seeds, which should be sown in a dry soil, not too rich, either in April or May; and in July the plants may be planted out into large borders, where they will flower the spring following; or they may be sown early in the spring, for flowering the same autumn, but then they are not so likely to endure the winter; and, if the autumn prove bad, they will not perfect their seeds. Any of the sorts may be continued, by planting cuttings in the summer months, which will easily take root. They are all pretty ornaments in a garden, and, requiring very little culture, are rendered more acceptable. They are hardy plants, and will resist the cold of our winters extremely well, especially if they are planted on a dry, gravelly, or sandy, soil: for, when they are planted in a rich moist soil, they will grow very luxuriant for a time, but are very subject to rot in autumn or winter; and are much more susceptible of cold, than when they are in a dry, hungry, rocky, soil; these plants will grow amongst stones, or the joints of old walls, where they may be placed so as to render some object part of a garden very agreeable, for they will continue in flower several months; and, if the seeds are permitted to shed, there will be a continual supply of young plants, without any trouble. Wherever these plants are designed to grow on walls, or on a rocky barren soil, the seeds should be sown the beginning of

March, where they are designed to remain; for if the plants are first raised in a better soil, and afterward transplanted into those places, they seldom succeed well. When the plants are come up, they will require no other culture but to keep them clear from weeds; and, where they come up too thick, to pull some of them out, so as to give them room to grow. In July they will begin to flower, and will continue flowering till the frost prevents them. Those plants which grow on walls will have strong woody stems, which will continue two or three years or more, and are rarely hurt by frost.

ANTIRRHINIUM, a promontory at the mouth of the Corinthian bay, where it is scarcely a mile broad, and where it separates the Ætolians from the Peloponnesus; so called from its opposite situation to Rhium in Peloponnesus: both are now called the *Dardanelles of Lepanto*.

ANTISABBATARIANS, a modern religious sect, who oppose the observance of the Christian sabbath. The great principle of the Antisabbatarians is, that the Jewish sabbath was only of ceremonial, not moral, obligation; and consequently is abolished by the coming of Christ.

ANTISAGOGE, *f.* in rhetoric, a figure differing little from that called *concession*. The following passage from Cicero is an instance of it: *Difficilis ratio belli gerendi; at plena fidei, plena pietatis: et si dicas, magnus labor, multa pericula proponuntur; at gloria ex his immortalis est consecutura.*

ANTISCII, *f.* [from *anti* and *σκια*, Gr.] In geography, the people who inhabit on different sides of the equator, who consequently at noon have their shadows projected opposite ways. Thus the people of the north are *antiscii* to those of the south; the one projecting their shadows at noon toward the north pole, and the other toward the south pole. The word has no singular.

ANTISCIANS, *f.* in astrology, certain degrees in the zodiac, answering one to the other.

ANTISCORBU'TIC, *adj.* [from *anti*, and *scorbutum*, Lat. the scurvy.] Good against the scurvy.—The warm *antiscorbutics*, animal diet, and animal salts, are proper. *Arbutus*.

ANTISCORBU'TICAL, *adj.* [from *anti*, and *scorbutum*, Lat. the scurvy.] Good against the scurvy.—The warm *antiscorbutical* plants, in quantities, will occasion stinking breath, and corrupt the blood. *Arbutus*.

ANTISEPTICS, *f.* [from *anti*, against, and *σηπτικα*, Gr. *septica*, or purifiers.] Such things as resist or correct putrefaction. A complete putrefaction is not a complaint of the human machine that can be an object of practice, because it cannot take place in any considerable portion of the body without extinguishing life: it is therefore a tendency to it in any considerable degree, which, producing various morbid disorders, requires the utmost aid of the medical art to prevent. Now, as this tendency may be brought on by excess of heat and motion, as well as receiving any ferment into the vascular system; and as, when once fixed, and begun to exert its deleterious action, it induces languor and great debility in the moving powers: the reason may be observed, why our antiseptic class of medicines exhibit, according to the conception received of their action, such apparently contradictory views; for we find both volatile and neutral salts in the same arrangement; the former considered as highly heating, and strongly stimulant of the moving powers; the other, cooling the system, and mitigating vascular action. Hence then it is apparent, that they are only applicable in different states of putrescent action, or in different constitutions affected with putrescency. And not unlikely the same may hold good with acids and alkalies; for they are both enumerated under antiseptics. They have been properly divided into four heads: 1. *Such as are cooling*: acid salines, neutral salts. 2. *Stimulant*: wine, alcohol, oil of turpentine. 3. *Tonic*: Peruvian bark, wormwood, chamomile. 4. *Antispasmodic*: camphor, assafoetida, musk. All which furnish examples of the particular divisions. From the nature of these, we readily know in what particular states each is inapplicable: where there is peculiar sensibility of

the stomach, the *tonic* are to be avoided; the *refrigerant*, where a debility of the vital powers is manifest; the *stimulant*, when there is too great a degree of irritability, the circulation too highly accelerated, and strong disposition to profuse bleeding; the *sedative antispasmodics*, when there is too languid a circulation, a lethargic disposition, or a considerable degree of torpor in the system. See Machride's Essay on the respective Powers of Antiseptics, &c. Remarks on Mr. Alexander's Essays on Putrid Diseases; Cullen's *Materia Medica*; Wallis on Health and Disease.

ANTISO'PHIST, *f.* [*antisophistes*, Lat. *antisophistes*, Gr. of *anti*, against, and *sophistes*, a sophister.] A counter-sophister, one that disputes on the contrary.

ANTISPA'SIS, *f.* [from *anti*, against, and *σπασω*, to draw. Gr.] A revulsion. The turning the course of the humours whilst they are actually in motion. The doctrine of revulsion is the invention of Hippocrates.

ANTISPASMODICS, *f.* [from *anti*, against, and *σπασμος*, Gr. a convulsion.] Medicines suited to cure spasmodic affections. Some remove spasms by immediate contact, as asses milk, cream, oil of almonds, &c. others by repelling animal heat, as the gas sulphuris, nitre, sal ammoniac, &c. and where the strictures are produced by inanition, or defective vital heat, spasms are removed by those means that restore the vis vitæ, such as valerian, castor, musk, &c. Opium, balsam. Peruv. and the essential oils of many vegetables, are the most powerful of this kind. Opium, for its immediate effects, excels; balf. of Peru, in many instances, produces more lasting benefit than opium, and indeed it sometimes succeeds where opium hath failed; the essential oils differ as *antispasmodics* from opium; in this, they act more upon a particular part than upon the system in general, and have no soporific effect.

Antispasmodics are a very uncertain species of medicines in their effect on the disorders for which they are generally esteemed useful. They are best adapted for those spasmodic affections which are attended with great mobility, and which are usually known by the name of spasmodic diseases. They are more useful in preventing the approach, and in removing spasms which are more immediately present in weaker habits; and in preventing the returns of spasms when given in the remission of the spasm in strong habits: on the contrary, they are less useful in preventing the return of spasms in weak habits than in stronger ones; nay, they rather increase the tendency to spasmodic complaints in weakly people, if given in the interval of those disorders; and are less useful in removing the present fit, in strong habits, than they are in weak ones. Sometimes, indeed, in strong habits, they both remove the present fit and prevent returns. Cullen's *Mat. Medica*.

ANTISPAS'TIC, *adj.* [from *anti*, and *σπασμος*, Gr.] Medicines which cause a revulsion of the humours.

ANTISPLENE'TIC, *adj.* [from *anti* and *splenetic*.] Efficacious in diseases of the spleen.—*Antisplenetics* open the obstructions of the spleen. *Floyer*.

ANTISTA'SIS, *f.* in oratory, a defence of an action from the consideration that had it been omitted worse would have ensued. This is called by Latin writers *comparativum argumentum*; such, *e. gr.* would be the general's defence who had made an inglorious capitulation. That, without it, the whole army must have perished.

ANTIS'THENES, a Greek philosopher, and founder of the Cynics. He was born at Athens, and passed the early part of his life as a soldier. Having afterwards been an attendant at the lectures of Socrates, he was principally charmed with those exhortations of that great philosopher, which persuaded to frugality, to temperance, and to moderation: these Antisthenes was resolved to practise by carrying every precept to its utmost extent. Permitting therefore his beard to grow, he went about the streets in a thread-bare coat, scarcely to be distinguished from a common beggar. He prided himself upon the most rigid virtue, and thought himself obliged to attack the vicious

wherever he found them. His philosophy consisted rather in action than speculation: it was therefore his constant maxim, That to be virtuous was to be happy, and that all virtue consisted in action; that the wise man should live for himself, contented in all situations, and happy alone in the consciousness of his own virtue. He acknowledged nothing to be good but what was honourable; and asserted, that virtue might be acquired by practice. Laertius tells us that his works consisted of ten volumes, and he has given us many of his apophthegms.

ANTISTOE'CHON, *f.* in grammar, the using one letter instead of another; as *olli* for *illi*.

ANTI'STROPHE, *f.* [*αντιστροφη*, from *anti*, the contrary way, and *στροφη*, Gr. turning.] In an ode supposed to be sung in parts, the second stanza of every three, or sometimes every second stanza; so called because the dance turns about. In prose, it is a figure by which two things mutually depending on one another are reciprocally converted; as, The servant of the master, the master of the servant.

ANTISTRUMA'TIC, *adj.* [from *anti*, and *struma*, a scrophulous swelling.] Good against the king's evil.—I prescribed him distilled milk, with *antistrumatics*, and purged him. *Wiseman*.

ANTITACTÆ, *f.* in church history, a branch of Gnostics, who held, that God was good and just, but that a creature had created evil; and consequently that it is our duty to oppose this author of evil, in order to avenge God of his adversary.

ANTI'THESIS, *f.* in the plural *antitheses*. [*αντιθεσις*, Gr. placing in opposition.] Opposition of words or sentiments; contrast:

I see a chief, who leads my chosen sons,
All arm'd with points, *antitheses*, and puns.

Pope.

Such also is that of Cicero, in the second *Catilinarian*: "On one side stands modesty, on the other impudence; on one fidelity, on the other deceit; here piety, there sacrilege; here continency, there lust, &c." Such also is that of Augustus to some seditious young men: *Audite, juvenes, senem, quem juvenem senes audire.* Such again is that of Seneca: *Cura laves loquunter, ingentes stupent.* Many ancient writers seem greatly to affect antitheses; but among the moderns they are generally decried. The following, however, is an example of modern antithesis:

Though gentle, yet not dull;
Strong, without rage; without o'erflowing, full. *Denham.*

ANTI'THESIS, is sometimes used for controversy. In this sense, we meet with *antithetic* method, *antithetic* discourses; &c. Marcion composed a volume of *Antitheses*, or contrarieties and oppositions between the law and the gospel.

ANTITRINITA'RIANS, *f.* those who deny the Trinity, and teach that there are not three persons in the God-head. Thus the Samosatrenians, who do not believe the distinction of persons in God; the Arians, who deny the divinity of the Word; and the Macedonians, who deny that of the Holy Spirit; are all properly antitrinitarians. Among the moderns, antitrinitarians are particularly understood of Socinians, called also Unitarians.

ANTI'TYPE, *f.* [*αντιτυπος*, Gr.] That which is resembled or shadowed out by the type; that of which the type is the representation. It is a term of theology.—When once upon the wing, he soars to an higher pitch, from the type to the *antitype*, to the days of the Messiah, the ascension of our Saviour, and, at length, to his kingdom and dominion over all the earth. *Burnet*. The word *antitype* occurs twice in the New Testament; viz. in the Epistle to the Hebrews, ix. 24. and in St. Peter, i Eph. iii. 21. where its genuine import has been much controverted. The former says, that "Christ is not entered into the holy places made with hands, which are *αντιτυπα*, the figures or antitypes of the true—now to appear in the presence of God for us," Now *τυπος*, signifies the pater-
by

by which another thing is made; and as Moses was obliged to make the tabernacle, and all things in it, according to the pattern shewed him in the mount; the tabernacle so formed was the antitype of what was shewn to Moses: any thing, therefore, formed to a model or pattern, is an antitype.

AN'TITYPE, among the ancient Greek fathers, and in the Greek liturgy, is also applied to the symbols of bread and wine in the sacrament.

ANTI'TYPICAL, *adj.* that which relates to an antitype; that which explains the type.

AN'TIUM, anciently a city of the Volsci, situated on the Tuscan sea. The Romans gained their first reputation in naval affairs against the Antiates; part of whose ships they conveyed into the arsenal of Rome, and part they burnt; and with their beaks or rostra adorned the pulpit erected in the forum, thence called *rostra*. Here stood a famous temple of Fortune. Addison says, there were two Fortunes worshipped at Antium.—It is now extinct, but the name still remains in the *Capo d'Anzo*.

ANTI'VARI, a strong town of Turkey, in Europe, in Dalmatia, a Greek archbishop's see, and subject to the Turks. Lat. 43. 0. N. lon. 29. 15. E.

ANTIVENE'REAL, *adj.* [from *anti* and *venereal*.] Good against the venereal disease.—If the lues be joined with it, you will scarcely cure your patient without exhibiting *antivenereal* remedies. *Wifman*.

ANTLER, *f.* [andouillier, Fr.] Properly the first branches of a stag's horns; but, popularly and generally, any of his branches. BROW-ANTLER, denotes the branch next the head; and, BES-ANTLER, the branch next above the brow-antler.

ANT'LIA, *f.* an ancient machine, supposed to be the fame with our pump. Hence the phrase in *antliam condemnari*, according to the critics, denotes a kind of punishment, whereby criminals were condemned to drain ponds, ditches, or the like.

ANTOE'CI, *f.* It has no singular. [Lat. from *αντι*, and *οικω*, Gr. to inhabit.] In geography, those inhabitants of the earth who live under the same meridian, and at the same distance from the equator; the one toward the north, and the other to the south. Hence they have they same longitude, and their latitude is also the same, but of a different denomination. They are in the same semicircle of the meridian, but opposite parallels. They have precisely the same hours of the day and night, but opposite seasons; and the night of the one is always equal to the day of the other.

ANTO'INE (St.), a small town of France, in the department of Here, and late province of Dauphiny; 13 miles E. of Lyons. Lat. 45. 43. N. lon. 5. 20. E.

ANTONA, a river of Britain, which Camden supposes to be a faulty reading for Avuona, or Aufona, the Avon.

ANTON'ACUM, or ANTUN'NACUM, *f.* a town of the Treveri; now *Andernach*, below Coblenz. Lat. 50. 25. N. lon. 7. 5. E.

ANTON'IA, *f.* a citadel of Jerusalem, the origin of which we have in Josephus; who says, that Hyrcanus, the first high-priest of that name, built Baris near the temple, a house with turrets, where he generally resided. Herod afterwards made it stronger, for the security and defence of the temple; and in honour of Marc Antony, who then commanded in the east, called it *Antonia*.

ANTONIAN WATERS, *f.* medicinal waters of Germany, very pleasant to the taste, and esteemed good in many chronic and hypochondriac cases.

ANTONIA'NO (Silvio), a man of great learning, who raised himself from a low condition by his merit, was born at Rome in the year 1540. When only ten years old, he could make verses upon any subject proposed to him. The duke of Ferrara, coming to Rome, was so charmed with his genius, that he carried him to Ferrara, and provided able masters to instruct him in all the sciences. From thence he was sent for by Pius IV. who made him professor of the belles lettres in the college at Rome. Antoniano filled this place with so much reputation, that, on

the day of his oration *pro Marco Marcello*, he had a vast crowd of auditors, and among them no less than twenty-five cardinals. He was then chosen rector of the college; and, after the death of Pius IV. he joined himself to Philip Neri, and accepted the office of secretary to the sacred college, offered him by Pius V. which he executed for 25 years with the reputation of an honest and able man. He refused a bishopric which Gregory XIV. would have given him; but he accepted the office of secretary to the briefs, offered him by Clement VIII. who made him his chamberlain, and afterwards a cardinal. Antoniano is said to have died of fatigue: for he spent whole nights in study, which brought on his death, in the 63d year of his age.

ANTONI'DES VANDER GOES (John), an eminent Dutch poet, born at Goes in Zealand, the 3d of April, 1647. His parents were people of good character, but of low circumstances. They went to live at Amsterdam when Antonides was about four years old; and in the ninth year of his age he began his studies, under the direction of Hadrian Junius and James Coccius. Antonides took great pleasure in reading the Latin poets, and carefully compared them with Grotius, Heinsius, &c. By this means he acquired a taste for poetry, and enriched his mind with elegant ideas. He undertook one of the most difficult tasks in poetry, to write a tragedy: this was *Tragizil*, or *The invasion of China*. Antonides, however, was so modest, as not to permit it to be published. Vondel, who was then engaged in a dramatic piece, which was taken also from some event that happened in China, read Antonides's tragedy; and was so well pleased with it, that he declared, if the author would not print it, he would take some passages out of it, and make use of them in his own tragedy. He accordingly did so; and it was reckoned much to the honour of Antonides, to have written what might be adopted by so great a poet as Vondel. Upon the conclusion of the peace between Great Britain and Holland, in the year 1674, Antonides wrote a piece, intitled *Bellona aan band*, i. e. "Bellona chained;" a very elegant performance. He next wrote an ingenious heroic poem, intitled *The River Y*, (the river on which Amsterdam is built.) Antonides soon gained the esteem and friendship of several persons of distinction; particularly of Mr. Buifero, one of the lords of the admiralty at Amsterdam, who sent him at his own expence to the university of Leyden, where he remained till he took his degree of doctor of physic, and then his patron gave him a place in the admiralty. In 1678, Antonides married Susanna Bermans, a minister's daughter, who had also a talent for poetry. After marriage, he did not much indulge his poetic genius; and within a few years he fell into a consumption, of which he died on the 18th of September, 1684, being but thirty-seven years and a few months old. He is esteemed the most eminent Dutch poet after Vondel. His works were collected by father Anthony Tanfz. The best edition was printed by Nicholas Ten Hoom, at Amsterdam, in 1714, in 4to.

ANTONIN'US PIUS, the Roman emperor, was born at Lanuvium in Italy, A. C. 86, of a family originally from Nifnes in Languedoc. His character was in all respects one of the most amiable that can be imagined; and he had the title of *Pius* given him by the senate. We have no regular account of the transactions of his reign, since Capitolinus has written in a very confused manner, and we have only an abridgment of Dion Cassius's history by Xiphilin now extant. He managed the public revenues with great frugality, yet was extremely generous; was fond of peace, and in war preferred the reputation of justice to all the advantage which might be gained by victory. He was more intent upon preserving the bounds of his empire than extending them; and he often made use of Scipio's expression, That he chose rather to save one citizen than kill a thousand enemies. By this conduct he made himself universally esteemed and revered in that age, and admired by posterity. This great and good emperor died in 161, aged 75 years, having reigned 23.

ANTONINUS

ANTONINUS PIUS

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ANTONINUS PHILOSOPHUS (Marcus Aurelius), the Roman emperor, born at Rome, the 26th of April, in the 121st year of the Christian æra. He was called by several names till he was admitted into the Aurelian family, when he took that of Marcus Aurelius Antoninus. Adrian, upon the death of Cejonius Commodus, turned his eyes upon Marcus Aurelius; but, as he was not then 18 years of age, and consequently too young for so important a station, he fixed upon Antoninus Pius, whom he adopted, upon condition that he should likewise adopt Marcus Aurelius. The year after this adoption, Adrian appointed him questor, though he had not yet attained the age prescribed by the law. After the death of Adrian, Aurelius married Faustina, the daughter of Antoninus Pius, by whom he had several children. In the year 139, he was invested with new honours by the emperor Pius, in which he behaved in such a manner as endeared him both to the prince and the people.

Upon the death of Pius, which happened in the year 161, he was obliged by the senate to assume the government; in the management of which he took Lucius Verus as his colleague. Dion Cassius says, that the reason of this was, that he might have leisure to pursue his studies, and on account of his ill state of health; Lucius being of a strong vigorous constitution, and consequently more fit for the fatigues of war. The same day he took upon him the name of Antoninus, which he gave likewise to Verus his colleague, and betrothed his daughter Lucilla to him. The two emperors discharged the government in a very amicable manner; but the happiness Rome enjoyed under them was interrupted, in the year 162, by a dreadful inundation of the Tiber, which destroyed a vast number of cattle, and occasioned a famine. The calamity was followed by the Parthian war; and at the same time the Catti ravaged Germany and Rhetia. Lucius Verus went in person to oppose the Parthians; and Antoninus continued at Rome, where his presence was necessary. The Romans having gained a victory over the Parthians, who were obliged to abandon Mesopotamia, the two emperors triumphed over them at Rome in the year 166; and were honoured with the title of *Fathers of their country*. This year was fatal, on account of a famine under which Rome laboured: it was now that the Marcomanni, and many other people of Germany, took up arms against the Romans; but the two emperors, having marched in person against them, obliged the Germans to sue for peace. The war, however, was renewed the year following, and the two emperors marched again in person; but Lucius Verus was seized with an apoplectic fit, and died at Altinum. The Romans were now defeated with great slaughter; and the emperor, not choosing to burden his subjects with new taxes, exposed to public sale the furniture of the palace, the gold and silver plate belonging to the crown, and his wife's rich garments embroidered with gold, and a curious collection of pearls, which Adrian had purchased during his long progress through the provinces of the empire, and was called *Adrian's cabinet*. In 175, Antoninus made a treaty with several nations of Germany. Soon after, Avidius Cassius, governor of Syria, revolted; but this insurrection was put an end to by the death of Cassius, who was killed by a centurion named *Anthony*. In this affair Antoninus behaved with great lenity: he would not put to death, nor imprison, nor even sit in judgment himself upon, any of the senators engaged in this revolt. He wrote also to the senate, desiring them to act with indulgence rather than severity; not to shed the blood of any person whatsoever, but to allow this honour to his reign, that, even under the misfortune of a rebellion, none had lost their lives, except in the first heat of the tumult. In 176, Antoninus visited Syria and Egypt. He staid several days at Smyrna; and, after he had settled the affairs of the east, went to Athens, on which city he conferred several honours. From thence he returned to Rome with his son Commodus; and on the 23d of December, he entered Rome in triumph, with Commodus, on account of the

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victories gained over the Germans. Dion Cassius tells us, that he remitted all the debts which were due to himself and the public treasury during 46 years, and burnt all the writings relating to those debts. He applied himself likewise to correct many enormities, and introduced several excellent regulations. In the year 179, he left Rome to go against the Marcomanni, and other barbarous nations; and the year following gained a considerable victory over them; after which he was seized with an illness, which carried him off on the 17th of March, 180, in the 59th year of his age, and 19th of his reign. The whole empire regretted the loss of so valuable a prince, and paid the greatest honour to his memory: he was ranked amongst the gods, and almost every person had a statue of him in their houses. His book of meditations is much admired.

ANTONINUS'S WALL, the name of the third rampart or defence built by the Romans against the incursions of the North Britons. It is called by the people in the neighbourhood, *Graham's Dyke*; from the notion that one Graham, or Grimus, first made a breach in it after the retreat of the Romans out of Britain. The great number of inscriptions which have been found in or near the ruins of this wall, to the honour of Antoninus Pius, leave us no room to doubt its having been built by his direction and command. It reached, as some imagine, from Caer-riden on the frith of Forth to Old Kirkpatrick on the Clyde; or, as others think, from Kinniel on the east, to Dunglass on the west. These different suppositions hardly make a mile of difference in its length, which, from several actual mensurations, appears to have been 37 English or 40 Roman miles. It is not a little surprising, that though it is now more than 1600 years since this work was finished, and more than 1300 since it was slighted, we can yet discover, from authentic monuments which are still remaining, by what particular bodies of Roman troops almost every part of it was executed. This discovery was made from inscriptions upon stones, which were originally built into the face of the wall, and have been found in or near its ruins. And, though we cannot discover exactly how many years this wall continued to be the boundary of the Roman territories in Britain, yet we know with certainty that it was not very long. For we are told by an author of undoubted credit, that, in the reign of Commodus, A. D. 180, "he had wars with several foreign nations, but none so dangerous as that of Britain. For the people of the island, having passed the wall which divided them from the Romans, attacked them, and cut them in pieces."

ANTONIO (Nicholas), knight of the order of St. James, and canon of Seville, did great honour to the Spanish nation by his *Bibliothèque* of their writers. He was born at Seville in 1617, being the son of a president of the admiralty established in that city in 1626. After having gone through a course of philosophy and divinity, he went to study the law at Salamanca; where he closely attended the lectures of Francisco Ramos del Manzano, afterwards counsellor to the king and preceptor to Charles II. In the year 1659, he was sent to Rome by Philip IV. in the character of agent-general from this prince, and from the inquisition of Spain. The cardinal of Arragon procured him, from pope Alexander VII. a canonry in the church of Seville, the income whereof he employed in purchasing books: he had above 30,000 volumes in his library. By this help, joined to continual labour, and indefatigable application, he at last finished his *Bibliotheca Hispan.* in 4 vols. folio, two of which he published at Rome in the year 1672. The work consists of two parts; the one containing the Spanish writers who flourished before the 15th century, and the other those since the end of that century. After the publication of this work, he was recalled to Madrid by Charles II. to take upon him the office of counsellor to the crusade; which he discharged with great integrity till his death, which happened in 1684.

ANTONIO (St.), one of the Cape de Verd islands, 15 miles from St. Vincent's, from which it is separated by a navigable channel two leagues in breadth. On the north

side, it has a good road for shipping, with a collection of fresh water rising from springs. The island stretches from north-east to south-west, and is filled with mountains; one of which is of so extraordinary a height, as to be compared with the Peak of Teneriffe: its top is constantly covered with snow, and, notwithstanding the clearness of the sky, is generally hid in clouds. Here are produced a variety of fruits; oranges, lemons, palms, melons, &c. and sugar-canes: but, notwithstanding all this plenty, the inhabitants live in the most wretched poverty. They are chiefly negroes, under the protection of the Portuguese, whose language they speak, and imitate their manners. Lat. 18. 10. N. lon. o. 26. E.

ANTONIO (St.), a Dutch fort in Axim, on the gold coast of Africa. It stands on a high rock, which projects into the sea in form of a peninsula; and is so environed by rocks and dangerous shoals, as to be inaccessible to an enemy but by land, where it is fortified by a parapet, draw-bridge, and two batteries of heavy cannon. This settlement was first founded by the Portuguese, during the reign of Emanuel. They fixed it first upon a small point; where, finding themselves insecure, they built the fort where it now stands. They were driven out by the Dutch in 1642; and, upon the conclusion of a peace with the States General, the fort remained by treaty in the hands of the Dutch West-India Company. This place lies in lat. 17. 0. N. lon. 25. 0. W.

ANTONIUS (Marcus), a celebrated Roman orator. He was made consul with A. Posthumius Albinus, in the year of Rome 653; when he opposed the turbulent designs of Sextus Titus, tribune of the people, with great resolution and success. Some time after, he was made governor of Cilicia, in quality of proconsul; where he performed so many great exploits, that he obtained the honour of a triumph. He was one of the most able orators of the forum; and it was owing to him, according to the testimony of Cicero, that Rome might boast herself a rival to Greece in the art of eloquence. He defended Marcus Aquilius; and moved the judges in so sensible a manner, by the tears he shed, and the scars he shewed upon the breast of his client, that he carried his cause. He never would publish any of his pleadings, that he might not be proved to say in one cause what might be contrary to his argument in another. He was unfortunately killed during those bloody contentions, raised at Rome by Marius and Cinna. He was discovered in the place where he hid himself, and soldiers were sent to dispatch him; but his manner of addressing them had such an effect, that none but he who commanded them, and had not heard his discourse, had the cruelty to kill him. His head was exposed before the rostra, a place which he had adorned with his triumphal spoils. This happened ninety years before the Christian era.

ANTONIUS (Marcus), Marc Antony, the triumvir, grandson to the above, was very handsome in his youth; for which reason he was greatly beloved by Curio, a senator, who carried him about in all his debaucheries, in so much that his own father forbade him his house. When the civil war broke out, Curio took Cæsar's party, and prevailed with Marc Antony to do the same; for which he was made a tribune of the people, and in that office did Cæsar great service. At the battle of Pharsalia, Cæsar gave him the command of the left wing of his army, whilst he himself led the right. After Cæsar was elected dictator, he made Marc Antony general of the horse; and he was also made consul in the last year of that usurper's life. On Cæsar's death, he harangued the people with great art, and raised their fury against his murderers; flattering himself that he should easily get into the place which Cæsar had filled; but his haughty behaviour occasioned him to lose all the advantages his affected concern had gained him. His ill treatment of Octavius produced another civil war; which ended in an accommodation between him, Octavius, and Lepidus, fatal to the peace of Rome. They agreed to share the supreme power among them; and many

of the most illustrious Romans were sacrificed by proscription to cement this bloody league, which is known by the name of the *Second Triumvirate*. But the triumvirs were too ambitious, and hated one another too much, to be long united. Marc Antony went into Asia, to raise money for his soldiers; and during his absence Fulvia his wife quarrelled with Octavius. While he was in Asia, indulging in all manner of luxury, the famous Cleopatra inspired him with the most violent passion. Finding Octavius was become publicly his enemy, he entered into a confederacy with Sextus Pompeius, who was still master of Sicily. He then went into Italy to fight Octavius; but Fulvia, who had been the author of this war, dying, Octavius and Marc Antony came to a compromise. One of the conditions of this new peace was, that they should together attack Pompey, though the latter had lately made an alliance with him. Marc Antony then married Octavia, sister to Octavius, as a pledge of their renewed friendship; but returned soon after to his beloved Cleopatra, and again lived with her in Alexandria. Octavius made this a pretence to begin the war again. At last they engaged in a sea-fight at Actium, and Octavius gained a complete victory: upon which Marc Antony fell upon his own sword; and Cleopatra stung herself to death with an asp, to avoid gracing the victor's triumph at Rome.

ANTONOMASIA, *f.* [from *anti*, and *νομα*, a name.] A form of speech, in which, for a proper name, is put the name of some dignity, office, profession, science, or trade; or when a proper name is put in the room of an appellative. Thus a king is called his majesty; a nobleman, his lordship. We say the philosopher instead of Aristotle, and the orator for Cicero: thus a man is called by the name of his country, a German, an Italian; and a grave man is called a Cato, and a wise man a Solomon.

ANTOSIAN'DRIANS, *f.* a sect of rigid Lutherans, who oppose the doctrine of Osiander relating to justification. They are otherwise denominated *Osiandromastixes*. The Antosians deny that man is made just, with that justice wherewith God himself is just; that is, they assert, that he is not made essentially, but only imputatively, just; or, that he is not really made just, but only pronounced so.

AN'TRE, *f.* [*antre*, Fr. *antrum*, Lat.] A cavern; a cave; a den: *not now in use*.

With all my travels history:
Wherein of *antres* vast, and deserts wild,
It was my hent to speak.

Shakespeare.

AN'TRIM, the most northerly county in Ireland, is bounded by that of Down on the south-east, that of Londonderry on the west, from which it is separated by the river Bann, part of Armagh on the south, St. George's channel on the east, and the Deucaledonian ocean on the north. It greatest length is about forty-six miles, its greatest breadth about twenty-seven; and the number of acres it contains, plantation-measure, are computed at 383,000. Though the country is much incumbered with bogs and marshes, yet it enjoys a pretty good air, and is well peopled, chiefly with protestants. Where it is free from bogs, the soil is fruitful. It sends two members for the shire, and two for each of the following towns, viz. Lisburn, Belfast, Antrim, and Randalstown. Antrim contains two great natural curiosities: Lough Neagh, a large lake, the waters of which are of a petrifying quality; and the Giant's Causeway, a very large and curious basalt.

ANTRIM, the capital of the above county, situated at the north end of Lough Neagh, about six miles from the mouth of the bay, having a good road, within which vessels lie dry at low water. It is thirteen miles west of Carrickfergus, and about eighty-four miles north of Dublin; and gives title of earl to the noble family of M'Donnell. At Antrim is a seat, with noble demesnes, and beautiful and highly-cultivated lands, of the earl of Massarene. Lat. 54. 45. N. lon. 6. 26. W.

AN'TRUM, *f.* among anatomists, a term used to denote several cavities of the body: as the *antrum highmoreanum*,
or

or that in the maxillary or jaw-bone; *antrum pylori*, or that at the bottom of the pylorus, &c.

ANTWERP, a large handsome town of Brabant, with a strong citadel, seated on the Scheldt. About 200 years ago it was the greatest emporium of trade in Europe; but the civil wars, that were the consequence of the tyranny of Philip II. diminished that commerce, which was almost annihilated in 1648, when, by the treaty of Munster, between Spain and the United Provinces, the navigation of the Scheldt, to large ships, was shut. Upon the seven United States of Holland being thus declared a free state, and the navigation of the Scheldt yielded to them, the Dutch built forts upon the river, to hinder all ships from coming up, except such as paid them custom; and after that time the trade was principally removed from Antwerp to Amsterdam, till then an inconsiderable town; but, by the late revolution, all these restrictions are done away. The streets of Antwerp are large and regular, their number 212, besides twenty-two public squares: the harbour is very commodious, the river being 400 yards wide, and, at the time of high water, twenty-two feet deep; so that large vessels may come up to the quay; and, by the canals, from the river to the doors of the houses. The public buildings are very handsome, and at least 200 in number. The church of Notre Dame, which is the cathedral, is allowed to be one of the most admirable pieces of architecture in all Europe. It is more than 500 feet long, 240 broad, and 340 high, and contains sixty-six chapels, enriched with columns of marble, all different, and ornamented with the most beautiful and masterly paintings. The high and elegant tower contains thirty-three large bells. It has three principal doors of marble, embellished with gold. Its spire is 466 feet high, with a cross on the top 151. The diameter of the clock is thirty feet, and its circumference ninety. It has also two sets of chimes. The fine paintings of the altar are most of them by Rubens. That of taking our Saviour down from the cross, where the figures are as large as life, is deemed his master-piece. Quintin Maffey, the famous blacksmith of Antwerp, has also enriched this cathedral with some curious pieces. The anecdote of his becoming a painter, deserves here particularly to be recorded. Falling in love with a painter's daughter, and her father saying that he should marry none but a painter, Quintin Maffey went to Italy, entered in the Lombard School, and, in a few years, returned a greater painter than the father of her he admired, which obtained him the hand of his mistress. He is interred at the entrance into this cathedral, where his effigy has this inscription: *Connubialis amore de Mulibre fecit Apellem*; i.e. Connubial love made Vulcan an Apelles. In this cathedral, Henry VIII. of England, with the then kings of France, the Romans, Denmark, Portugal, Poland, and Bohemia, were all, on the 25th of January, 1555, made by Philip II. of Spain, knights of the order of the Golden Fleece. The exchange cost 300,000 crowns. From this building Sir Thomas Gresham took the model of the Royal Exchange in London, as did the burghers of Amsterdam for that city. The town-house is a grand piece of architecture, and stands in the great market-place. The house of the Hanse-Towns, built for the accommodation of the oosteringers, or eastern merchants from the Baltic, is a square building of stone. In the middle story, which has a gallery quite round the square, there are 300 lodging-rooms: the cellars serve for stables. It is twenty-two miles north of Brussels, twenty-two north-east of Ghent, and sixty-five south of Amsterdam; situated in lat. 51. 12. N. lon. 4. 15. E.

In 1585, Antwerp underwent a remarkable siege by the duke of Parma. In order to succeed, he was obliged to cut off the communication of the city with Holland, Ghent, and all places both above and below the town. To effect this, he laid siege to Lissenhouk and Tillo, places of the utmost consequence to the security and commerce of Antwerp: both were obstinately defended; and the siege of Tillo was raised, after it had been carried on for three

months: however, the duke gained several other posts on the river, where he built forts, and greatly annoyed the shipping and trade of the besieged. Finding, however, this method of hemming in the city was ineffectual, while an opening to the mouth of the river remained, he formed a design of building a bridge across the Scheldt, to shut up the navigation. He began with collecting great quantities of wood at Callo and Fort St. Philip, where he intended the bridge should be built; but his project was for some time retarded by the Antwerpers, who broke down the dykes, overflowed the whole country, and carried off his magazines by the inundation. Not discouraged by this loss, he applied himself diligently to repair it, and with incredible expedition cut a canal from Steken to Callo, by which he carried off the waters. He then set to work upon the bridge, and finished it in seven months, without the least interruption from the Zealanders. During the building of this bridge, Aldegonde, governor of Antwerp, proposed to build a fort on Couvensteyn dyke, in order to secure that important post, and to break down the dyke when the bridge was nearly finished: but he was violently opposed by certain citizens, who apprehended that their lands and villas would be destroyed by the inundation. When the magistrates were afterwards deliberating on means for destroying the bridge, which they might have prevented from being completed, Ginebelli, a Mantuan engineer, offered his service, undertaking at a certain expence to blow it into the air. Even in this extremity the expence was grudging: but necessity at last overcame this obstacle; Ginebelli was furnished with two large vessels, a number of small boats, and every thing necessary. He formed the two large vessels into fire-ships, which he set adrift with the stream, deceiving the enemy by means of false fires lighted up in the fleet of small boats. The train of one of the fire-ships was expended before the time expected, and she blew up with a terrible explosion, but with little damage to the bridge. The other was more successful, carrying off all the out-works, setting fire to the whole bridge, and burying above 500 soldiers in the ruins. The fire, however, was soon extinguished, and the bridge repaired by the duke of Parma, while the Antwerpers were prevented by avarice from repeating the experiment; so that they were soon reduced to the utmost distress, and obliged to surrender. It is said that the city of Amsterdam had obstructed every measure for the relief of Antwerp, hoping to profit by its destruction. After the battle of Ramillies, the city of Antwerp surrendered to the duke of Marlborough. It was taken by the French in 1746, but restored to the house of Austria at the treaty of Aix-la-Chapelle.

ANUBIS, a symbolical deity of the Egyptians, was regarded as the faithful companion of Osiris and of Isis. Temples and priests were consecrated to him, and his image was borne in all religious ceremonies. Cynopolis, the present Minich, situated in the lower Thebais, was built in honour of Anubis. The temple wherein he was worshipped no longer subsists. The priests celebrated his festivals there with great pomp, and consecrated the dog to him as his living representation. "Anubis (says Strabo) is the city of dogs, the capital of the Cynopolitan prefecture. These animals are fed there on sacred aliments, and religion has decreed them a worship." An event, however, related by Plutarch, brought them into considerable discredit with the people. Cambyfes having slain the god Apis, and thrown his body into a field, all animals respected it except the dogs, which alone ate of his flesh. This impicity diminished the popular veneration for them.

The signification of this emblematical deity is thus explained by Plutarch. "The circle which touches and separates the two hemispheres, and which is the cause of this division, receiving the name of *horizon*, is called *Anubis*. He is represented under the form of a dog, because that animal watches day and night." St. Clemens of Alexandria, who was well informed of the mystic theology of the Egyptians, favours this explanation. The two dogs, says

he, (the two Anubis,) are the symbols of two hemispheres which environ the terrestrial globe. He adds in another place: Others pretend that these animals, the faithful guardians of men, indicate the tropics, which guard the sun on the south and on the north like porters. It is however, reasonable to imagine, that Anubis at first was only a symbolical image, invented by astronomers to give a sensible expression of their discoveries; that afterwards, the people, accustomed to see it in their temples, which were the depositories of science, adored it as a deity; and that the priests favoured their ignorance by connecting it with their religion. The worship of Anubis being introduced, that of the dog became his emblem. Almost all the gods of the Gentiles have originated in this manner.

ANUS, *f.* in anatomy, the lower extremity of the intestinum rectum, or orifice of the fundament.

ANUS, in botany, signifies the posterior opening of a monopetalous flower.

ANVIL, *f.* [*anvil*, Sax.] The iron block on which the smith lays his metal to be forged. Any thing on which blows are laid. Figuratively, *to be upon the anvil*, is to be in a state of formation or preparation.—Several members of our house knowing what was upon the *anvil*, went to the clergy, and desired their judgment. *Swift*.

ANXICO or ANRICO, a kingdom of Lower Guinea, the country of the Jagas. The inhabitants are strong, nimble, and very intrepid; rather fierce, but very sincere. They do not till the ground, but, like the Arabs, wander from place to place. They seem to pay some reverence to the sun and moon, and have other idols; and they carry off slaves from their own country and Nubia, to barter at Angola for the toys and trifles of Europe.

ANXIETY, *f.* [*anxietas*, Lat.] Trouble of mind about some future event; suspense with uneasiness; perplexity; solicitude.—To be happy, is not only to be freed from the pains and diseases of the body, but from *anxiety* and vexation of spirit; not only to enjoy the pleasures of sense, but peace of conscience, and tranquillity of mind. *Tillotson*.—In the medical language, lowness of spirits, with uneasiness of the stomach.—In *anxieties* which attend fevers, when the cold fit is over, a warmer regimen may be allowed; and, because *anxieties* often happen by spasms from wind, spices are useful. *Arbutnot*.

ANXIOUS, *adj.* [*anxius*, Lat.] Disturbed about some uncertain event; solicitous; being in painful suspense; painfully uncertain:

With beating hearts the dire event they wait,
Anxious, and trembling for the birth of fate. *Pope*.

Careful; full of inquietude; unquiet:

In youth alone unhappy mortals live;
But, ah! the mighty bliss is fugitive;
Discolour'd sickness, *anxious* labour, come,
And age, and death's inexorable doom. *Dryden*.

Careful, as of a thing of great importance.—No writings we need to be solicitous about the meaning of, but those that contain truths we are to believe, or laws we are to obey: we may be less *anxious* about the sense of other authors. *Locke*.—It has generally *for* or *about* before the object, but sometimes *of*; less properly.

ANXIOUSLY, *adv.* In an anxious manner; solicitously; uneasily; carefully; with painful uncertainty.

ANXIOUSNESS, *f.* The quality of being anxious; susceptibility of anxiety.

ANXUR, anciently a city of the Volsci, in Latium; called Tarracina by the Greeks and Latins: now *Terracina*; situated on an eminence. Lat. 41. 18. lon. 14. 5. E.

ANY, *adj.* [*anig*, *enig*, Sax.] Every; whoever he be; whatever it be. It is, in all its senses, applied indifferently to persons or things.—How fit is this retreat for uninterrupted study! Any one that sees it will own, I could not have chosen a more likely place to converse with the dead in. *Pope*.—Whosoever; whatsoever; as distinguished from some other.—What warmth is there in your affection

towards any of these princely suitors that are already come? *Shakespeare*.—It is used in opposition to *none*.—I wound and I heal: neither is there any that can deliver out of my hand. *Deut.* xxxii. 39.

ANZERMA, a town and province of Popayan, on the river Coca, in South America, where there are mines of gold. Lat. 4. 58. N. lon. 75. 25. W.

A'ON, a son of Neptune, who came from Apulia to Bœotia, where he collected the inhabitants, and reigned over them. They were called Aones, and the country Aonia, from him.

AO'NIDES, a name of the Muses, because the country Aonia was more particularly frequented by them.

AORA'SIA, *f.* [*αορασια*, Gr. from *α* priv. and *οραω*, to see.] In antiquity, the invisibility of the gods. The opinion of the ancients with regard to the appearance of the gods to men, was, that they never shewed themselves face to face, but were known from their backs as they withdrew. Neptune assumed the form of Calchas to speak to the two Ajaxes; but they knew him not till he turned his back to leave them, and discovered the god by his majestic step as he went from them. Venus appeared to Æneas in the character of a huntress: but her son knew her not till she departed from him; her divinity was then betrayed by her radiant head, her flowing robe, and her majestic pace.

A'ORIST, *f.* [*αοριστος*, Gr.] A tense peculiar to the Greek language, comprehending all the tenses; or rather, expressing an action in an indeterminate manner, without any regard to past, present, or future.

AORIS'TIA, *f.* in the sceptic philosophy, denotes that state of the mind wherein we neither assert nor deny any thing positively, but only speak of things as seeming or appearing to us in such a manner. The aoristia is one of the great points or terms of scepticism, to which the philosophers of that denomination had continual recourse by way of explication, or subterfuge. Their adversaries, the *dogmatists*, charged them with dogmatizing, and asserting the principles and positions of their sect to be true and certain.

AOR'NUS, a very high rock of India, having its name from its extraordinary height, as being above the flight of a bird. Its circuit is about twenty-five miles, its height eleven furlongs, and the way leading up to the top artificial and narrow; the bottom washed by the river Indus; and on the top a fine plain, part of which was covered with a thick wood; the rest arable land, with a fountain furnishing abundance of excellent water. This rock was taken by Alexander the Great, in whose time there was a report that Hercules had attempted it in vain: however, according to Arrian, this was a mere report, raised to magnify Alexander's exploit. While the Macedonian monarch was preparing for the siege, an old man, who had long lived in a cave near the summit, came and offered to shew him a private way up. This being readily accepted, Ptolemy, with a considerable body of light-armed troops, was dispatched, with orders, in case they succeeded, to entrench themselves strongly upon the rock, and to give notice, by a lighted torch, that he had got safely up. Upon this, Alexander gave orders for a body of troops to attempt the passage by which the rock was commonly ascended; but they were repulsed with great slaughter. He then sent an Indian to Ptolemy, desiring him, in the next attack, to fall upon the enemy behind. But in the mean time, those who defended the rock attacked Ptolemy with great vigour; but were repulsed, though with much difficulty. The next day Alexander renewed the attack; and, though Ptolemy attacked the Indians in the rear, the Macedonians were repulsed on both sides. At last, the king perceiving that the strength of the Indians lay in the straitness and declivity of the way, he caused a great quantity of trees to be felled, and with them filled the cavities between the plain on which the Indians were encamped and the highest of his own advanced posts. The Indians at first derided his undertaking; but at length perceiving the

the ardour with which the work was carried on, and having felt the effects of the missile weapons of the Macedonians, they sent deputies to propose terms of capitulation. Alexander, suspecting that their design was only to amuse him till they made their escape, withdrew his guards from the avenues. As soon as he knew the enemy were defended, he took possession of the deserted rock, and then made a signal for his forces to fall upon the flying Indians, the greatest part whom were killed in the roads.

AORTA, *f.* [of *αἶμα*, Gr. to lift up.] In anatomy, the great artery which rises immediately from the left ventricle of the heart, and is from thence distributed to all parts of the body. It is divided into two grand trunks, distinguished by the terms *ascending* and *descending*. See **ANATOMY**, p. 624.

AOUSTA, a town and district of Piedmont. Here are several antiquities of the Romans, who, under their general, Terentius Varro, reduced its ancient and hardy inhabitants, the Salassii, a people of Celtic extraction. It is seated at the foot of the Alps, on the river Doria, fifty miles north-west of Turin. Lat. 45. 48. N. lon. 7. 30. E. The valley of Aousta is thirty miles in length, and abounds in pastures and all sorts of fruits. The present inhabitants have mostly the *krope* (swollen throats), and are accounted the most simple people among the Piedmontese.

AOUTA, the name of the paper mulberry-tree at Otaheite, in the South Sea, from which a cloth is manufactured, that is worn by the principal inhabitants. See **BARK**.

APA'CE, *adv.* [from *a* and *pace*; that is, with a great pace.] Quick; speedily: used of things in motion.—Is not he imprudent, who, seeing the tide making haste towards him *apace*, will sleep till the sea overwhelm him. *Tillotson*.

ay, quoth my uncle Glo'ster,
Small herbs have grace, great weeds do grow *apace*.
And since, methinks, I would not grow so fast,
Because sweet flow'rs are slow, and weeds make haste.
Shakespeare.

With haste; applied to some action. Hastily; with speed: spoken of any kind of progression from one state to another.—If sensible pleasure, or real grandeur, be our end, we shall proceed *apace* to real misery. *Watts*.

This second course of men,
With some regard to what is just and right,
Shall lead their lives, and multiply *apace*. *Milton*.

APA'CHES, or **APA'CI**, a people of New Mexico in North America. They are brave, resolute, and warlike, fond of liberty, and the inveterate enemies of tyranny and oppression. Of this disposition the Spaniards found them towards the end of the last century, when they revolted against the Catholic king, massacred several of his officers, and committed the greatest devastations. Ever since, they have remained the allies, not the subjects, of the Spaniards; and the viceroy of Mexico has been obliged to maintain a more formidable garrison, and a greater number of troops. They have several strong holds in the mountains, and live under the government of their own cacique.

APAC'TIS, *f.* [απακτῆς, Gr. *abductus*, from *απαγω*.] In botany, a genus of the dodecapandria monogynia class. The generic characters are—Corolla: four-petalled; petals roundish, crenate, concave, unequal; two opposite broader. Stamina: filaments from sixteen to twenty. Pistillum: germ superior; style one.—*Essential Character*. Corolla, four-petalled.

There is but one species, known by the name of *apactis Japonica*. It is a tree erect and very branching; the branches are alternate, round, scabrous with dots, erect; branchlets similar, the last frequent. Leaves on the branchlets alternate, petiolate, ovate, acute, serrate, entire at the base, nerved, smooth, paler underneath, an inch long. Petioles half round, furrowed, a quarter of an inch in length. The flowers in racemes at the end of the branch.

lets. Racemes usually ovate, as they advance becoming more oblong. Peduncle and pedicels villose-scabrous.

AP'EDU'SIA, *f.* denotes ignorance or unskilfulness in what relates to learning and the sciences. Hence also persons uninstrued and illiterate are called *apadeute*. The term *apadeute* was particularly used among the French in the time of Huet; when the men of wit at Paris were divided into two factions, one called by way of reproach *apadeute*, and the others *eruditi*. The *apadeute* in effect were the men of pleasure; the *eruditi* those of study.

APAGO'GE, *f.* in logic. See **ABDUCTION**.

APAGOGE, in the Athenian law, the carrying a criminal taken in the fact to the magistrate. If the accuser was not able to bring him to the magistrate, it was usual to take the magistrate along with him to the house where the criminal lay concealed, or defended himself.

APAGOGE, in mathematics, is sometimes used to denote a progress or passage from one proposition to another; when the first, having been once demonstrated, is afterwards employed in the proving of others.

APAGO'GICAL, *adj.* [from *απαγω*, Gr. compound of *απο*, from, and *αγω*, to bring or draw.] An apagogical demonstration is such as does not prove the thing directly; but shews the impossibility, or absurdity, which arises from denying it; and is also called *reductio ad impossibile*, or *ad absurdum*.

APALA'CHIAN MOUNTAINS, more properly called the **ALLEGANY MOUNTAINS**, which see.

APALATO'A, *f.* in botany. See **CYCLAS**.

APAMEA, or **APA'MIA**, the name of several ancient cities. One of Bithynia, formerly called *Myrlea*, from Myrtilus, general of the Colophonians: destroyed by Philip, father of Perseus; and given to his ally Prusias, who rebuilt it, and called it Apamea, from the name of his queen Apama. Another Apamea, called *Cibotos*, of Phrygia, on the Meander. The name is from Apame, mother of Antiochus Soter, the founder, and the daughter of Artabazus. The rise, or at least the increase, of Apamea, was owing to the ruins of Celenæ. A third, on the confines of Parthia and Media, surname *Raphane*. A fourth Apamea, a town of Mesene, an island in the Tigris; where a branch of the Euphrates, called the *Royal River*, falls into the Tigris. A fifth in Mesopotamia, on the other side the Euphrates, opposite to Zeugma, both founded by Seleucus, and joined by a bridge, from which the latter takes its name. A sixth Apamea, now *Famia*, in Syria, below the confluence of the Orontes and Marfyas; a strong city, and situated in a peninsula, formed by the Orontes and a lake. "It was here (says Strabo) that the Seleucids had established the school and nursery of their cavalry." The soil of the neighbourhood, abounding in pasturage, fed no less than 30,000 mares, 300 stallions, and 500 elephants; instead of which, the marshes of Famia at present scarcely afford a few buffaloes and sheep. To the veteran soldiers of Alexander, who here reposed after their victories, have succeeded wretched peasants, who live in perpetual dread of the oppressions of the Turks and the inroads of the Arabs. Apamea was also the ancient name of *Pella*, in the Decapolis.

APANA'GE, or **APPEN'NAGE**, *f.* in the French customs, were lands assigned by the sovereign for the subsistence of his younger sons, which were to revert to the crown upon the failure of male issue in that branch to which the lands were granted.

APANO'MIA, a town of Santorin, an island in the Mediterranean Sea, called by some the Sea of Candia. It has a spacious harbour, in the form of a crescent. Lat. 36. 18. N. lon. 25. 59. E.

APAN'THROPY, *f.* [from *απο*, from, and *ανθρωπος*, Gr. a man.] A love of solitude, and aversion from the company of mankind. It is by some reckoned among the symptoms, by others among the species or degrees, of melancholy.

APAR'GIA, *f.* [αργῆς, Gr. white.] In botany, a genus of the syngenesia polygamia æqualis class, ranking in

the natural order of compositæ semisfculosæ. The generic characters are—Calyx: common imbricate, oblong; scales feveral, linear, parallel, unequal, longitudinal, incumbent. Corolla: compound, imbricate, uniform; corolllets hermaphrodite, numerous, equal; proper monopetalous, ligulate, linear, truncate, five-toothed. Stamina: filaments five, capillary, very short; antheræ cylindric, tubular. Pistillum: germ subovate; style filiform, length of the stamens; stigmas two, recurved. Pericarpium: none; calyx oblong, straight. Seeds: solitary, oblong, striated; down sessile, (in the central seeds somewhat stippled,) plumose; rays chafly beneath. Receptaculum: naked, subvillose.—*Essential Character.* Calyx, subimbricate, with linear, parallel, unequal, scales; down plumose, subfessile; receptacle naked, subvillose.

Species. 1. *Apargia hispida*: the whole calyx upright; leaves lanceolate toothed, hispid with forked bristles; scape one-flowered, naked. Linnæus says that this plant has a linear bractæ below the flower, which is not in the next species. Our English plant has the root end-bitten; the stem from six to sixteen inches high; the leaves petioled, lanceolate, toothed, rough and somewhat hoary with hairs, which sometimes have two or three points, and sometimes are simple. It is very common in meadows and pastures, where it flowers earlier than the other hawkweeds, namely, in May. The old writers call it *rough dandelion* or *dandelion hawkweed*. M. Villars has taken much pains to settle the synonyms of this and the other species, and to extricate them from the confusion under which they labour; but with what success we have not leisure to determine. The flowers open at four in the morning, and close at three in the afternoon.

2. *Apargia hirta*: the whole calyx upright, smoothish; leaves toothed, rough with hairs which are undivided; scape smooth, without any floral leaf; outer seeds without down. This very much resembles the foregoing, but yet it is different. According to Linnæus this is a native of Germany, Switzerland, France, Spain, &c. Villars confines it to the south of Europe, in hot, dry, rocky, places; and Leers affirms that he found it in marshy meadows, flowering in July. Mr. Curtis informs us that it is frequent on Hampstead-heath, Barnes-common, and other commons about London.

3. *Apargia Danubialis*: the whole calyx upright, smooth; leaves toothed, smooth; scape one-flowered, almost naked. It is found in meadows in the islands on the Danube, and flowers in June.

4. *Apargia tuberosa*: calyx acute hirsute, leaves runcinate scabrous. Native of Tuscany and the south of France, in meadows.

5. *Apargia autumnalis*: stem branched almost naked, peduncles scaly, leaves lanceolate toothed quite entire smooth. Root perennial, the second or third year dying at the end, and thus appearing as if bitten off. Linnæus remarks, that the flowers open at seven in the morning, and close at three in the afternoon. It is difficult, he says, to determine, under what genus it should be placed; since it differs from *scorzonera* in its sessile egret, from *crepis* in its simple imbricate calyx, from *leontodon* in its sessile plumose egret. This species is subject to many variations: having the leaves smooth, or hairy; toothed, sinuate-toothed, or pinnatifid, with the teeth quite entire; the calyx smooth or hirsute; the stem simple or branched, with one, two, three, or more, flowers, naked or scaly. It is common in pastures, flowering from July to October. According to the observations in the *Amenitates Academicæ*, horses, goats, and swine, eat it, but cows and sheep refuse it. Our old English writers name it *yellow devil's bit*, *small hare's hawkweed*, or *small hawkweed with bitten roots*.

6. *Apargia Pyrenaica*: peduncles scaly, leaves lanceolate with very few teeth, calyxes villose, root end-bitten. Native of the south of Europe. Perennial.

7. *Apargia taraxaci*: peduncles somewhat scaly at the top, leaves entire or pinnatifid smooth, calyx woolly, root end-bitten. Root perennial, oblique, almost creeping,

end-bitten, large, with strong fibres, longer than the plant itself. Linnæus, who placed it in the genus *hieracium*, doubts whether it be a mile plant, or a new species. This plant was gathered in 1573, in the mountains of Lapland, by Dan. Ch. Solander, LL. D. It has since been observed in several parts of the south of Europe, in mountainous situations; and with us both in Wales and Scotland. It flowers in July. Perhaps there may be other species which belong properly to this genus; but they are mostly common weeds in pasture, and not of much known use.

A'PARINE, *f.* in botany. See *ASPERUGO*, *GALUM*, *SHERARDIA*, *VALANTIA*, and *UTRICULARIA*.

APARINES. See *AMMANIA*.

APARITHME/SIS, *f.* in rhetoric, denotes the answer to the protasis or proposition itself. Thus, if the protasis be, *Apellandi tempus non erat*, the aparithmesis is, *At tecum anno plus vixi*.

APART, *adv.* [*à part*, Fr.] Separately from the rest in place.—Since I enter into that question, it behoveth me to give reason for my opinion, with circumspection; because I walk aside, and in a way *apart* from the multitude. *Raleigh*.—In a state of distinction; as, To set *apart* for any use:

The tyrant shall demand yon sacred load,
And gold and vessels set *apart* for God.

Prior.

Distinctly.—Moses first nameth heaven and earth, putting waters but in the third place, as comprehending waters in the word earth; but afterwards he nameth them *apart*. *Raleigh*.

APARTMENT, *f.* [*appartement*, Fr.] A part of the house allotted to the use of any particular person; a room; a set of rooms:

He, pale as death, despoil'd of his array,
Into the queen's *apartment* takes his way.

Dryden.

APARITHMENUS, *f.* in the ancient poetry, an appellation given to a verse, which comprehended an entire sense or sentence in itself. This is sometimes also written *apartemenus*, i. e. suspended, as not needing any following verse.

APA'TE, *f.* in botany. See *LATUCA*.

APA'THES, *f.* [*α priv.* and *παθος*, Gr. an affection or passion.] Those who seem to be void of human passions. This temper is also carried to that inflexible sternness which extinguishes the affections of humanity, as was instanced in Diogenes the Cynic, and Timon.

AP'ATHY, *f.* [*α, not*, and *παθος*, Gr. feeling.] The quality of not feeling; exemption from passion; freedom from mental perturbation:

In lazy *apathy* let stoics boast
Their virtue fix'd; 'tis fixed as in frost,
Contracted all, retiring to the breast;
But strength of mind is exercise, not rest.

Pope.

The stoics affected an entire apathy: they considered it as the highest wisdom to enjoy a perfect calmness or tranquillity of mind, incapable of being ruffled by either pleasure or pain. In the first ages of the church, the Christians adopted the term apathy to express a contempt of all earthly concerns; a state of mortification, such as the gospel prescribes. Clemens Alexandrinus, in particular, brought it exceedingly in vogue; thinking hereby to draw the philosophers to Christianity, who aspired after such a sublime pitch of virtue. Quietism is only apathy disguised under the appearance of devotion.

APATU'RIA, *f.* [*from απατη*, Gr. fraud.] A solemn feast celebrated by the Athenians in honour of Bacchus. It is said to have been instituted in memory of a fraudulent victory obtained by Melanthus king of Athens over Xanthus king of Bœotia, in a single combat, which they agreed upon, to put an end to a dispute between them relating to the frontiers of their countries. Hence Budæus calls it *sestum deceptionis*, "the feast of deceit." But other authors give a different etymology of this feast.

APAU'LIA, *f.* in antiquity, the third day of a marriage solemnity. It was thus called, because the bride, returning

turning to her father's house, did *απαυλιζεσθαι* *τυ νυμφίω*, lodge apart from the bridegroom. Some will have the *απαυλια* to have been the second day of the marriage, viz. that whereon the chief ceremony was performed; thus called by way of contradistinction from the first day, which was called *προαυλια*. On the day called *απαυλια* (when-ever that was), the bride presented her bridegroom with a garment called *απαυλητηρια*.

A'PE, *f.* [*ape*, Icelandic.] In zoology, that species of the *Simia* tribe which approaches nearest to the form of man. See *SIMIA*.

"An *ape* is an *ape*, a varlet's a varlet, though he be cloathed in silk or scarlet." Or, according to another proverb, "The higher the *ape* goes, the more he shews his tail." *Plus le singe s'eleve, plus il decouvre son cul pelé*, Fr. That is, dignities serve but to make persons ridiculous, who are not worthy of them, or don't know how to behave themselves in them.

Sea-APE, a name given by Steller to a marine animal which he saw on the coast of America, but which is neither known nor classed in any system of natural history by this appellation.

To *APE*, *v. a.* To imitate or mimic, as an *ape* imitates or mimics human actions:

Aping the foreigners in every dress,
Which, bought at greater cost, becomes us less. *Dryden*.

APE'AK, *adv.* [probably from *à pique*.] In a posture to pierce; formed with a point. It is mostly used as a sea-term: the anchor is said to be *apeak* when in a posture presently to pierce the ground.

APEI'BA, *f.* in botany. See *AURLETIA*.

APEL'LA, *f.* among the old physicians, was a name given to those whose prepuce is either wanting or shrunk, so as no longer to cover the glans. But, according to Salmasius and others, it was the proper name of a Jew.

APEL'LES, one of the most celebrated painters of antiquity. He was born in the isle of Cos, and flourished in the time of Alexander the Great, with whom he was in high favour. He executed a picture of this prince, holding in a thunderbolt in his hand: a piece, finished with so much skill and dexterity, that it used to be said there were two Alexanders: one invincible, the son of Philip; the other inimitable, the production of Apelles. Alexander gave him a remarkable proof of his regard: for, when he employed Apelles to draw Campaspe, one of his mistresses, having found that he had conceived an affection for her, he resigned her to him; and it was from her that Apelles is said to have drawn his *Venus Anadyomene*. What is called *grace*, was the characteristic of this artist. His pencil was so famous for drawing fine lines, that Protogenes discovered by a single line that Apelles had been at his house. Protogenes lived at Rhodes: Apelles sailed thither, and went to his house with great eagerness, to see the works of an artist who was known to him only by name. Protogenes was from home; but an old woman was left watching a large piece of canvas, fitted in a frame for painting. She told Apelles that Protogenes was gone out; and asked his name, that she might inform her master who had inquired for him. "Tell him (says Apelles) he was inquired for by this person;" at the same time, taking up a pencil, he drew on the canvass a line of great delicacy. When Protogenes returned, the old woman acquainted him with what had happened. That artist, upon contemplating the fine stroke of the line, immediately pronounced that Apelles had been there; for so finished a stroke could be produced by no other person. Protogenes, however, himself drew a finer line of another colour; and, as he was going away, ordered the old woman to shew that line to Apelles if he came again; and to say, "This is the person for whom you are enquiring." Apelles returned, and saw the line: he would not for shame be overcome; and therefore, in a colour different from either of the former, he drew some lines so exquisitely delicate, that it was utterly impossible for finer strokes to be made. Protogenes

now confessed the superiority of Apelles, flew to the harbour in search of him, and resolved to leave the canvas with the lines upon it for the admiration of future artists.

Apelles afterwards shewed great liberality of mind towards Protogenes. With ideas enlarged by education and literature, he was incapable of harbouring the little jealousies of competitors; on the contrary, he was the first who made the works of Protogenes to be valued as they deserved among the Rhodians. There are two stories related of Apelles, which shew him to be at once an artist of modesty in amending even trifling improprieties, and yet of self-confidence sufficient to make him know the perfection and value of his own paintings. It was customary with Apelles to expose to public view the works which he had finished, and to hide himself behind the picture, to hear the remarks passed on it by persons who came to view it. He once heard himself blamed by a shoemaker for a fault in the slippers of some picture: he corrected the fault which the man had noticed: but on the day following the shoemaker began to animadvert on the leg; upon which Apelles with some anger looked from behind the canvas, and bade him keep to his own province, "*Ne futor ultra crepidam*." It is well known, that Alexander forbade any one besides Apelles to paint his portrait. We are not, however, to conclude from this, that Alexander was a more skilful judge of painting than he was of poetry. Like Augustus, he cherished the fine arts more from vanity than taste. A remarkable proof is given of this prince's inability to discern merit, and of the painter's freedom in expressing the mortification he felt, when a work of his was not sufficiently commended. "Alexander (says *Zelian*, lib. ii. c. 3. Var. Hist.) having viewed the picture of himself which was at Ephesus, did not praise it as it deserved; but, when a horse was brought in, and neighed at seeing the figure of a horse in the picture, as though it had been a real horse, "O king," said Apelles, "this horse seems to be by far a better judge of painting than you." It happened more than once that the horses drawn by him were mistaken for real ones, by living horses which saw and neighed at the pictures. The works of Apelles were all admired; but the most celebrated were the picture of Alexander above-mentioned, and that of Venus emerging from the sea, which was esteemed the most exquisite figure the pencil could create.

APELLI'TÆ, heretics in the primitive church, so called from their head Apelles, who taught that Christ's body was only an elementary composition, which he again left in the world at his ascension into heaven; that there is a good and bad principle; that the prophets contradicted each other; and that there is no resurrection of the dead.

APE'NE, *f.* in antiquity, a chariot whereon the images of the gods were carried in procession on certain days, attended with a solemn pomp, songs, hymns, dancing, &c. It was very rich, made sometimes of ivory, or even of silver, and variously decorated.

APENIN'NUS, or AP'PENINES, a ridge of mountains, running through the middle of Italy, from north-west to the south-west, for 700 miles, in the form of a crescent, beginning at the Alps in Liguria, or the Riviera di Genoa; and terminating at the strait of Messina, or at Reggio, and the promontory Leucopetra; and separating, as by a back or ridge, the Adriatic from the Tuscan sea.

AP'ENRADE, a town of Denmark, in the duchy of Selswick, seated at the bottom of a gulph in the Baltic sea, between Flenboürg and Hadachleben. It is twenty-five miles north from Selswick. Lat. 54. 4. N. lon. 9. 28. E.

AP'ENZEL, a town of Switzerland, in the canton of the same name, seated on the river Chuz, lat. 47. 31. N. lon. 9. 1. E. The canton itself was received into the Helvetic league in 1513. Its greatest length is about thirty miles, and its breadth about twenty. It yields good pasturage, and consequently is not destitute of cattle, milk, butter, or cheese. Considerable quantities also of wheat, rye, barley, oats, beans, pease, flax, and wine, are produced in it; besides a good deal of fruit, wood, and turf; with mineral

mineral waters and warm baths. There are many mountains in the canton, the highest of which is called the *Hohelantis*, or the *Hohemefner*, which commands a prospect of a prodigious extent. There are also several lakes and rivers. The inhabitants, who are partly protestants, and partly Roman catholics, subsist chiefly by their manufactures of linen, crape, fustian, and thread, or by bleaching, and the sale of their cattle, butter, cheese, horses, wood, and coal. In spiritual affairs, the Romanists are subject to the bishop of Constance, but the protestants to their own consistory. The militia of the former does not exceed 3000, whereas those of the latter amount to 10,000.

APEP'SIA, *f.* [from α priv. and $\pi\epsilon\pi\sigma\iota$, to digest.] That genus of disease which Dr. Cullen names *dyspepsia*, or indigestion. See **MEDICINE**.

A'PER, *f.* A ridiculous imitator or mimic.

APE'RIENT, *adj.* [*aperio*, Lat. to open.] That which has the quality of opening.—Of the stems of plants, some contain a fine *aperient* salt, and are diuretic and saponaceous. *Arbutnot*.

APE'RIENTS, *f.* Medicines which have the power of opening the mouths of vessels, hence clearing obstructions of the vascular and glandular kind, as well as the pores of the skin. In this sense they are synonymous with the *anastomatica*, *deobstruents*, and *deopplatives*. But those medicines which render the bowels gently laxative, are now generally called *aperients*; the removal of other obstructions is more confined to the term *deobstruents*.

APE'RITIVE, *adj.* That which has the quality of opening the excrementitious passages of the body.—They may make broth, with the addition of *aperitive* herbs. *Harvey*.

APERIT'TOS, *f.* [from α priv. and $\pi\epsilon\pi\tau\iota\sigma$, redundant.] Such aliment as generates but little excrement. The opposite quality is called *perittomaticos*.

APE'RT, *adj.* [*apertus*, Lat.] Open.

APER'TION, *f.* [from *apertus*, Lat.] An opening; a passage through any thing; a gap.—The next now in order are the *aperitions*; under which term I do comprehend doors, windows, staircases, chimneys, or other conduits: in short, all inlets or outlets. *Wotton*. The act of opening; or state of being opened.—The plenitude of vessels, otherwise called the *plethora*, when it happens, causeth an extravasation of blood, either by rupture or *aperition* of them. *Wifeman*.

APERT'LY, *adv.* [*apertè*, Lat.] Openly; without covert.

APERT'NESS, *f.* Openness.—The freedom, or *apertness* and vigour of pronouncing, and the closeness of muzzling, and laziness of speaking, render the sound different. *Holder*.

APERTURE, *f.* [from *apertus*, Lat. open.] The act of opening.—Hence ariseth the facility of joining a consonant to a vowel, because from an appulse to an *aperture* is easier than from one appulse to another. *Holder*. An open place.—If memory be made by the easy motion of the spirits through the open passages, images, without doubt, pass through the same *apertures*. *Glanville*. In optics, the hole next the object-glass of a telescope or microscope.—The concave metal bore an *aperture* of an inch: but the *aperture* was limited by an opaque circle, perforated in the middle. *Newton*. Enlargement; explanation: a sense seldom used.—It is too much untwisted by the doctors, and, like philosophy, made intricate by explications, and difficult by the *aperture* and dissolution of distinctions. *Taylor*.

APE'TALOUS, *adj.* [of α priv. and $\pi\epsilon\tau\alpha\lambda\omicron\nu$, a leaf.] Without petala or flower-leaves.

APE'TALOUSNESS, *f.* Being without leaves.

APEX, *f.* [*apices*, plur. Lat.] The tip or point of any thing.—The *apex*, or lesser end of it, is broken off. *Woodward*.

APEX, in antiquity, the crest of a helmet, but more especially a kind of cap worn by the flamens.

APEX, among grammarians, denotes the mark of a long syllable, falsely called a *long accent*.

APHA'CA, a place in Syria, situated between Heliopolis and Byblus, near Lebanon; infamous for a temple of Venus, called *Aphacitis*. Near it was a lake, round which fire usually burst forth, and its waters were so heavy, that bodies floated on them. The temple was destroyed by Constantine, as being a school of incontinence. The name is of Syriac origin, signifying *embraces*.

APHACA, *f.* in botany. See **LATHYRUS**.

APHÆRE'SIS, *f.* [*ἀφαίρεσις*, Gr. of *ἀφαιρέω*, to take away.] In grammar, a figure by which a letter or syllable is cut off from the beginning of a word. Thus *ciconia*, by *aphæresis*, is written *conia*; *contemnere*, *temnere*; *omittere*, *mittere*, &c. A similar retrenchment at the end of a word is called *apocope*.

APHÆRESIS, in medicine, denotes a necessary taking away or removal of something that is noxious. In surgery, it signifies an operation whereby something superfluous is taken away.

APHA'NES, *f.* [*ἀφανς*, Gr. not apparent; from its diminutive size.] In botany, a genus of the *tétrandria digynia* or *monandria monogynia* class, ranking in the natural order of *fenticosæ*. The generic characters are—*Calyx*: perianthium one-leaved, tubular, permanent; mouth flat, eight-parted. *Stamina*: filaments four, or one, erect, subulate, very small, placed on the mouth of the calyx; anthera roundish, or one twin. *Pistillum*: germ ovate; style filiform, the length of the stamens, inserted into the base of the germ; stigma headed. *Pericarpium*: none; calyx containing the seeds in the bottom, converging at the mouth. *Seeds*: ovate, acuminate, compressed, the length of the style.—*Essential Character*. *Calyx*, eight-cleft. *Seeds* two, or one, naked.

There is only one species, called *aphanes arvensis*, or *parsley-piert*: stems many, slender, leafy, four inches long, round. Leaves roundish, three-parted, deeply lacinate; the lower ones petiolate; the upper ones sessile, hoary beneath; flowers herbaceous, axillary; calyx cut into eight segments. It varies with one pistil and seed; some botanists say it is always so. *Hudson* gives it one pistil and two seeds. *Haller* says it has often two seeds; and *Leers*, that it never has that number. According to *Gærtner*, it has only one seed, in the garden usually, but in the wild plant constantly: and therefore does not deserve to be separated from the genus *alchemilla*. *Villars* affirms, that the calyx is only four-cleft, and that there is one pistil and one seed. It is a native of Europe, growing in fallow-fields and dry pastures. Annual; flowering from May to August. *Parsley-piert* is a strange corruption from the French *perceperrière*, which name it acquired from its supposed lithontriptic qualities.

APHA'SIA, *f.* [from α priv. and $\phi\eta\mu\iota$, Gr. I speak.] In the sceptic philosophy, denotes a state of doubt, wherein, a person not knowing how to determine, it is best for him to be silent. In this sense, *aphasia* stands opposite to *phasis*, under which are included both assertion and negation.

APHE'A, a deity worshipped by the Cretans. *Pindar* composed an ode to her honour, who had a temple in the Isle of Crete.

A'PHEK, the name of several cities mentioned in scripture. 1. *Aphek* in the tribe of Judah, where the Philistines encamped when the ark was brought from Shiloh; 1 Sam. iv. 1, 2, &c. It is supposed to be the same with *Aphekah*, mentioned in Josh. xv. 53. 2. *Aphek* in Jezreel, where the Philistines encamped while Saul and his army were upon the mountains of Gilboa; 1 Sam. xxix. 1, &c. 3. *Aphek* a city of the tribe of Asher, near the country of the Sidonians; Josh. xix. 30. and xiii. 4. 4. *Aphek* in Syria, near which the battle was fought between Ahab and Benhadad, wherein the Syrians were worsted; and, as they retreated into the city, the walls fell upon them, and crushed in pieces 27,000; 1 Kings, xx. 26, &c.

APHE'LION, or **APHE'LUM**, *f.* [*ἀφελιον*, Gr. of *ἀπο*, from, and *ἡλιος*, the sun.] In astronomy, that point in the orbit of the earth, or a planet, in which it is at the greatest

greatest distance from the sun; which is the point A (in the fig. to the art. ANOMALY, p. 741,) or extremity of the transverse axis of the elliptic orbit, farthest from the focus S, where the sun is placed; and diametrically opposite to the perihelion B, or nearer extremity of the same axis. In the Ptolemaic system, or in the supposition that the sun moves about the earth, the aphelion becomes the *apogee*. The times of the aphelia of the primary planets may be known by their apparent diameter appearing the smallest, and also by their moving slowest in a given time. Calculations and methods of finding them have been given by many astronomers, as Riccioli, Wolfius, Halley, sir Isaac Newton, Euler, d'Alembert, Clairaut, &c.

The aphelia of the planets are not fixed: for their mutual actions upon one another keep those points of their orbits in a continual motion, which is greater or less in the different planets. This motion is made in consequentia, or according to the order of the signs; and sir Isaac Newton shows that it is in the sesquuplicate ratio of the distance of the planet from the sun, that is, as the square root of the cube of the distance. The quantities of this motion, as well as the place of the aphelion for a given time, are variously given by different authors. Kepler states them, for the year 1700, as in the following table:

Planets.	Aphelion.	Annual Motion.
Mercury	♊ 8° 25' 30"	1' 45"
Venus	♊ 3 24 27	1 18
Mars	♊ 0 51 29	1 7
Jupiter	♊ 8 10 40	0 47
Saturn	♊ 28 3 48	1 10
The Earth	♊ 8 25 30	

By De la Hire, they are given as follows, for the same year 1700:

Planets.	Aphelion.	Annual Motion.
Mercury	♊ 13° 3' 40"	1' 39"
Venus	♊ 6 56 10	1 26
Mars	♊ 0 35 25	1 7
Jupiter	♊ 10 17 14	1 34
Saturn	♊ 29 14 41	1 22

And De la Lande states them as follows, for 1750:

Planets.	Aphelion.	Secular Motion.
Mercury	8s 13° 33'	1° 57' 40"
Venus	10 8 13	4 10 0
Mars	5 1 28	1 51 40
Jupiter	6 10 22	1 43 20
Saturn	8 29 53	2 23 20
The Earth	9 8 38	1 49 10

Of the new planet, Herschel or Georgium Sidus, the aphelion for 1790 was 11s 23° 29' 42", and its annual motion 50" 3.

APH'EREMA, the name of a city. 1 Mac. ii. 34.

APH'E'TA, *f.* in astrology, the name of the planet which is imagined to be the giver or disposer of life in a nativity.

APHET'ICAL, *adj.* Relating to the apheta.

A'PHIOM KA'RA-HIS'SAK, a town of Asiatic Turkey, in Natolia, situated on the Mandra, defended by a castle, on an eminence: fifty-six miles south of Kutaia. Lat. 37. 21. N. lon. 41. 13. E. Ferro.

A'PHIS, *f.* in entomology, the *puceron*, *vine-fretter*, or *plant-louse*; a genus of insects belonging to the order of hemiptera. The rostrum or beak of the aphid is inflexed; the antennæ or feelers are longer than the thorax; the wings are four, and erect, or they are wanting; the feet are of the ambulatory kind; and the belly often ends in two horns, from which is ejected that most delicate juice called *honey-dew*. Gmelin's Linnæus enumerates seventy-

five species of the aphid, all of them inhabitants of particular plants from which their trivial names are taken: as *aphis ribis*, *ulmi*, *rosæ*, &c.

The extraordinary nature of these insects for some time justly excited the wonder and attention of naturalists. They were long ranked among the animals which had been classed with the true androgynes spoken of by Mr. Breynius: for, having never been seen in coitu, it was hastily concluded that they multiplied without copulation. This, however, was but a surmise; but this surmise was believed and adopted by Mr. Reaumur: and, though he supported it by some observations peculiar to himself, the question remained still undecided, until Mr. Bonnet cleared it up in the affirmative, by shutting up a young aphid at the instant of its birth, in the most perfect solitude, which yet brought forth in his sight ninety-five young ones. The same experiment being made on one of the individuals of this family, that had been tried with its chief, the new hermit soon multiplied like its parent; and one of this third generation, in like manner brought up in solitude, proved no less fruitful than the former. Repeated experiments, in this respect, as far as the fifth or sixth generation, all uniformly presenting the observer with fecund virgins, were communicated to the Royal Academy of Sciences; when an unforeseen and very strange suspicion, imparted by Mr. Trembley to Mr. Bonnet, namely, that one copulation of these insects might serve for several generations, engaged him anew in a series of still more painful experiments than the foregoing. Mr. Bonnet now reared to the amount of the tenth generation of solitary aphides, and had the patience to keep an account of the days and hours of the births of each generation. In short, it was discovered, that they are really distinguished by sexes: that there are males and females amongst them, whose amours are the least equivocal of any in the world: that the males are produced only in the tenth generation, and are but few in number: that these, soon arriving at their full growth, copulate with the females: that the virtue of this copulation serves for ten generations: that all these generations except the first (from the fecundated eggs), are produced viviparous; and all the individuals are females, except those of the last generations, among whom some males make their appearance, to lay the foundation of a fresh series. These circumstances have been confirmed by other naturalists. In particular, we have a curious and accurate detail of them by Dr. Richardson of Rippon, in the Philosophical Transactions, vol. xi. art. 22.

The young, immediately after being protruded from the mother, are always of a paler colour than the parent: they have then the entire use of their limbs, and go in quest of food. All the different kinds cast their skin; and it is after these developments that such of them as have wings obtain these parts. It is not the males only that are winged, as we have seen in some other genera; many of the plant-lice of both sexes are deprived of these instruments in their most perfect state; for many of the females without them are seen producing young. As the larvae of these insects possess all the activity peculiar to their genus in its last stage of growth, so they are equally distinguished by voracity. They are furnished with a small trunk, which pierces the leaves, and enables the animal to extract the juices proper for its nourishment. Many plants grow deformed by the number of punctures thus made upon their leaves, and decay from the want of their usual sap. Some thrive even when covered with these insects, while others rise up into small hollow tubercles, which, on being broken open, disclose the numberless families that inhabit them. The galls or excrescences formed by the plant-louse, which often disfigure the shrubs upon which they grow, are in China, Persia, and the Levant, applied successfully in dying. Some species formed in these more northerly climes might probably be turned to the same useful purpose, were their virtues understood.

The plant-lice void from the anus that clear liquid sub-

rance called *honey-dew*, as well as from the two horny appendices that terminate the abdomen. It is in pursuit of this fluid that the ants are seen to frequent those plants upon which the plant-lice settle. From this circumstance, the former animals have been supposed hostile to the latter; while other naturalists have deemed it an indication of the friendship of the two genera for each other: but it is neither from motives of love nor of hatred that the ants repair in such numbers to these haunts; they seek only to gratify their appetite by devouring this delicious excrement.

The most effectual method of preventing the depredations of plant-lice upon flowers and the leaves of plants, is suggested by those insects which live by preying upon them. The plant-louse-lion, or aphidivorous fly, either by instinct or foresight, deposits her eggs in the midst of these animals; and, as soon as the larvæ are produced, they devour hundreds around them, without the necessity of any other movement than turning to the right side or the left. This formidable insect is furnished with two tubercular horns, with which it pierces the plant-louse, and sucks its juice. A few of its eggs placed upon the leaves frequented by the lice, would soon produce a number sufficient to suppress or destroy them.

APHLASTUM, *f.* in the ancient navigation, a wooden ornament, shaped like a plume of feathers, fastened on the goose's or swan's neck used by the ancient Greeks in the heads of their ships. The aphlastum had much the same office and effect in a ship that the crest had on the helmet. It also had this farther use, that, by waving a party-coloured riband fastened to it, it showed from what quarter the wind blew.

APHONIA, *f.* [Gr. from α priv. and $\phi\omega\nu\eta$, a voice.] One who hath lost his voice, called also by some *anaudia*. For the treatment of this disease, see **PATHOLOGY**.

APHORISM, *f.* A maxim or principle of a science; or a sentence which comprehends a great deal in a few words. The word comes from $\alpha\phi\omicron\rho\iota\varsigma\omega$, Gr. I separate; q. d. a choice or select sentence. The term is chiefly used in medicine and law. We say the aphorisms of Hippocrates, of Sanctorius, of Boerhaave, &c. aphorisms of the civil law, &c.

APHORISTICAL, *adj.* In the form of an aphorism; in separate and unconnected sentences.

APHORISTICALLY, *adv.* In the form of an aphorism.—These, being carried down, seldom miss a cure, as Hippocrates doth likewise *aphoristically* tell us. *Harvey*.

APHRACTI, *f.* in the ancient military art, denotes open vessels, without decks or hatches, furnished only at head and stern with cross planks, whereon the men stood to fight.

APHRADITA'RIMUM, *f.* in physic, a dry medicine made of equal parts of frankincense, pomegranate, meal, and scales of brass. *Scott*.

APHRODISIA, *f.* in antiquity, festivals kept in honour of Venus, the most remarkable of which was that celebrated by the Cyprians. At this solemnity several mysterious rites were practised: all who were initiated to them offered a piece of money to Venus as an harlot; and received as a token of the goddess's favour a measure of salt, and a $\phi\alpha\lambda\lambda\omicron\varsigma$; the former, because salt is a concretion of sea-water, to which Venus was thought to owe her birth; the latter, because she was the goddess of wantonness.

APHRODISIACAL, *adj.* in medicine, relating to the venereal disease.

APHRODISIACS, *f.* Medicines said to increase the quantity of semen, and create an inclination to venery.

APHRODISIASMUS, [from $\alpha\phi\omicron\rho\delta\iota\varsigma\mu\omicron\varsigma$, Venus.] An immoderate desire of venery.

APHRODISIUS, *f.* in chronology, denotes the eleventh month in the Bithynian year, commencing on the 25th of July in ours.

APHRODITA, *f.* in helminthology, a genus of worms of the order of mollusca. The generic characters are—

Body creeping, oblong, covered with scales, and furnished with numerous bristly fasciculate feet on each side; mouth terminal, cylindrical, retractile; feelers two, setaceous, annulate; eyes four. There are nine species.

1. *Aphrodita aculeata*, the aculeated aphrodite, or sea-mouse: body oval, brown, beneath flesh-colour; with long silky changeable hair on each side the body, which is convex above and covered with short brown fur, the sides with long rich green-gold hair mixed with sharp spines; vent covered with two scales; belly covered with a naked pale skin; the mouth is placed beneath. Feet from thirty to thirty-six on each side, each consisting of a tuft of five or six strong black spines. Inhabits the European Seas, and is often found in the belly of the cod-fish; it is from four to seven inches long. In the annexed Plate, fig. 1, 2, 3, 4, exhibit upper and under views of two varieties of this species.

2. *Aphrodita scabra*, the rough aphrodite: body oblong, with two rows of alternate scales; mouth projecting, cylindrical. Much smaller than the last, with twenty alternate scales; legs about twenty on each side.

3. *Aphrodita squamata*, the squamose aphrodite. This is also a small species: body oblong, covered with two rows of uniformly-coloured scales dotted with black. Middle of the back and belly smooth; the other part covered with large opposite rigid ochre-yellow scales resembling those of a fish, twenty-four in number. Inhabits the European and Asiatic Seas; about an inch long. This species is shown on the Plate at fig. 5.—The other species are the *imbricata*, *plana*, *lepidota*, *cirrosa*, *violacea*, and *longa*.

APHRODITE, in mythology, a name of Venus, derived from $\alpha\phi\omicron\varsigma$, froth; because, according to the poets, Venus is supposed to have been produced from the froth or foam of the sea.

APHROGA'LA, *f.* [Greek; of $\alpha\phi\omicron\varsigma$, froth, and $\gamma\alpha\lambda\alpha$, milk.] Milk beat into an entire froth; a syllabub.

APHTHÆ, *f.* [from $\alpha\pi\tau\omega$, Gr. to inflame.] In medicine, small round superficial ulcers arising in the mouth, called the *thrush*.

APHTHONIUS, a rhetorician of the third century, who wrote a work entitled *Progymnasmata Rhetorica*, or Rhetorical Exercises; first published in Greek by Aldus, at Venice, in 1508; afterwards with Hermogenes and Longinus, in 8vo. at Geneva, in 1569; and at Upsal, in 1670, by Scheffer, with a translation and notes. To the same author are ascribed Fables, printed with those of Æsop, at Frankfort, in 1610.

APHYLLANTES, *f.* in botany. See **GLOBULARIA**.

APHYLLANTHES, *f.* [$\alpha\phi\upsilon\lambda\lambda\omicron\varsigma$ $\alpha\nu\theta\epsilon\varsigma$, Gr. a flower without leaves.] In botany, a genus of the class hexandria, order monogynia, natural order of tripetaloidææ. The generic characters are—Calyx: glumes univalve, lanceolate, several imbricate. Corolla: petals six, ovate, spreading into the border; claws slender, erect, converging into a tube. Stamina: filaments setaceous, shorter than the corolla, inserted into the throat; antheræ oblong. Pistillum: germ superior, three-cornered, turbinate; style filiform, the length of the stamens; stigma three, oblong. Pericarpium: capsule turbinate, triangular, trilocular. Seeds: ovate.—*Essential Character*. Corolla six-petalled; filaments inserted into the throat of the corolla. Capsule superior. Glume of the calyx univalve, imbricate.

There is but one species, known by the name of *Aphyllanthes Monspeliensis*: root creeping; culms naked, simple, surrounded at the base with sheaths, like the rush. Glume two-valved, two-flowered; the proper glume also two-valved. Were it not for the corolla, it would be a rush. It grows wild about Montpellier and Nice, in barren pastures and rocky places.

APHYLLANT'IA AFFINIS. See **GLOBULARIA**.

APHYL'LO, *f.* in botany. See **OROBANCHE**.

APHYTE'IA, *f.* [α , and $\phi\upsilon\tau\epsilon\iota\alpha$, Gr. plantless; having neither root, stem, nor leaves.] In botany, a genus of the class monadelphia, order triandria. The generic characters

APHRODITA.

J. Ross sculp.

Two varieties of the aculeated Aphrodite, shewing the upper and under Parts.
Fig. 5. the squamese Aphrodite.

ters are.—Calyx: perianthium monophyllous, semitrifid, funnel-shaped, large, fleshy, erect, permanent. Corolla: rudiments of three petals, growing to the divisions of the calyx; or rather none. Stamina: filaments connate at bottom, short; antheræ convex, cordate, striated. Pistillum: germ inferior; style thickish, short; stigma three-cornered, channelled. Pericarpium: berry one-celled. Seeds: numerous, nestling.—*Essential Character.* Calyx large, funnel-shaped, semitrifid; petals three, inserted into the throat of the tube in the calyx, and shorter than it.

There is only one species, which is called *Aphyteia hydronora*. This is a vegetable without leaves, stem, or root. Parasitical, terrestrial, consisting of a fructification only, which has but one flower, four inches over, sessile, coriaceous, succulent. Calyx large, with an erect trifid border, as it were of double licinias; the inside painted of a white scutiform figure. Smell of the flower and ripe fruit not unpleasant. Very agreeable to foxes and weasels, and eaten both raw and roasted by the Hottentots. First observed at the Cape of Good Hope by Thunberg.

A'PIAN, or A'PIAN (Peter), called in German *Biene-witz*, a celebrated astronomer and mathematician, was born at Leisnig, or Leipzig, in Misnia, in 1495, and made professor of mathematics at Ingolstadt in 1524, where he died in the year 1552, at fifty-seven years of age. Apian wrote treatises upon many of the mathematical sciences, and greatly improved them; particularly astronomy and astrology, which in that age were much the same thing; also geometry, geography, arithmetic, &c. He particularly enriched astronomy with many instruments, and observations of eclipses, comets, &c. His principal work was the *Astronomicum Cesarium*, published in folio at Ingolstadt in 1540, and which contains a number of interesting observations, with the descriptions and divisions of instruments. In this work he predicts eclipses, and constructs the figures of them in plano. In the second part of this work, or the *Meteoroscopium Planum*, he gives the description of the most accurate astronomical quadrant, and its uses. To it are added observations of five different comets, viz. in the years 1531, 1532, 1533, 1538, and 1539; where he first shows that the tails of comets are always projected in a direction from the sun. Apian also wrote a treatise on Cosmography, or Geographical Instruction. In 1533 he made, at Nuremberg, a curious instrument, which from its figure he called *Folium Populi*; which, by the sun's rays, showed the hour in all parts of the earth, and even the unequal hours of the Jews. In 1534, he published his *Inferionis Orbis*. In 1540, his *Instrumentum Sinuum, sive Primi Mobilis*, with 100 problems.

A'PIARY, *f.* [from *apis*, Lat. a bee.] A house or place where bees are kept.—Those who are skilled in bees, when they see a foreign swarm approaching to plunder their hives, have a trick to divert them into some neighbouring *apiary*, there to make what havoc they please. *Swift*.

A'PICE, a town of Italy, in the kingdom of Naples, and Principato Citra: seven miles east-south-east of Benevento.

APICES, *f. plu.* in botany, the little knobs that grow on the tops of the stamina or chives of flowers.

AP'CIAN, *adj.* [from *Apicius*, the subject of the next article.] High-seasoned, voluptuous.

AP'CIUS. There were at Rome three persons of that name, famous for their gluttony: the second is the most celebrated of the three. He lived under Tiberius, spent immense sums on his belly, and invented divers sorts of cakes, which bore his name. After having spent a hundred millions of sesterces in entertainments, about 853,601 l. sterling, he examined into the state of his affairs; and finding that he had but a tenth part of that sum remaining, he poisoned himself, under an apprehension of starving.

APIDANO, a river of European Turkey, which runs into the Peneus, near Larissa.

APIE'CE, *adv.* [from *a*, for each, and *piece*, or share.] To the part or share of each.—Men in whose mouths at first founded nothing but mortification, were come to think that they might lawfully have six or seven wives *apiece*. *Hooker*.

APIE'CES, *adv.* Tombs were hackt and hewn *apieces*. *Weever*.

APIFAC'TURE, *f.* [from *apis*, Lat. a bee, and *facio*, to do.] The curious work of bees.

AP'INA, or APINÆ, a town of Apulia, built by Diomedes, as was also Tricæ. *Apinæ et Tricæ* is a proverbial saying for things trifling and of no value; and *Apinari* was the appellation for triflers or buffoons.

A'PINEL, *f.* An American root, poisonous to serpents, and called by the natives *yabcani*. It has its name from a captain Apiuel, who first made the Europeans acquainted with it.

AP'OLZE, an ancient city of Italy, which was taken by Lucinus Tarquinius the elder; and with the plunder of it, according to Pliny, he founded the capitol of Rome.

A'PION, a famous grammarian, born in Egypt, was a professor at Rome in the reign of Tiberius. He had all the arrogance of a mere pedant, and amused himself with difficult and insignificant inquiries. One of his principal works was his *Antiquities of Egypt*. He wrote also against the Jews, and was answered by Josephus.

APION'TA, *f.* [from *απο*, and *επι*, to go from.] The natural excretions which proceed from the body.

A'PIOS, *f.* in botany. See GLYCINE and EUPHORBIA.

APIOSCOR'ODON, *f.* in botany. See CRATEVA.

A'PIS, the son of Phoroneus, and king of the Argives, who received divine honours after death. Some have imagined that he went into Egypt with a colony of Greeks, and that after death he was worshipped under the name of Seraphis; but others think it was his nephew and successor Argus that went there, and took the name of Osiris.

A'PIS, in the heathen mythology, a divinity worshipped by the ancient Egyptians at Memphis. It was an ox having certain exterior marks, in which the soul of the great Osiris was supposed to subsist. This animal had the preference to all others, as being the symbol of agriculture, the improvement of which that prince had so much at heart. Several learned writers on the Egyptian religion consider Apis as the only symbolical deity. "Amongst the animals consecrated to ancient rites, (says Ammianus Marcellinus,) Mnevis and Apis are the most celebrated: the first is an emblem of the sun, the second of the moon." Porphyry tells us, that Apis bore the characteristic signs of the two stars; and Macrobius, who confirms this opinion, adds, that he was equally consecrated to them both. According to Plutarch, the term of the life of Apis was limited to twenty-five years; which number marked a period of the sun and of the moon, and the bull was consecrated to these two bodies. Syncellius, in his Chronography, when he comes down to the thirty-second Pharaoh, called *Aseth*, says, "Before Aseth, the solar year consisted of 360 days. This prince added five to complete its course. In his reign a calf was placed amongst the gods, and named *Apis*." And in the Bibliotheca of Fabricius we have the following passage: "It was customary to inaugurate the kings of Egypt at Memphis, in the temple of Apis. They were here first initiated in the mysteries, and were obliged to swear, that they would neither insert months nor days in the year, and that it should remain composed of 365 days, as had been established by the ancients." From these facts Mr. Savary, in his letters on Egypt, infers that Apis was the tutelary divinity of the new form given to the solar year, and of the cycle of twenty-five years discovered at the same time. This deity, besides, had a marked relation to the swelling of the Nile, as is testified by a great number of historians. The new moon which followed the summer solstice was the era of this phenomenon, on which the eyes of every body was fixed; and Pliny speaks as follows on this subject: "Apis had on his right side a white mark, representing the crescent. This mark (continues Elian) indicated the commencement of the inundation." If Apis possessed the characteristic signs which proved his divine origin, he promised fertility and abundance of the fruits of the earth. It seems demonstrated, therefore, Mr. Savary adds, that this sacred bull, the guardian of the so-

lar year of 365 days, was also regarded as the genius who presided over the overflowing of the river. The priests, by fixing the course of his life to 25 years, and by making the installment of a new Apis concur with the renewal of the period above-mentioned, had probably perceived, as the result of long meteorological observations, that this revolution always brought about abundant seasons. Nothing was better calculated to procure a favourable reception of this emblematical deity from the people, since his birth was a preface to them of a happy inundation, and of all the treasures of teeming nature. The solemnity of this inauguration was called *Apparition*. That which was renewed every year towards the 12th or 13th of the month *Payn*, which corresponds with the 17th or 18th of June, was called *the birth of Apis*. It was a time of rejoicing, which Ælian describes in the following manner: "What festivals! what sacrifices take place in Egypt at the commencement of the inundation! It is then that all the people celebrate the birth of Apis. It would be tedious to describe the dances, the rejoicings, the shows, the banquets, to which the Egyptians abandon themselves on this occasion, and impossible to express the intoxication of joy which breaks forth in all the towns of the kingdom."

Dr. Bryant, however, apprehends, that the name of *Apis* was an Egyptian term for a father; that it referred to the patriarch Noah; and that the crescent which was usually marked on the side of the animal was a representation of the ark.

A'PIS [from *α*, priv. and *πες*, a foot, because they are born without feet; or from *apis*, to knit together, because they collect together in swarms; or from *οφις*, a serpent, on account of their stings. *Ape*, Ital. *abeja*, Span. *abelha*, Portuguese.] The BEE; in entomology, a genus belonging to the order of hymenoptera. The mouth is furnished with two jaws, and a proboscis infolded in a double sheath; the wings are four in number, the two foremost covering those behind when at rest: in the anus or tail of the females and working bees there is a hidden sting. These insects are distinguished into several species, each of which has its peculiar genius, talent, manners, and disposition. Variety prevails in the order of their architecture, and in the nature of their materials. Some live in society, and share the toils; such are the common bee and the drone. Others dwell and work in solitude, building the cradles of their families; as the leaf-cutter bee does with the rose-tree leaf, the upholsterer with the gaudy tapestry of the corn-rose, the mason-bee with a plaster, the wood-piercer with saw-dust. All are employed in their little hermitage, with the care of providing for the wants of their posterity. The species enumerated by Gmelin are 212; of which the following are the most remarkable:

1. *Apis floriformis*, the black bee, with a cylindrical incurvated belly, having two toothed-like protuberances at the anus, and a kind of prickles on the hind-legs. This bee sleeps in flowers.

2. *Apis dentata*, the shining green bee, with black wings, and a kind of teeth on the hind thighs. The tongue of this bee is almost as long as its body.

3. *Apis variegata*: the breast and belly are variegated with white and black spots; the legs are of an iron colour. It is a native of Europe. This species sleeps in the geranium phæum, or spotted crane's-bill.

4. *Apis rostrata*: the upper lip inflected and of a conical shape, and the belly invested with bluish belts. They build their nests in high sandy grounds, and there is but one young in each nest.

5. *Apis ferruginea*, the smooth black bee, with the feelers, mouth, belly, and feet, of an iron colour. This is a small bee, and supposed to be of an intermediate kind between the bee and wasp. It is a native of Europe.

6. *Apis cariosa*, the yellowish hairy bee: feet and front of a bright yellow colour. It builds in the rotten trees of Europe.

7. *Apis basiliatorum*, the pale-red hairy bee, with the

basis of the thighs black. This is a very large bee, every where covered with a testaceous skin. It is a native of America.

8. *Apis lapidaria*, the red hairy bee, with a yellow anus, builds in holes of rocks.

9. *Apis terrestris*, the humble bee: black and hairy, with a white belt round the breast, and a white anus; it builds its nest very deep in the earth.

10. *Apis violacea*, is a red bee, and very hairy, with bluish wings. It is a native of Europe; it is said to perforate trees, and hollow them out in a longitudinal direction; they begin to build their cells at the bottom of these holes, and deposit an egg in each cell, which is composed of the farina of plants and honey, or a kind of gluten.

11. *Apis muscorum*, a yellow hairy bee with a white belly, builds in mossy grounds.

12. *Apis centuncularis*, the leaf-cutter, or black bee, having its belly covered with yellow down. The nests of this species are made of leaves curiously plaited in the form of a mat or quilt. There are several varieties, all equally industrious.

13. *Apis mellifica*, the domestic honey-bee, an insect whose history has been the subject of many volumes. Almost every writer on entomology has made the manners and economy of these animals a considerable part of his work; and many authors have treated of them, who have entered into no other department of natural history. The celebrated Reaumur, in detailing the economy of these animals, an object to which he applied himself with a perseverance superior to all mankind, has abstracted much of the marvellous from their history; but in return he has enlarged it with many facts and observations formerly unknown, and which succeeding experiments have seldom contradicted.

There are, of the domestic bee, at certain seasons of the year, three kinds in every hive; the males, the females, and the bees without sex. The latter every person is acquainted with; their number is beyond comparison greater than that of the other two kinds. Nature seems to have destined them solely for the purpose of labour; and the whole drudgery of the hive lies upon them; hence they have properly been termed *working bees*. It is only during one or two months of the summer, when the hive is most crowded, that males are found in it; and even then, they do not amount to a tenth part of the whole: but they are of a superior size. During the whole course of the season, except a few days, there is only a single female to be discovered in the most numerous hive. Her fecundity, however, is so prodigious, that she is soon capable of multiplying her family to such a degree, that the hive can no longer contain it. To her the whole swarm, amounting from twenty to forty thousand, owe their birth. Her residence is generally in the interior apartments of the lodging; when she shows herself, she is readily known by her size, being longer than even the male bees, but inferior in thickness. It is this female whom the ancients dignified with the title of *king of the bees*, and whom, with more propriety, the moderns have denominated their *queen*. From a number of well-attested experiments and observations, it appears that her life is more precious than any of the rest; for she is the soul of all their operations. If a hive is deprived of her, however numerous, it will undertake no labour; and the individuals will hardly give themselves the trouble of collecting their daily subsistence. A swarm, busily employed from morning to night constructing cells and collecting wax, immediately upon this accident seem to forget that the flowers contain their food; they scarcely stir from the hive, construct no new cells, nor even finish what was begun; but, the moment she is restored, their wonted spirit and activity is resumed by the whole swarm.

The external parts of bees are happily accommodated, by their structure, to the delicate operations they are destined to perform. Each of them is furnished with a trunk or proboscis, commonly folded up, but capable of being extended

extended at pleasure. It is with this instrument that they collect their food; not by pumping or sucking, but by licking it from the nectaria of flowers. The teeth with which these insects are provided, serve another purpose equally important; they are the instruments by which they fashion and give a proper consistency to the wax. That valuable commodity is not found in a perfect state upon the flowers, as many have imagined; it is there scattered upon the surface in the form of a fine powder or dust, and swept off by the hairy legs of the bee, and deposited in a hollow part of each thigh, prepared for its reception. After being carried in that form into the hive, it is all eaten up by the bee; and by the action of the stomach is brought into the state of genuine wax. From the stomach, the working bee brings it back in small parcels to the mouth like a ruminating animal; and, by chewing it there, fashions it into pieces proper for the construction of the cell to which it is applied, and afterwards polished as the situation requires.

That small scaly spine, commonly termed the *sting* of the bee, is only the case of two needles or darts, extremely fine, and each denuded and united at the point. The wounds made by these slender arms would be little to be apprehended, were their points not impoisoned by a small drop of acrid liquor. This liquor, which, when tasted, burns the tongue, is conveyed along a small canal to the case of the sting, on the tip of which it appears in small drops, when the bee intends to make use of her offensive weapons. However disagreeable this instrument may sometimes prove to us, it is absolutely necessary to the bee, surrounded as that animal continually is with many enemies, whose hostilities are constantly provoked by the honey and wax. The sting of the bee is also used for another purpose, the propriety of which we are not so well able to vindicate. At a certain time, they are busy from morning till night in no other employment than mauling their associates. The males, after the female is fecundated, become useless, and even offensive to the rest of the hive. The working bees, who had formerly been their nurses, and hitherto had lived with them in the best understanding, all at once break loose upon them with unrelenting fury, and in two or three days destroy the whole in one general carnage. Of the reasons alleged by the working bees for this massacre, we are altogether ignorant; we know not upon what claim their power of life and death over the males is founded, farther than that nature seems to have granted such a right, by giving them power to exercise it. These, however, are not the only combats in which the bees are engaged: the working bees of the same hive often quarrel, and challenge each other to battle; the one endeavouring to find a place in the scaly body of his adversary into which he may thrust his sting, and the other as studiously warding off the blow. The first wound that takes place puts an end to the engagement; and the victorious bee walks off, leaving his adversary to expire in the dust. Sometimes three or four attack a single bee, without any design upon his life, but with a view to force him to disgorge his honey; and, as soon as they have succeeded, they lick it up, allowing the former proprietor to walk away. Battles are also occasioned when a neighbouring swarm, from poverty, or a principle of injustice, invade a hive already occupied. Scarcely have they entered the walls of the city, when a general engagement ensues: those who have the right of possession oppose their invaders with all their force, and with undaunted courage; not a minute passes that you do not observe a victorious bee dragging to the door of the hive a dead adversary, or one who is yet struggling in all the agonies of death. These engagements do not close but with the day; and, before victory declares for either party, they often cost thousands their lives; for very often the one who has stung its opponent leaves its weapon in the wound, an accident which proves fatal to itself. Insects of their own species are far from being the only enemies which the bees have to fear;

worms, wasps, hornets, and insects of different kinds, never fail to make their way into the hive, whenever any rent or crevice is left open. When attacked by these robbers, they perish in the unequal combat; and, when dead, their bodies are ripped up, in order to extract from them the honey they contain. Apprised of the fatal consequences of admitting them into the hive, the bees carefully fill up every chink and crevice, not with wax, but with the glutinous matter that exudes from certain trees, a substance still more tenacious. When a bee enters the hive loaded with a quantity of this stuff, it is met by others, who take small particles of it, and apply it to the sides of the part to be stopped up, till they are entirely closed.

A swarm of bees, however numerous, as we have already seen, all owe their birth to a single female. This queen, which Virgil, and the other writers of antiquity have charged with all the cares of government, is indeed busily occupied, but in functions of a different kind; and these are, the production of a vast number of eggs, which she continues to drop, one after another, into the empty cells, during a considerable part of the summer. This animal, which is so amazingly productive, on being opened, has been found to contain upwards of five thousand eggs, all of a size sufficient to be perceptible. If we make allowance for those that were already dropped, and many more not yet formed, so as to become perceptible; we shall no longer deem it incredible, that this animal should in one season become the mother of so many thousands. The most numerous hive is far inferior to the number of spawn that have been taken from the belly of a small fish. During the whole time that the female goes from cell to cell depositing her eggs, she is accompanied by the working bees, who attend her with the most officious care. And, as the males and females are produced by her of a superior size to the rest, the working bees, as if apprised of the circumstance, construct a few cells larger than the rest; and, what is still more remarkable, the female herself knows which of the embryos are to become of her own sex, and accordingly deposits them in cells of a suitable capacity. The cell which is to contain the future queen-bee is of a structure different from all the rest; and in building it, the labourers abandon the hexagonal shape which is best adapted to the saving of labour, and of wax; nothing, in this instance, seems to cost them too dear. The cradle of their future queen consumes as much as a hundred or a hundred and fifty of the ordinary cells.

From the great number of males in each hive to a single female, the ancients were induced to believe, that fecundation among these insects was not accomplished by any act of copulation, but that it was performed by a vivifying liquor shed upon the ova in the cells. But this opinion was overthrown, as soon as it was observed, that for nine or ten months in the year there was no male in the hive. Swammerdam, who could not observe that in these animals there were any parts of generation, therefore supposed, that the female was impregnated solely by the effluvia of the male bees. The observations made by Reaumur have removed those difficulties with which this part of the history of bees seemed to be attended. The female, who is surrounded by so many males, instead of being fatigued and persecuted by their importunities, is obliged to carefs and inflame the passions of these drones, who are the most cold and indifferent of all their sex. She mounts upon their backs, and pushes her gallantry to what may be deemed indecency; at length her allurements produce the desired effect, and copulation is performed. The female thus impregnated proceeds to lay her eggs, which are round and oblong, rather thicker at the one end than the other. Each is deposited in a separate cell, except upon some occasions, when the industry of the working bees has not been sufficient for the fertility of the mother: she then lays two or three in a single cell; the supernumeraries being afterwards carried away and placed by themselves, as soon as new cells are provided. The single egg which remains is fastened to the

bottom of the cell by the small end, the only part which seems to touch it. In a day or two after being placed there, it produces a worm, which the working bees take care to supply with suitable food, consisting of a whitish liquor, which serves it at once for subsistence and a bed; for it lies upon it, folded up like a ring. In the space of six or seven days more, the whole of its growth is completed; and the bees, who know the time at which it no longer needs to be supplied with food, cease to carry it any more. The last office which they render it, is closing up the mouth of the cell, which is done with wax. In the mean time, the young animal within, which hitherto was almost entirely inactive, begins to spin silk, and line the inside of its habitation, as a preparative to its entering into the chrysalis state, in which, for a while, it remains. Thus, in the space of about three weeks after it was first dropped into the cell, the young bee is ready to make its appearance as a winged animal. The first employment, after it has arrived at that period, is to gnaw off the wax with which the mouth of its cell had been stopped up. On its first issuing from the cell, the whole body is wet with the humid substance of the cell; but the affectionate bees flock around, and with their trunks assist in wiping off the moisture. The wings grow dry, and the limbs firm; and, in the course of the same day, it issues forth with the labourers to collect wax and honey, and thereby to make returns to the society for the care with which it has been reared.

Thus, after the commencement of summer, the number of bees daily continues to increase, till, by the month of June, they have become so numerous, that the same hive can no longer contain them. The only measure which then remains to be adopted, is to divide; and in an instant, a large colony prepares to abandon for ever the place of their nativity, and to follow a young queen in forming a new establishment for themselves. It is not merely the number of bees in a hive that determines them to swarm; that event depends upon the young female, who must not only be sufficiently strong to lead the colony, but must also be impregnated; for upon that circumstance depends the whole hopes of the future progeny. But no sooner do all these predisposing circumstances concur in a hive, than it prepares immediately for colonisation. In the evening before that eventful period, indication of their intention is given, by an unusual noise and hurry within the hive. All the morning of the next day passes without hardly a single bee going to collect honey. Those who are to leave the hive are preparing to take their departure; while those that remain behind defer their operations, till their companions, by their leaving them, have afforded sufficient room. It is in the great enterprise of colonisation that the influence of the queen bee is most clearly seen. Wherever she alights, there the whole swarm take up their abode, and all cling round her body. If she is removed, they all fly in quest of her: if put into a hive where she is not placed, they either forsake it or die. Hence the art of those persons is explained, who go about shewing bees, making them alight on different parts of their body, and follow them for any length of time. They have possession of the queen-bee; and by that means can influence the movements of all the others. When a swarm thus migrates from the parent hive, it frequently happens that more than one female accompanies it. The prosperity, however, of the new colony requires that there should be but one; one only is accordingly preserved. In a single day, all the rest are put to death; and it is found that the one which is spared is the best entitled to reign, because she is most fertile, or nearest her period of giving a new progeny to the society. The young females in the old hive, if any remain there, share not a more happy destiny; all the supernumeraries, like those in the swarm, are put to death.

When the bees begin to work in their hives, they divide themselves into four companies: one of which roves in the fields in search of materials; another employs itself

in laying out the bottom and partitions of the cells; a third is employed in making the inside smooth, from the corners and angles; and the fourth company brings food for the rest, or relieves those who return with their respective burdens. But they are not kept constant to one employment; they often change the tasks assigned them: those that have been at work, being permitted to go abroad; and those that have been in the fields already, take their places. They seem even to have signs, by which they understand each other: for, when any of them want food, it bends down its trunk to the bee from whom it is expected, which then opens its honey-bag, and lets some drops fall into the other's mouth, which is at that time open to receive it. Their diligence and labour is so great, that, in a day's time, they are able to make cells which lie upon each other numerous enough to contain 3000 bees. In the plan and formation of these cells they discover a most wonderful sagacity. In constructing habitations within a limited compass, an architect would have three objects in view: first, to use the smallest quantity that can be of materials; next, to give to the edifice the greatest capacity in a determined space; and thirdly, to employ the spot in such a manner that none of it may be lost. On examination, it will be found that the bees have obtained all these advantages in the hexagonal form of their cells: for, first, there is an economy of wax, as the circumference of one cell makes part of the circumferences of those contiguous to it; secondly, the economy of the spot, as those cells which join to one another leave no void between them; and thirdly, the greatest capacity or space; as, of all the figures which can be contiguous, that with six sides gives the largest area. This thriftiness prompts them to make the partitions of their cells thin; yet they are constructed so as that the solidity may compensate for the scantiness of materials. The parts most liable to injury are the entrance of the cells. These the bees take care to strengthen, by adding quite round the circumference of the apertures a fillet of wax, by which means this mouth is three or four times thicker than the sides: and they are strengthened at the bottom by the angle formed by the bottom of three cells falling in the middle of an opposite cell. The combs lie parallel to each other; and there is left between every one of them a space which serves as a street, broad enough for two bees to pass by each other. There are holes which go quite through the combs, and serve as lanes for the bees to pass from one comb to another, without being obliged to go a great way about. When they begin their combs, they form at the top of the hive a root or stay to the whole edifice, which is to hang from it.

It is not easy to discover the particular manner of their working; for, notwithstanding the many contrivances used for this purpose, there are such numbers in continual motion, and succeed one another with such rapidity, that nothing but confusion appears to the sight. Some of them, however, have been observed carrying pieces of wax in their talons, and running to the places where they are at work upon the combs. These they fasten to the work by means of the same talons. Each bee is employed but a very short time in this way: but there is so great a number of them that go on in constant succession, that the comb increases very perceptibly. Besides these, there are others that run about beating the work with their wings and the hinder part of their body, probably with a view to make it more firm and solid.

The crude wax, when brought home by the bees to form their cells, is of as different colours as are the flowers from which it is collected: but the new combs are always of a white colour, which is afterwards changed only by the impurities arising from the steam, &c. of the bees. They likewise collect crude wax for food; for, if this were not the case, there would be no want of wax after the combs are made: but they are observed, even in old hives, to return in great numbers loaded with such matter, which is deposited in particular cells, and is known by the name

of *bee-bread*. We may guess that they consume a great deal of this substance in food by the quantity collected; which, by computation, may in some hives, amount to an hundred weight in a season, whilst the real wax in such an hive does not perhaps exceed two pounds.

Honey is originally a juice digested in plants, which sweats through their pores, and chiefly in their flowers, or is contained in reservoirs in which nature stores it. The bees sometimes penetrate into these stores, and at other times find the liquor exuded. This they collect in their stomachs; so that, when loaded with it, they seem, to an inattentive eye, to come home without any booty at all.

When the bees have collected their honey, the instant they return home, they seek the cells in which they may disgorge and deposit their loads. They have two sorts of stores: one which consists of honey laid up for the winter; and the other of honey intended for accidental use in case of bad weather, and for such bees as do not go abroad in search of it. Their method of securing each of these is different. They have in each cell a thicker substance, which is placed over the honey, to prevent its running out of the cell; and that substance is raised gradually as the cell is filled, till the bees, finding that the cell cannot contain any more, close it with a covering of wax, not to be opened till times of want, or during the winter.

When the bees first settle in swarming, indeed when they at any time rest themselves, there is something very particular in their method of taking their repose. It is done by collecting themselves together in a heap, and hanging to each other by their feet. They sometimes extend these heaps to a considerable length. It would seem probable to us, that the bees from which the others hang must have a considerable weight suspended to them. All that can be said is, that the bees must find this to be a situation agreeable to themselves. They may perhaps have a method of distending themselves with air, thereby to lessen their specific gravity; in the same manner as fishes do, in order to alter their gravity compared with water. Their vigilance to counteract depredation or surprise from a foreign enemy, is highly deserving our admiration. Even during their repose, they plant centinels at the mouth of the hive, to prevent insects of any kind from getting in. But if a snail, or other large insect, should get in, notwithstanding all resistance they sting it to death; and then cover it over with a coat of *propolis*, to prevent the bad smell or maggots which might proceed from the putrefaction of such a large animal. Bees seem also to be forewarned of the appearance of bad weather by some particular feeling. It sometimes happens, even when they are assiduous and busy, that they on a sudden cease from their work; not a single one stirs out; and those that are abroad hurry home in such prodigious crowds, that the doors of their habitations are too small to admit them. It is alleged, that no bee is ever caught even in what we call a sudden shower, unless it has been at a very great distance from the hive, or has been before injured by some accident, or be sickly and unable to fly so fast as the rest. As to the age of bees, the large drones live but a little while, being destroyed without mercy so soon as the office of impregnating the queen bee is performed. Writers are not agreed as to the age of the working bees. Some maintain that they are annual, and others suppose that they live many years.

It has been generally supposed, that the queen-bee is the only female contained in the hive; and that the working bees are neutral, or of neither sex. But M. Schirach has lately established a different doctrine, which has been also confirmed by the later observations of Mr. Debray, of Cambridge. According to M. Schirach, all the working or common bees are females in disguise; and the queen bee lays only two kinds of eggs, viz. those which are to produce the drones, and those from which the working bees are to proceed: and from any one or more of these, one or more queens may be produced; so that every worm of the latter or common kind, which has been hatched about three days, is capable, under certain circumstances,

of becoming the queen, or mother, of a hive. In proof of this doctrine, new and singular as it may seem, he alleges a number of satisfactory and decisive experiments, which have been since verified by those of Mr. Debray. In the early months of the spring, and in any preceding month, even so late as November, he cut off from an old hive a piece of that part of the comb which contains the eggs of the working bees; taking care, however, that it contained likewise worms which had been hatched about three days. He fixed this in an empty hive, or box, together with a portion of honey-comb, &c. or, in other words, with a sufficiency of food and building materials, or wax, for the use of the intended colony. He then put into, and confined within, the same box, a sufficient number of common working bees, taken from the same or any other hive. As soon as the members of this small community found themselves deprived of their liberty, and without a queen, a dreadful uproar ensued, which continued generally, with some short intervals of silence, for the space of about twenty-four hours; during which time it is to be supposed they were alternately meditating and holding council on the future support of the new republic. On the final cessation of this tumult, the general and almost constant result was, that they betook themselves to work; first proceeding to the construction of a royal cell, and then taking the proper measures for hatching and feeding the brood inclosed within them. Sometimes, even on the second day the foundations of one or more royal cells were to be perceived; the view of which furnished certain indications that they had elected one of the inclosed worms to the sovereignty. The final result of this experiment is, that the colony of working bees thus shut up, with a morsel of common brood, not only hatch it, but are found, at the end of eighteen or twenty days, to have produced from thence one or two queens; which have apparently proceeded from worms of the common sort, pitched upon by them for that purpose; and which, under other circumstances, that is, if they had remained in the old hive, there is reason to suppose would have been changed into common working bees. In the present instance, the common worm appears to be converted by them into a queen bee, merely because the hive was in want of one. Hence we may justly infer, that the kingdom of the bees is not, if the expression may be used, a *jure divino*, or hereditary monarchy, but an elective kingdom; in which the choice of their future ruler is made by the body of the people, while she is yet in the cradle, or in embryo; and who are determined by motives of preference which will perhaps for ever elude the penetration of the most sagacious naturalists.

The conclusions drawn by M. Schirach, from experiments of the preceding kind, often repeated by himself and others with the same success, are, that all the common or working bees were originally of the female sex; but that, when they have undergone their last metamorphosis, they are condemned to a state of perpetual virginity, and the organs of generation are obliterated; merely because they have not been lodged, fed, and brought up, in a particular manner, while they were in the worm state. He supposes that the worm, designed by the community to be a queen, or mother, owes its metamorphosis into a queen, partly to the extraordinary size of its cell, and its peculiar position in it; but principally to a certain appropriate nourishment found there, and carefully administered to it by the working bees while it was in the worm state; by which, and possibly other means unknown, the development and extension of the germ of the female organs, previously existing in the embryo, is effected; and those differences in its form and size are produced, which afterwards so remarkably distinguish it from the common working bees. This discovery is capable of being applied towards forming artificial swarms, or new colonies of bees, by which means their number might be increased, and their produce in honey and wax proportionably augmented.

The annexed Plate will in some measure exhibit the structure

structure and economy of the bee. *Fig. 1.* is the queen bee. 2. The drone. 3. The working bee. 4. Represents the bees hanging to each other by the feet, taking their repose. 5. The proboscis or trunk magnified, wherewith they gather the honey and take their nourishment. 6. One of the hind legs of a working bee loaded with wax. 7. A comb in which the working bees are bred: the cells are the smallest of any: a royal cell is suspended on one side. 8. A comb in which the drones are bred, being larger than the former; the young-drones being included in several of them; with two royal cells suspended on the side. 9. A similar comb, in which the royal cell is fixed in the middle, and several common cells are sacrificed to serve as a basis and support to it: in general, the royal cells are suspended on the side of a comb, as in *fig. 7, 8.* At the side of *fig. 9.* two royal cells are begun; they resemble pretty much the cup in which an acorn lies: the other royal cells have the young queens included in them. *Fig. 10.* exhibits the sting and all its parts, magnified: the sting is composed of a sheath or case, and two shanks, united to each other, and terminating in a sharp point, so as to look like a single part; *b*, the poisonous bag; *c*, the tube that conveys the poison to the sting; *dd*, the two shanks of the sting; *ee*, the sheath of the sting; *ff*, the thickest end of the sheath, where the tube opens into it with the poison; *g*, the point of the sting; *h*, the beards or jags with which the sting is armed; *i*, the tube that secretes the poison; *kk*, extremities of the tube; *lll*, cartilages which are articulated with the shanks of the sting; *mm*, two other cartilages, less than the former; *nnnn*, places where the foregoing cartilages are articulated; *oooo*, four muscles serving to move the sting different ways; *pp*, two muscles which draw the shanks of the sting into its sheath; *qq*, two appendages of the sting which are moved along with it, and seem to answer no other purpose but that of ornament. *Fig. 11.* The ovary. 12. Six eggs drawn after nature, and placed on their ends. 13. An egg viewed with a microscope: it resembles the skin of a fish, divested of its scale, but still retaining the marks of their insertion. 14. Worms of bees of different sizes, drawn after nature; *a*, a worm newly hatched; *bcd*, four worms that received more nourishment, and are more grown; *fg*, two worms still larger than the former, having had more nourishment provided for them: they are represented as they lie doubled in their cells; *h*, a worm placed on its belly, so as to shew on its back a black line, which denotes the stomach; *i*, a worm lying on its back, beginning to draw in the hinder part of its body, and move its head. *Fig. 15.* A full-grown worm, viewed with a microscope; *aa*, its fourteen annular incisions or divisions; *b*, the head and eyes, &c. *ccc*, ten breathing-holes. 16. The worm forming its web; *aa*, the sides of the cell that contain it; *b*, bottom of the cell; *c*, entrance or door of the cell: the worm is here represented as making its web to shut up this entrance. *Fig. 17.* A worm taken out of the web, and just ready to cast its skin. 18. A cell containing the worm changed into a nymph, and perfectly lined with the worm's web: likewise the web entire, with the nymph contained in it, as they appear on opening the cell; *aa*, the sides of the cell, lined with the worm's web; *b*, the mouth of the cell, closed by the web; *c*, the bottom of the cell; *d*, the web entire, as it appears on opening the cell, which it greatly resembles in form; *e*, the upper part of the web of a convex form: this part shews its filaments pretty distinctly; *f*, the inclosed nymph appearing through the transparent sides of the web; *g*, the bottom of the web answering to that of the wax-cell. *Fig. 19.* Is a worm changed to a nymph, of its natural size and form, yet so as to exhibit its limbs, which are folded up in a curious manner. 20. The nymph of the bee viewed with the microscope, displaying all the parts of the inclosed insect, and the beautiful manner in which they are laid up; *a*, the head, bloated with humours; *bb*, the eyes, projecting considerably; *cc*, the horns, or antennæ; *d*, the lip; *ee*, the teeth, or jaw-bones; *ff*, the first pair of joints belonging to the pro-

boscis; *h*, the proboscis itself; *ii*, the first pair of legs; *hh*, two transparent little parts, lying against the lowest joints of the first pair of legs; *ll*, the second pair of legs; *mm*, the wings; *nn*, the blade bones; *oo*, the last pair of legs; *pp*, the abdominal rings; *q*, the hinder part of the body; *r*, two little parts accompanying the sting; *s*, the anus. *Fig. 21. a*, A cell full of bee-bread, placed in layers; *b*, little grains, of which the said substance, viewed with a microscope, appears to consist.

Of the MANAGEMENT of BEES.

OF THE APIARY, and HIVES. Columella directs that the apiary face the south, and be situated in a place neither too hot nor too much exposed to the cold: that it be in a valley, in order that the loaded bees may with greater ease descend to their homes: that it be near the mansion-house, on account of the convenience of watching them; but so situated as not to be exposed to noisome smells, or to the din of men or cattle: that it be surrounded with a wall, which however should not rise above three feet high: that, if possible, a running stream be near them: or, if that cannot be, that water be brought near them in troughs, with pebbles or small stones in the water, for the bees to rest on while they drink; or that the water be confined within gently-declining banks, in order that the bees may have safe access to it; they not being able to produce either combs, honey, or food for their maggots, without water; and that the garden in which the apiary stands, be well furnished with such plants as afford the bees plenty of good pasture. Columella mentions thyme, the oak, the pine, the sweet-smelling cedar, and all fruit-trees. Experience has taught us, that furze, broom, mustard, clover, heath, &c. are excellent for this purpose. Pliny recommends broom, in particular, as a plant exceedingly grateful and very profitable to bees.

With regard to hives, those made of straw are generally preferred on several accounts: they are not liable to be over-heated by the rays of the sun; they keep out cold better than wood or any other materials; and the cheapness renders the purchase of them easy. Those who intend to erect an apiary, should purchase a proper number of hives at the latter part of the year, when they are cheapest. The hives should be full of combs, and well stored with bees. The purchaser should examine the combs, in order to know the age of the hives. The combs of that season are white, those of the former year are of a darkish yellow; and, where the combs are black, the hive should be rejected, because old hives are most liable to vermin and other accidents. The summer is an improper time for buying bees, because the heat of the weather softens the wax, and thereby renders the combs liable to break, if they are not very well secured. The honey, too, being then thinner than at other times, is more apt to run out of the cells; which is attended with a double disadvantage, namely, the loss of the honey, and the daubing of the bees, whereby many of them may be destroyed. A first and strong swarm may indeed be purchased; but leave should be obtained for them to stand in the same garden till the autumn.

OF HIVING. Bees begin to swarm in May, or in the end of April, but earlier or later according to the warmth of the season. They seldom swarm before ten in the morning, and seldom later than three in the afternoon. When the bees of a swarm fly too high, they are made to descend lower, by throwing handfuls of sand or dust among them, which they probably mistake for rain. For the same purpose, it is usual to beat on a kettle or frying-pan: this practice may have taken its rise from observing that thunder or any great noise prompts such bees as are in the fields to return home. As soon as the swarm is settled, the bees which compose it should be got into a hive with all convenient speed, to prevent their taking wing again. If they settle on a small branch of a tree, easy to come at, it may be cut off and laid upon a cloth; the hive being ready immediately to put over them. If the branch cannot

not be conveniently cut, the bees may be swept off into a hive. The hive should not be immediately set on the stool where it is to remain; but should be kept near the place at which the bees settled, till the evening, lest some stragglers should be lost. It should be shaded either with boughs or with a cloth, that the too great heat of the sun may not annoy the bees.

OF FEEDING BEES IN WINTER. Providence has ordained, that insects which feed on leaves, flowers, and green succulent plants, are in an insensible or torpid state from the time that the winter's cold has deprived them of the means of subsistence. Thus the bees during the winter are in so lethargic a state, that little food supports them: but, as the weather is very changeable, and every warm or sunny day revives them, and prompts them to return to exercise, food becomes necessary on these occasions. Many hives of bees which are thought to die of cold in the winter, in truth die of famine; when a rainy summer has hindered the bees from laying in a sufficient store of provisions. The hives should therefore be carefully examined in the autumn, and should then weigh at least eighteen pounds. There is still, however, a want of experiments to ascertain both the time and the manner in which bees should be fed.

The following directions given in the *Maison Rustique* seem to be very judicious. Replenish the weak hives in September with such a portion of combs full of honey taken from other hives as shall be judged to be a sufficient supply for them. In order to do this, turn up the weak hive, after taking the precaution of defending yourself with the smoke of rags, cut out the empty combs, and put the full ones in their place; where secure them with pieces of wood run across, in such manner that they may not fall down when the hive is returned to its place. The bees will soon fix them more effectually. If this method be thought too troublesome, set under the hive a plate of liquid honey, unmixed with water, with straws laid across it, and over these a paper pierced full of holes, through which the bees will suck the honey without daubing themselves. This should be done in cloudy or rainy weather, when the bees stir least abroad; and the hive should be covered, to protect the bees from robbers, who might be allured to it by the smell of the honey. Another circumstance which may render it very necessary to feed the bees is, when several days of bad weather ensue immediately after they have swarmed; for then, being destitute of every supply beyond what they carried with them, they may be in great danger of starving. In this case, honey should be given them in proportion to the duration of the bad weather.

OF TAKING THE HONEY AND WAX. In this country it is usual, in seizing the stores of these little animals, to rob them also of their lives. The common method is, That when those which are doomed for slaughter have been marked out (which is generally done in September), a hole is dug near the hive, and a stick, at the end of which is a rag that has been dipped in melted brimstone, being stuck in that hole, the rag is set on fire, the hive is immediately set over it, and the earth is instantly thrown up all around, so that none of the smoke can escape. In a quarter of an hour, all the bees are seemingly dead; and they will soon after be irrecoverably so, by being buried in the earth that is returned back into the hole. By this last means it is that they are absolutely killed; for it has been found by experiment, that all the bees which have been affected only by the fume of the brimstone, recover again, excepting such as have been singed or hurt by the flame. Hence it is evident, that fume of brimstone might be used for intoxicating the bees, with some few precautions. The heaviest and the lightest hives are alike treated in this manner: the former, because they yield the most profit, with an immediate return; and the latter, because they would not be able to survive the winter. Those hives which weigh from fifteen to twenty pounds are thought to be the fittest for keeping. More humane and judicious methods were practised by the ancients; and successful attempts

have lately been made in our own country, to attain the desirable end of getting the honey and wax without destroying the bees.

Mr. Thorley, in his Inquiry into the Nature, Order, and Government, of Bees, has this object principally in view; and he thinks colonies in boxes preferable to hives, for the following reasons: 1st, The more certain preservation of very many thousands of these useful creatures. 2dly, Their greater strength, which consists in numbers, and consequently their greater safety from robbers. 3dly, Their greater wealth, arising from the united labours of their greater number. He tells us, that he has in some summers taken two boxes filled with honey from one colony; and yet sufficient store has been left for their maintenance during the winter; each box weighing forty pounds. Add to these advantages, the pleasure of viewing them, with the greatest safety, at all seasons, even in their busiest time of gathering, and their requiring a much less attendance in swarming time. The bees thus managed are also more effectually secured from wet and cold, from mice and other vermin. For this purpose boxes are made of deal, which, being spongy, sucks up the breath of the bees sooner than a more solid wood would do. Yellow dram-deal thoroughly seasoned is the best. An octagon, being nearer to a sphere, is better than a square form; for as the bees, in winter, lie in a round body near the centre of the hive, a due heat is then conveyed to all the out-parts, and the honey is kept from candying. The dimensions which Mr. Thorley recommends for the boxes, are ten inches depth, and twelve or fourteen breadth in the inside. There should be a glass-window behind, fixed in a frame, with a thin deal cover, two small brass hinges, and a button to fasten it. This window will be sufficient for inspecting the progress of the bees.

The London Society of Arts, having, among their premiums for the year 1790, proposed a reward for the most satisfactory mode of managing and preserving bees, and for collecting honey and wax, the same was adjudged to Mr. Thomas Morris, of Isleworth, for the following Paper, addressed to that society:

"My Lords and Gentlemen,—Were it the custom to ornament your gardens with that useful piece of furniture, an apiary, properly situated, and carefully managed, the public might be furnished with the valuable article of honey without adulteration, and your cellars be furnished with excellent mead, little inferior to foreign white wines. Hoping that such a fashion may yet prevail in the future allotment and disposal of garden and pleasure grounds, permit me to lay before you the construction of my own apiary, and the management of my bees.

"My hives are made in the following manner: nine inches deep, and fourteen diameter, containing each about five Winchester gallons, with a flat top made of well-seasoned deal, an inch thick; four holes at the top, one exactly over the mouth of the hive, the other three in a right angle, viz. take an inch centre-bit; make three holes as near as possible, so that you have but a small partition of wood between them; let them be made smooth and neat; then take a circular piece of half-inch board, tack it over those holes which are made in the hive, and let them be made to fit so close that no moth can get in among the young bees: so that, when a swarm is put in one of these hives in May, or the beginning of June, and begins to fill the hive with combs, brood, &c. which you may easily perceive by means of small pieces of glass, three inches square, put in the back of the hive, to observe their operations, and when the bees have filled their hive, and appear very busy at the mouth, open gently the hole on the top next the mouth, or rather right over the mouth, and place a glass or small hive over the hole, with proper sticks in the glass for the bees to hang their work upon; otherwise they would be a long time filling their glass, which, if they kindly take to, they will fill in twelve or fourteen days. But if your stock increases, and, perhaps, lies out at the mouth of the hive, you must open a second hole at

the top, and then a third, and so on to the fourth, if the bees increase, and continue to lie out at the mouth: and yet many of my hives have swarmed, and left their glasses only half full of honey, in order to follow the mother bee, to settle a new colony. What I call a *mother*, most writers on bees call a *queen*; but I am satisfied she is the real mother of the whole empire and stock; and hence may be deduced that filial affection and love so conspicuous in the whole community for the mother bee, which has been vaguely and erroneously compared to the mere loyalty of subjects for their sovereign. Those stocks, the mothers of which do not breed so fast as others, of course cannot swarm so early; therefore I put on them glasses, or small hives: if the stocks so glassed keep swarming without swarming, you most likely will get sixteen or seventeen pounds of honey in a month's time, and save all the bees alive; and such a stock will, except by accident, make a good stock next season.

"My hives, made as before described, have a board at the top, seventeen inches wide, that is a full inch wider than the outside of the hive, that one may stand on another; and thus you may make complete colonies of bees with a small expence, for three hives make a complete colony. When hives are made in this manner, they cost but 12s. but, in octagon boxes, 1l. 10s. I much prefer straw hives, well made, to wooden ones, because the joints of the wood often give way, by being exposed to the weather and the sweat of the bees; and the moth-fly (the greatest enemy they have) gets in and lays her eggs in the comb, and the warmth of the bees hatches them to their own destruction; therefore straw hives are preferable, as well as cheaper than wood. My method of managing straw hives is thus: when I make use of an old straw hive, I dip it into a copper of boiling water, so that, if there should be any moth's eggs, they must be destroyed; but I let the hive be perfectly dry before I use it.

"The best situation for an apiary is a little to the west of the fourth; for the sun, shining into the mouth of the hive too early, calls the bees abroad before the cold steam is exhaled from the flowers, and the vernal juice turned into honey: but in this situation the sun will reach the front of your apiary about nine o'clock. I would have the front leaning a little inwards, that the mouth of the hive may fit close to the mouth made in the boards, which should be three inches long in summer, and one in winter, and about one-fourth of an inch high, the better to keep out cold and the bevering moth, which you may often see, at the latter end of August, (when the working of the bees begins to decline,) standing at the mouth of the hive, bevering their wings, as if just flying in among the bees: they are then laying their eggs, and with the wind of their wings fan them within the hive; and the warmth of the bees hatches them. In October every stock should be well examined, and all the maggots brushed out, to prevent danger: for the grub or maggot forms a chrysalis, with a covering so strong, that the bees cannot displace them; and in the spring they creep out of their little sepulchres, and spin a thin web before them, as they march up into the hive among the combs; and the bees, endeavouring to dislodge them, are entangled in the web, and there die: and thus, for the want of a little trouble, many stocks are destroyed.

"To cleanse the hive of these maggots, it must be turned up, and the dust and vermin picked out, and then gently set down in its place. If your bees are well, and in a condition to stand the winter, and have a mother with them, they will sting, otherwise not, unless you hurt them: however, a yard and a half of Scotch gauze, sewed round the brim of your hat, and then tied round the waist, having holes for your arms, will completely secure your face. The hive should also be brushed on the outside very clean, and washed all over with a sponge dipped in brine made with clean salt; a small quantity of lime and hair, made fine, should be put round the bottom, and the hives be covered with hay or hay-bands.

"I come now to my method of feeding them, which, I think, is new. Sink a cavity in the middle of the floor, about six inches diameter, like a trencher, deep enough to hold a quarter of a pint of honey, and no more: if the cavity be too deep, the bees may be suffocated. A channel must be made from the outside of the floor, to communicate with the cavity; and a piece of wood to fit close into it, to keep out the vermin. If your bees do not weigh sixteen or seventeen pounds, exclusive of the hive, they must be fed in September, October, March, and April, and sometimes in May: they must not be fed in cold weather, for that calls them from sleep, and they then never return to the hive again: nor must they be fed in the sunshine; for, when the honey smells strong, it sets them quarrelling and fretting, and the strong injure the weak. The best time is evening, when I take the piece of wood out of the channel, and gently pour a quarter of a pint of honey into the cavity: if the honey will not run freely, I boil up four or five pounds with a quart of strong sweet-wort, which brings it to a proper liquid. This food will be of great service to the mothers, and make them lay eggs in abundance in the spring.

"If a stock has been glassed two summers, it should not be worked a third; but, if it increase, take a new hive, or a clean old one, and take off all the covers from the top of the hive: let it be stuck the same as if you were to have a new swarm; place it on one of the floors; and, having opened the hole on the top nearest the back, place a piece of lath diagonally from that hole to the side of the mouth; let it be made fast with pegs, not nails, lest the honey be stained; then place the old hive upon the new one, and stop the old mouth close; and the bees will then gradually work down the new hive: that will give them sufficient room for the summer. And, next spring, take another clean hive, and place the two upon it, in the same manner as before: this will serve for the next year. Now, having had no honey for two years, the upper hive will most likely be full, and may be taken away as follows: With a strong chisel separate the top hive from the other two; and in a fine day take it away, twenty or thirty yards, and place it on the ground bottom upwards; and secure the holes on the top of the second hive. The bees no doubt will rage; but you must secure yourself with gauze, as before directed, and wear black stockings, for that colour is least observed. Place a table even with the mouth of the lowest hive, and spread a cloth over it, near the mouth, and by this time the greater part of the bees that were out will come home: the middle hive being the breeding-place, it is most likely the mother is in that; but, if she was in the top, she may yet be safe. Place a clean hive, of the same diameter as that you have taken away, upon it; then tie a cloth over both, (glasses and all, if there be any,) so tight, that the bees within may be in darkness: let them remain thus half an hour; then, with a stick, rap the bottom hive, but not so hard as to injure the combs; continue rapping half an hour; then untie the cloth, and take away the upper hive, into which the noise has driven the bees, and place it on the table and cloth from whence you took them, and shake them out on the cloth, and they will run into the mouth of their proper hive. If necessary, repeat this operation, and all the bees will be preserved: this saves the trouble and loss of smothering them with sulphur, as is the custom; and the bees, in one day, will forget the injury, and work as usual. But, in case little honey is left in their two hives, they must be fed; thus, in two hours, your honey may be taken, and the bees preserved: the honey you have obtained in this way may be dark, but will make excellent meat; but better and brighter will be produced by those which work in glasses.

"Apiaries will not be beneficial in barren countries; but should be near gardens, shrubberies, orchards of cherries, or farms where clover, beans, fainfoin, or French wheat, grow. Lime-trees, or green-house plants, set out in the spring, and orange or lemon trees, are useful, and produce excellent

excellent honey: where there is room, it is worth while to plant gooseberries, currants, sweet marjoram, peppermint, or the like. Though I am not for preventing bees from swarming when they are inclined, yet I acknowledge that it is sometimes necessary to destroy some stocks. If they have lost their mother, and neither swarm nor work much, they should not be kept. The moth, or other accident, will sometimes spoil them, and then they should be destroyed. If bees continue in one hive for four or five years, they always degenerate, and become both fewer and weaker: the reason is, the combs for breeding are generally made on purpose, and larger than the rest; every time a bee is hatched in one, a skin or coat is left behind, which reduces the size; and in time it becomes too small to produce a bee of its proper dimensions, and occasions a necessity for their having frequently new habitations, which they will always accept, if you provide them a good situation and clean hives."

A'PISH, adj. Having the qualities of an ape; imitative. Foppish; affected. Silly; trifling, insignificant.—All this is but *apish* fopphistry; and to give it a name divine and excellent, is abusive and unjust. *Glanville.* Wanton; playful.

Gloomy fits the queen,
Till happy chance reverts the cruel scene;
And *apish* folly, with her wild resort
Of wit and jest, disturbs the solemn court.

Prior.

A'PISHLY, adv. In an apish manner; foppishly; conceitedly.

A'PISHNESS, f. Mimickry; foppery; insignificance; playfulness.

APIT'PAT, adv. [a word formed from the motion.] With quick palpitation.—O there he comes. Welcome my bully, my back: agad, my heart has gone *apitpat* for you. *Congreve.*

A'PIUM, [from *apes*, bees, because these insects are said to delight in it; or from *apex*, the head, which on some occasions was crowned with this herb.] In botany, a genus of the pentandria digynia class, ranking in the natural order of umbellatæ or umbellifere. The generic characters are—Calyx: umbel universal of fewer rays; partial of more. Involucre universal small, of one or more leaflets; partial similar: proper perianth obsolete. Corolla: universal uniform; floscules almost all fertile; proper, petals roundish, inflex, equal. Stamen: filaments simple; anthers roundish. Pistillum: germ inferior; styles reflex; stigmas obtuse. Pericarpium: none; fruit ovate, striated, splitting in two. Seeds: two, ovate, striated on one side, plane on the other.—*Essential Character.* Fruit ovate, striated; involucre one leaved; petals equal.

Species. 1. *Apium petrocelinum*, or parsley: Stem-leaves wedge-shaped. Of this there are the following varieties: 1. *Apium sativum*, or common parsley. The stems of parsley are round, smooth, striated. Usually there is one leaflet at the origin of the universal umbel, and an involucre of six or eight short folioles fine almost as hairs to the partial umbel. Flowers pale yellow, regular; petals small, long, narrow, acuminate, inflex. Seed short, turgid. The common parsley, which is generally cultivated for culinary use, is a biennial plant, and is said by Linnæus to be found wild in Sardinia, by brooks. The roots of parsley are sometimes used in apozems, and supposed to be aperient and diuretic, but liable to produce flatulencies. When large quantities are distilled, two or three drams of essential oil separate from 200 pounds. The leaves are warmer, but less sweet than the roots; they yield about ten drams of essential oil from 200 pounds. The seeds are warmer and more aromatic than any other part, and are accompanied with a considerable bitterness; they are accounted carminative, resolvent, and diuretic, and are recommended in the German ephemerides for destroying cutaneous insects in children. In distillation, three pounds yield above an ounce of essential oil. Parsley is said to be fatal to small birds.

It has sometimes been accused of causing epileptic symptoms, and of aggravating that complaint where it already exists: it has been said also to injure the eyes. A cataplasin of the leaves is reported to be resolvent and discent, if applied to glandular tumours: and also to be an efficacious remedy in curing the bites or stings of poisonous insects. According to some, the human calculus in a decoction of the leaves becomes friable; and hence the plant has been considered as of great efficacy in cases of the stone. For the distinction between this and fool's-parsley, see *ÆTHUSA*. ii. *Apium crispum*, curled parsley. The surest way to avoid any hazard, is to cultivate the curled parsley; which Mr. Miller affirms will remain constant, provided care be taken to separate all the plants which have thin leaves, when seed is to be saved from them. Columna informs us, that this variety is a native of Sardinia, and has been distributed from that island into the rest of Europe. iii. *Apium latifolium*, large-rooted parsley or Hamburgh parsley, is chiefly cultivated for its roots, which are now pretty commonly sold in the London markets; the leaves have much longer footstalks, and their subdivisions are not so numerous as in the common parsley; the leaflets are much larger, and of a darker green, so that it is easily distinguished from the common the common sort by its leaves, but the roots are six times as large as the common parsley can be brought to with the utmost culture. This sort was many years cultivated in Holland before the English gardeners could be prevailed upon to sow it. It is now however more familiar to us, and the roots are much esteemed in soups: in Holland they have long brought the roots to market in bunches, as we do young carrots. It is in season with us from July to Christmas, or March, according to the season.

2. *Apium graveolens*, or smallage: stem-leaves wedge-shaped. Of this there are also three varieties. This species grows in ditches and marshes, flowering from July to September. Biennial. The fresh roots, especially in their native watery places, are fetid, acrid, and supposed to be noxious. By drying, they lose the greatest part of their ill flavour, and become sweetish. In this state they have been employed in apozems, as aperients and diuretics. The seeds have been sometimes used as carminatives and aperients. They have a moderately strong grateful smell, and a warm bitterish taste. Mr. Miller affirms that he cultivated smallage forty years, to try if by art it could be brought to the same goodness as *celeri*; but all that he could do was to bring it to a larger size, and by earthing to give it a whiteness: it would not grow tall, nor rise with a straight stem, but sent out many suckers near the root, and after it was blanched, retained its strong, rank, taste. In more southern climates, however, this change has been effected with success; and Ray affirms that *celeri*, left to itself, will return after some years to smallage. i. *Apium dulce*, or upright *celeri*. Smallage, as improved by culture, has taken the Italian name of *celeri*, and in this state is reckoned not only wholesome, but serviceable for strengthening the stomach and assisting digestion. It is a good antiscorbutic, but said to be hurtful to persons predisposed to epileptic complaints. The expressed juice, taken to the quantity of six ounces, in the beginning of the shaking fit, it is said to conquer an intermittent by exciting sweat. The juice is also esteemed efficacious in calculous cases, like that of parsley. The blanched stalks have a sweetish warm taste, without any of the bad flavour of the wild plant. It is scarcely necessary to mention, that they are in great request in soups, for stewing, and as a raw salad herb, from August to Christmas, or even March, if the winter be not too severe, or if the beds be covered with stable muck or haulm in case of hard frost. The London gardeners cultivate two varieties; 1. the hollow *celeri*, which has been long known; and 2. the solid, which is of later introduction, and is preferred by some, for soups and stewing; but is not so proper for the main winter crop, because it

will

will not endure the frost so well as the other; nor for the market-gardener, because it is very brittle, and easily breaks in washing and bunching up for the market. Celeris, though a biennial, will run to seed the same year if sown very early. The seeds of this are much inferior in aromatic flavour to those of smallage. ii. *Apium rapaceum*, celeriac, or turnip-rooted celeri. iii. *Apium lufitanum*, or Portngal celeri.

Propagation and Culture. The common and curled parsley must be sown early in the spring, for the seeds remain a long time in the earth, the plants seldom appearing in less than four or six weeks after the seeds are sown. This sort is generally sown in drills by the edges of borders in the kitchen-gardens near London, because it is much easier to keep it clear from the weeds than if the seeds are sown promiscuously on a border, and the parsley is much sooner cut for use: but, when the roots are desired for medicinal use, then the seeds must be sown thin: and, when the plants are come up, they should be hoed out single, as is practised for carrots, onions, &c. observing also to cut up the weeds: if this be observed, the roots will become fit for use by July or August, and continue so till the spring. The common parsley is, by some skilful persons, cultivated in fields for the use of sheep, it being a sovereign remedy to preserve them from the rot, provided they are fed twice a-week for two or three hours each time with this herb; but hares and rabbits are so fond of it, that they will come from a great distance to feed upon it; and, in countries where these animals abound, they will destroy it, if it is not very securely fenced against them. The best time for sowing it in the fields is about the middle or latter end of February: the ground should be made fine, and the seeds sown pretty thick, in drills drawn at about a foot asunder, that the ground may be kept hoed between the drills, to destroy the weeds, which, if permitted to grow, will soon overrun the parsley. One bushel of seed will sow an acre of land. Large-rooted parsley may be cultivated by sowing the seeds in good ground early in the spring; and in April, when the plants are up, cut them out with a hoe (as is practised for young carrots) to about five or six inches square, and keep them constantly clean from weeds; and in July the roots will be fit to draw for use, and may be boiled and eaten as young carrots; and are very palatable and wholesome, especially for those who are troubled with the gravel. But if these plants are cut out, to allow them more room, if the soil is good, the roots will grow to the size of a middling parsnep by September.

Smallage, being a common weed by the side of ditches and brooks of water, in many parts of England, is seldom cultivated in gardens; but, if any person is willing to propagate it, the seeds should be sown soon after they are ripe, on a moist spot of ground; and, when the plants come up, they may be either transplanted in a moist soil, or hoed out, and left six or eight inches asunder, where they may remain for good. The seeds of the upright and turnip-rooted celeri should be sown at two or three different times, the better to continue it for use through the whole season, without running up to seed. The first sowing should be in the beginning of March, upon a gentle hot-bed; the second may be a fortnight or three weeks after, which ought to be in an open spot of light earth, where it may enjoy the benefit of the sun; the third time of sowing should be the end of April, or beginning of May, which ought to be in a moist soil: and, if exposed to the morning sun only, it will be so much the better, but it should not be under the drip of trees. The seeds which are sown in the hot-bed will come up in about three weeks or a month after sowing, when the plants should be carefully cleared from weeds; and, if the season prove dry, they must be frequently watered; and, in about a month or five weeks after it is up, the plants will be fit to transplant: you must therefore prepare some beds of moist rich earth, in a warm situation; in which you should prick these young plants, at about

three inches square, that they may grow strong; and, if the season should prove cold, the beds must be covered with mats to screen the plants from morning frosts, which would retard their growth: you must also observe, in drawing these plants out of the seed-beds, to thin them where they grow too thick, leaving the small plants to get more strength before they are transplanted; by which means one and the same seed-bed will afford three different plantings, which will accordingly succeed each other for use. You must observe, if the season prove dry, to keep the plants diligently watered after they are transplanted, as also to clear the seed-beds from weeds; and after every drawing keep them duly watered to encourage the small plants left therein. The middle of May some of the plants of the first sowing will be fit to transplant for blanching; they should be planted in a moist, rich, light, soil, upon which the first planted celeri will often grow to be twenty inches long in the clean blanched parts, which upon a poor or dry soil seldom rises to be ten inches. The manner of transplanting it is as follows: after having cleared the ground of weeds, you must dig a trench by a line about ten inches wide, and six or seven inches deep, loosening the earth in the bottom, and laying it level; the earth that comes out of the trench should be equally laid on each side the trench to be ready to draw in again, to earth the celeri as it advances in height. These trenches should be made at three feet distance from each other; then place the plants in the middle of the trench, at about four or five inches distance, in one straight row, having before trimmed the plants, and cut off the tops of the long leaves; when they are planted, you must observe to close the earth well to their roots, and to water them plentifully until they have taken fresh root; after which it will be needless, except in dry soils, or very dry seasons: as these plants advance in height, you must observe to draw the earth on each side close to them, being careful not to bury their hearts, nor ever to do it but in dry weather, otherwise the plants will rot. When the plants have advanced a considerable height above the trenches, and all the earth which was laid on the sides has been employed in earthing them up, you must then make use of a spade to dig up the earth between the trenches, which must also be made use of for the same purpose, continuing from time to time to earth it up until it is fit for use. The first of your planting out will, perhaps, be fit for use by the beginning of July, and will be succeeded by the after plantations; and, if the latter sowings are rightly managed, there will be a succession of celeri for use till April; but you should observe to plant the last crop in a drier soil, to prevent its being rotted with too much wet in winter; and also if the weather should prove extremely sharp, you will do well to cover your ridges of celeri with some pease-haulm, or some light covering which will admit the air to the plants; for, if they are covered too close, they will be very subject to rot; by this means you may preserve your celeri in season a long time, but you must remember to take off the covering whenever the weather will permit. By this method of covering the celeri, the frost being kept out of the ground, it may be always taken up for use when it is wanted. The celeri, when fully blanched, will not continue good above three weeks or a month before it will rot or pipe: therefore, in order to continue it good, you should have at least six or seven different seasons of planting; and if it be only intended to supply a family, there need not be much planted at each time. The best method to save seed of upright celeri, is to make choice of some long good roots, which have not been too much blanched, and plant them out at about a foot asunder in a moist soil, early in the spring; and, when they run up to seed, keep them supported with stakes, to prevent their being broken down by the winds: and in July, when the seed begins to be formed, if the season should prove very dry, it will be proper to give some water to the plants, which will greatly

ly help their producing good seeds. In August these seeds will be ripe, at which time the plants should be cut up, in a dry time, and spread upon cloths in the sun to dry; then beat out the seeds, and preserve them dry in bags for use.

A'PIUM MACEDO'NICUM. See BUBON.

A'PIUM PETRÆ'UM and MON'TANUM. See ATHAMANTA.

A'PIUM PYRENA'ICUM. See CRITHMUM.

APLA'NES, [απλανής, Gr. not wandering.] The fixed stars, so called in opposition to the planets; also the spheres themselves in which they are placed.

APLU'DA, *f.* [The name of the chaff, &c. that flies off from grain.] In botany, a genus of the polygamia monoecia class, of the natural order of gramina or grasses. The generic characters are—I. Calyx: involucre common univalve; valve ovate, concave, terminated by a very short point or leaflet, two-flowered, the inferior flower sessile in the short, ovate, truncate, hollow, base, which is continued into opposite, glumaceous, linear, flat, vertical, footstalks, (one at each side of the flower;) on one of these sits the superior flower; on the other a very short rudiment of a flower; flower inferior hermaphrodite, almost entirely lying hid between the footstalks. Calyx: involucre proper univalvate; valvelet lanceolate, compressed, rigid, double-toothed at the tip, smooth, embracing the flower with its margins beneath; opposite to the common involucre. Glume one-flowered, two-valved; valvelets membranaceous, transparent, shorter than the involucre; the exterior navicular, gibbous on the back, keeled, contracted towards the tip, acuminate; the interior ventricose, somewhat sharp, smaller. Corolla: glume bivalve, membranaceous, extremely thin, transparent; valve exterior navicular, compressed, smooth, hyaline; gibbous on the back, bifid, acute, awned below the tip, hid within the exterior valve of the calyx, and shorter than it; the interior lanceolate, flat, acute, doubled together at each margin, the exterior rather longer. Nectary very small, two-leaved, truncate-rounded, hyaline. Stamen: filaments three, capillary. Anthers linear, bifid on each side. Pistillum: germ oblong, small. Styles two, capillary upright, longer than the germ. Stigmas oblong, villose, spreading, protruded on each side from the flower. Pericarpium: none. Corolla cherishes the seed, gapes and drops it. Seed: ovate-oblong, compressed, smooth. II. Flower superior smaller. Calyx: glume two-flowered, two-valved; valves lanceolate, broadish, flat, sharp, nervose, nearly equal. One floscule female, (within the inner valve of the calyx;) the other male or neuter. Corolla: of the female; glume bivalve; valves membranaceous, hyaline; the exterior ventricose, cornered, sharp-pointed; the interior lanceolate, narrower, shorter, obtuse. Of the male; glume bivalve; valves lanceolate, membranaceous, hyaline; the exterior somewhat ventricose, sharp; the interior narrower, shorter. Nectary in both as in the inferior flower. Stamen: of the male as in the inferior flower. Pistillum: of the female as in the inferior flower. Pericarpium and seed of the female as in the inferior flower.—*Essential Characters.* Calyx: glume common; bivalve, female floret sessile, males peduncled. Male: calyx, none; corolla, bivalve; stamina, three. Female: calyx, none; corolla, bivalve; style, one; seed, one, covered.

Species. 1. *Apluda mutica*; leaves lanceolate, all the flowers awnless. 2. *Apluda aristata*: leaves lanceolate; male flowers, awnless, one at the end sessile and awned. Natives of India.

3. *Apluda zeugites*, or mountain reed-grass: leaves ovate; male flowers awnless, one at the end sessile and awned. Native of Jamaica. Browne says, that he found this curious little plant at the cold spring, in the mountains of New Liguanea, growing in a rich shady soil. He calls it *mountain reed-grass*.

4. *Apluda digitata*; spikes digitate, flowers pointing one way. A lofty East-Indian grass discovered by Thunberg.

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APLUS'TRE, *f.* [Lat.] The ancient ensiga carried in sea vessels.—The one holds a sword in her hand, to represent the Iliad; as the other has an *aplustre*, to represent the Odyssey, or voyage of Ulysses. Addison.

APNOE'A [απνοια, of α privative, and πναι, to breathe, Gr.] want of breath, an entire suppression of breathing, or at least as to sense, as it happens to persons in a swoon.

APOBATA'NA, anciently the metropolis of Media, where the kings kept their treasures; supposed to be the same with Ecbatana.

APOBATE'RION, in antiquity, a valedictory speech or poem made by a person on departing out of his own country, and addressed to his friends or relations.

APOBA'THRA, a place near Sestos; the landing place where Xerxes's ships were frozen and stuck in the ice.

APO'CALYPSE, *f.* [from ἀποκαλυπτω, Gr. to reveal or discover.] Revelation; discovery: a word used only of sacred writings; and in general means the revelation of St. John.

O for that warning voice, which he who saw

Th' *apocalypse* heard cry in heav'n aloud. Milton.

The book of Revelation, according to Irenæus, was written about the year 99 of Christ, in the Patmos, whether St. John had been banished by the emperor Domitian. But Sir Isaac Newton places the writing of it earlier, viz. in the time of Nero. Some attribute this book to the arch-heretic Cerinthus: but the ancients unanimously ascribed it to John, the son of Zebedee, and brother of James; whom the Greek fathers call the *Divine*, by way of eminence, to distinguish him from the other evangelists. This book has not, at all times, been esteemed canonical. There were many churches in Greece, as St. Jerome informs us, which did not receive it; neither is it in the catalogue of canonical books prepared by the council of Laodicea, nor in that of St. Cyril of Jerusalem: but Justin, Irenæus, Origen, Cyprian, Clemens of Alexandria, Tertullian, and all the fathers of the fourth, fifth, and the following, centuries, quote the Revelations as a book then acknowledged to be canonical. The Alogians, Marcionites, Cerdonians, and Luther himself, rejected this book: but the Protestants have forsaken Luther in this particular; and Beza has strongly maintained, against his objections, that the apocalypse is authentic and canonical. It consists of twenty-two chapters. The three first are an instruction to the bishops of the seven churches of Asia Minor. The fifteen following chapters contain the persecutions which the church was to suffer from the Jews, heretics, and Roman emperors.

It is proper to mention that there have been several other works published under the title of *Apocalypses*. Sozomen speaks of a book used in the churches of Palestine, called the *Apocalypse* or *Revelation of St. Peter*. He also mentions an apocalypse of St. Paul: which the Coptæ retain to this day. Eusebius also speaks of both these apocalypses. St. Epiphanius mentions an apocalypse of Adam; Nicephorus, an apocalypse of Esdras; Gratian and Cedrenus, an apocalypse of Moses, another of St. Thomas, and another of St. Stephen; St. Jerom, an apocalypse of Elias. Porphyry, in his life of Plotin, makes mention of the apocalypse or revelations of Zoroaster, Zostrian, Nicothæus, Allogenes, &c.

APOCALYP'TICAL, *adj.* Concerning revelation; containing revelation.—If we could understand that scene, at the opening of this *apocalypitical* theatre, we should find it a representation of the majesty of our Saviour. Burnet.

APOCALYP'TICALLY, *adv.* In such a manner as to reveal something secret.

APO'COPE, *f.* [ἀποκοπή, Gr. of απο, and κοπή, to cut off.] A figure in grammar, when the last letter or syllable of a word is taken away; as, *ingeni*, for *ingenii*; *apoplex*, for *apoplexy*.

APOCRISA'RIOUS, [from ἀποκριναι, G. to answer.] In ecclesiastical antiquity, a sort of resident in an imperial city,

city, in the name of a foreign church or bishop, whose office was to negotiate, as proctor at the emperor's court, in all ecclesiastical causes in which his principals might be concerned. The institution of the office seems to have been in the time of Constantine, when, the emperors being become Christians, foreign churches had more occasions to promote their suits at court than formerly. However, we find it established by law in the time of Justinian. In imitation of this officer, almost every monastery had its apocrifarius, or resident, in the imperial city. The title and quality of apocrifary became at length appropriated to the pope's agent, or *nuncio*, as he is now called; who resided at Constantinople, to receive the pope's dispatches, and the emperor's answers.

APOCRUS'TIC, *adj.* [*αποκρυφικα*, Gr. from *αποκρυφω*, to drive.] Remedies endued with a repelling and astringent power, by which they prevent the too great afflux of humours.

APO'CRYPHA, *f.* [from *αποκρυφω*, Gr. to put out of sight.] Books not publicly communicated; books whose authors are not known. It is used for the books appended to the sacred writings, which, being of doubtful authors, are not admitted into the canon of scriptures. —We hold not the *apocrypha* for sacred, as we do the holy scripture, but for human compositions. *Hooker.*

When the Jews published their sacred books, they gave the appellations of *canonical* and *divine* only to such as they then made public: such as were still retained in their archives they called *apocryphal*, for no other reason but because they were not public; so that they might be really sacred and divine, though not promulgated as such. Thus, in respect of the Bible, all books were called *apocryphal* which were not inserted in the Jewish canon of scripture. The Protestants acknowledge such books of scripture only to be canonical as were so esteemed to be in the first ages of the church; such as are cited by the earliest writers among the Christians as of divine authority, and after the most diligent enquiry were received and so judged to be by the council of Laodicea. The several epistles above mentioned, and the book of Revelations, whatever the sentiments of some particular persons are or may have been of them, are allowed by all the reformed churches to be parts of the canon of the New Testament. The apocryphal books, however, according to the sixth article of the church of England, are to be read for example of life and instruction of manners; but it doth not apply them to establish any doctrine.

APOCY'MA, *f.* [*αποκος* and *κυμα*, Gr. a wave.] In the materia medica of the ancients, a name given by the Greek authors to a sort of cement used to daub over the bottoms of their ships, to preserve them from the injuries of the water: they called this also by the name of *zopiffa*; and Avicenna and Serapion call it *ketram*, *ketran*, or *alketran*. It was mixture of bees-wax and pitch melted together; and, after it had been soaked some time in seawater, it was supposed to have peculiar virtues, and was used in many compositions.

APO'CRYPHAL, *adj.* Not canonical; of uncertain authority. Contained in the apocrypha.—To speak of her in the words of the *apocryphal* writers, wisdom is glorious, and never fadeth away. *Addison*.—It is sometimes used for any account of uncertain credit.

APO'CRYPHALLY, *adv.* Uncertainly; not indisputably.

APO'CRYPHALNESS, *f.* Uncertainty; doubtfulness of credit.

APO'CYLISM, *f.* in medicine, the inspissated juice of vegetables.

APOCY'NUM, *f.* [*απο κυνος*, because the ancients supposed this plant was fatal to dogs.] In botany, a genus of the pentandria digynia class, ranking in the natural order of contortæ. The generic characters are—Calyx: perianth one-leaved, five-parted, acute, short, permanent. Corolla: monopetalous, bell-shaped, semiquinquefid; divisions revolute. Nectary of five glandular o-

val corpuscles, surrounding the germ. Stamina: filaments very short; antheræ oblong, erect, acute, bifid at the base, converging. Pistillum: germs two, ovate; styles short; stigma roundish, bifid at the tip, mucate, glued to the antheræ. Pericarpium: follicles two, long, acuminate, one-valved, one-celled. Seeds: numerous, very small, crowned with a long down. Receptacle subulate, very long, rough, free.—*Essential Character.* Corolla, bell-shaped; nectaries 5, alternate with the stamens.

Species. 1. *Apocynum androsæmifolium*, or tuttle-leaved dog's-bane: stem straightish, herbaceous; leaves ovate, smooth on both sides; cymes terminating. Baccæ as firms, that flies are destroyed if they light on the flowers of this plant. The French inhabitants of Canada call it *herbe à la puce*; and say, that it is noxious to some persons, but harmless to others. Kalm relates, that he saw a soldier whose hands were blistered all over merely from plucking it; whereas he frequently rubbed his own hands with the juice without feeling any inconvenience. It is a native of Virginia, as well as Canada; and flowers from July to September. It was cultivated in 1731, by Mr. Miller; but was in the Chelsea garden much earlier, for Mr. Ray mentions its being there in 1688, under the name of *apocynum flore lilii convallium purpurascente*.

2. *Apocynum cannabinum*, or hemp dog's-bane: stem straightish, herbaceous, leaves oblong, cymes lateral longer than the leaf. Roots perennial, creeping. Stems brown, about two feet high. Leaves smooth, in pairs, abounding with a milky juice, like the former. Towards the upper part of the stem, the flowers come out from the wings of the leaves in small bunches; they are of an herbaceous white colour, and, being small, make no great appearance; this therefore is seldom admitted into gardens, except for the sake of variety. It flowers with the foregoing; and is a native of the same countries. The Indians of North America prepare the stalks of this species as we do hemp, and make twine, bags, fishing nets and lines, and linen for their own wear. It was cultivated here in 1699, by the dukes of Beaufort.

3. *Apocynum hypericifolium*, or St. John's-wort-leaved dog's-bane: stem straightish herbaceous, leaves oblong cordate smooth, cymes shorter than the leaf. Root perennial creeping. The whole plant is smooth, and abounds in milk. It is a native of North America; was cultivated in 1756, by Mr. Miller; and flowers in June and July.

4. *Apocynum venetum*, or spear-leaved dog's-bane: stem straightish herbaceous, leaves ovate-lanceolate. Root perennial, creeping. Stems about two feet high. Leaves opposite, smooth. The flowers grow erect, at the top of the stems in small umbels, and are much larger than the former sorts. It varies with purple, and with white, flowers, and they shew themselves in July and August. It is a native of the islands in the Adriatic sea, near Venice; but is supposed to have been originally brought from some other country. It was cultivated in 1690, in the royal garden at Hampton-court.

5. *Apocynum minutum*, or petty dog's-bane: stem prostrate, leaves hastate. Found at the Cape by Montin.

6. *Apocynum filiforme*, or thread-leaved dog's-bane: stem prostrate herbaceous, leaves filiform, flowers umbelled. Found at the Cape by Thunberg.

7. *Apocynum frutescens*, or shrubby dog's-bane: stem erect shrubby, leaves lanceolate-oval, corollas acute villose at the throat. Native of the East-Indies, Ceylon, and the coast of Guinea.

8. *Apocynum reticulatum*, or net-leaved dog's-bane: stem twining perennial, leaves ovate veined. This plant has a twining stem, by which it rises to a considerable height. The leaves are dark green, very shining, with a beautiful net of milky veins. Native of the East Indies and Cochinchina. Mr. Miller cultivated it by seeds from professor Van Royen.

9. *Apocynum lineare*, or linear-leaved dog's-bane: stem twining herbaceous, leaves linear flat, umbels axillary compound. 10. *Apocynum triflorum*, or three-flowered dog's-bane: stem twining herbaceous, leaves lanceolate, umbels

umbels axillary two or three flowered. Found at the Cape of Good Hope by Thunberg.

11. *Apocynum juvenas*, or renovating dog's-bane: stem twining shrubby, leaves ovate hairy, racemes dichotomous. Native of Cochinchina. The physicians of the country fancy the root of this plant to refresh the animal spirits to such a degree, as by a long use of it to endow old age with all the strength and vigour of youth. The Chinese have the same opinion with respect to their *ho xeu u*, which they suppose to be the same plant, but that is not certain.

12. *Apocynum alterniflorum*, or alternate-flowered dog's-bane: stem climbing shrubby, leaves ovate acuminate smooth, axils alternate umbelliferous. Native of the islands near Canton in China.

13. *Apocynum Africanum*, or African dog's-bane: stem suberect shrubby, leaves ovate-oblong, peduncles two or three flowered. Native of the coast of Zanguebar, in Africa, on a sandy plain.

14. *Apocynum scandens*, or climbing dog's-bane: leaves oblong-cordate stiff, flowers lateral, stem shrubby twining. Was discovered by father Plumier, in some of the French islands in America. It was afterwards found by the late Mr. Robert Millar, surgeon, growing plentifully near Carthage, in New Spain, from whence he sent the seeds, which succeeded in several gardens. This plant has twining stalks, by which it mounts to the top of very tall trees, and stiff, oblong, heart-shaped, leaves, which are smooth, and of a shining green colour, being of the same thickness with those of the citron-tree. The flowers are produced in small clusters from the sides of the branches, and are of an herbaceous colour, so that they do not make any great appearance: these appear in August and September, but are not succeeded by pods in this country.

15. *Apocynum nervosum*, or nerved-leaved dog's-bane: leaves ovate, nerved; cymes lateral; flowers yellow, large; tube very long; stem shrubby, climbing. Has a climbing woody stalk, and rises to a considerable height, by the support of neighbouring trees. The leaves grow by pairs opposite; they are ovate, ending in a sharp point, and have many transverse nerves from the midrib. The flowers come out from the wings of the leaves, each standing upon a separate long foot-stalk; they are large, of a bright yellow colour, with very long tubes, spreading open wide at the top; these are succeeded by long compressed pods, which have borders on one side filled with long channelled seeds, which are crowned with long plumes of soft down. This sort grows naturally at Carthage, in New Spain, from whence Miller received the seeds.

16. *Apocynum cordatum*, or heart-leaved dog's-bane: leaves oblong-cordate pointed sessile, flowers lateral, stem climbing. 17. *Apocynum villosum*, or villose-flowered dog's-bane: leaves cordate smooth, flowers villose lateral, on long peduncles, stem climbing. These were discovered at La Vera Cruz, in New Spain, in the year 1729, by the late Dr. William Houston, who sent their seeds to England. These plants have both climbing stalks, by which they mount to the tops of the tallest trees. In England they have climbed over the plants in the stoves, and risen to upwards of twenty feet high. The sixteenth sort has produced flowers in England several times; but the seventeenth, which grows more luxuriantly than the other, never had any appearance of flowers. The down of these plants is in great esteem in France, for stuffing easy chairs, and making quilts, which, being warm, and extremely light, are very proper covering for persons afflicted with the gout. The French call it *delawad*; and, in the southern parts of France, where some of the sorts will thrive in the open air, and perfect their seeds, there are many plantations made of these plants for the sake of the down. As many of these sorts grow plentifully in the uncultivated lands in Jamaica, this cottony down might be easily procured from thence in plenty, and might probably become a vendible commodity in England, if once it were to become a fashionable furniture: especially as the plants require no cultivation, and the only trouble is to collect the

down, which, in some of the sorts with large pods, is produced in great quantity, and may be collected with little trouble.

Propagation and Culture. They are propagated by parting the roots in March, before they put out new stems. They are hardy enough to thrive in the open ground, but the soil should be light and dry, otherwise the roots are apt to rot in winter. They flower in July, and their stems decay to the root in autumn, seldom ripening their seeds. The second sort spreads so much by its creeping roots as to be troublesome in a garden. The first four species will live in the open air, provided they be planted in a warm situation. The other species are tender, and must be constantly kept in the hot-house, plunged in the tan-bed. They may be propagated by cuttings during the summer months; these should be laid in the stove three or four days to dry, before they are planted: or by seeds, procured from their native places, for they rarely produce any in England. These should be sown in pots filled with light sandy earth, and plunged into the tan-bed: they will appear in a month or six weeks, and should then be watered sparingly. They must be kept constantly in the tan-bed; and, as they advance in height, will require larger pots; but care must be taken not to overpot them; for, unless their roots are confined, the plants will not thrive. The second year, the plants will generally flower, if they have been skilfully managed, in July or August. Some of these make a fine appearance; and the leaves, being of a beautiful green, and keeping on the plant all the year, are an ornament to the stove at all seasons. See *ASCLEPIAS*, *CEROPEGIA*, *CYNANCHUM*, and *ECHITES*.

APODACRYTICS, *f.* [from *απο*, signifying negatively, and *δαρυ*, Gr. a tear.] Medicines which first excite, and then evacuate, the superfluous moisture of the eyes, thus preventing preternatural moisture there. Such are onions, celandine, hellebore, &c.

APODEC'TÆ, *f.* in antiquity, a name given to ten general receivers appointed by the Athenians to receive the public revenues, taxes, debts, &c. The apodectæ had also a power to decide controversies arising in relation to money and taxes, all but those of the most difficult nature and highest concern, which were reserved to the courts of judicature.

APODECTÆI, *f.* in the Athenian government, officers appointed to see that the measures of corn were just.

APODE'MICA, *f.* [*αποδημια*, Gr. I travel.] The doctrine or science of travelling, whether for knowledge, devotion, or other purposes. Jo. Meraker has published an *Apodemica*; Ranzovius a *Methodus Apodemica*.

A'PODES, *f.* in a general sense, denotes things without feet. Zoologists apply the name to a fabulous sort of birds, said to be found in some of the islands of the New World, which, being entirely without feet, support themselves on the branches of trees by their crooked bills.

Aropes, in the Linnæan system, the name of the first order of fishes, or those which have no belly-fins. See *ZOOLOGY*.

APODIC'TICAL, *adj.* [from *αποδειξις*, Gr. evident truth; demonstration.] Demonstrative; evident beyond contradiction.

APODIX'IS, *f.* [*αποδειξις*, *αποδεινω*, Gr. to demonstrate.] A plain proof or evident demonstration.

APODO'SIS, *f.* [*αποδοσις*, Gr. of *απο*, and *διδωμι*, to restore.] A recompensing or giving again.

Apodosis, in rhetoric, makes the third part of a complete exordium, being properly the application, or restriction of the *protasis*. The apodosis is the same with what is otherwise called *axiōsis*; and stands opposed to *protasis*: e. gr. *protasis*, all branches of history are necessary for a student; *catēscue*, so that, without these, he can never make any considerable figure; *apadōsis*, but literally history is of a more especial use, which recommends it, &c.

APODYTE'RIUM, *f.* [from *αποδοριαι*, Gr. to undress.] A private room before the entrance into the baths, where

where the bathers undressed themselves. It is also called *consilium* and *spoliarium*.

APOGEE, *f.* [*apogæum*, Lat.] In astronomy, that point in the orbit of the sun, moon, &c. which is farthest distant from the earth. It is at the extremity of the line of the apsidæ; and the point opposite to it is called the *perigee*, where the distance from the earth is the least. The ancient astronomers, considering the earth as the centre of the system, chiefly regarded the apogee and perigee; but the moderns, placing the sun in the centre, change these terms for the *aphelion* and *perihelion*. The apogee of the sun is the same thing as the aphelion of the earth; and the perigee of the sun is the same as the perihelion of the earth. The quantity of motion in the apogee may be found by comparing two observations of it made at a great distance of time; converting the difference into minutes, and dividing them by the number of years elapsed between the two observations; the quotient gives the annual motion of the apogee. Thus, from an observation made by Hipparchus in the year before Christ 140, by which the sun's apogee was found $5^{\circ} 30'$ of Π ; and another made by Ricciolus, in the year of Christ 1646, by which it was found $7^{\circ} 26'$ of Θ ; the annual motion of the apogee is found to be $1''$. And the annual motion of the moon's apogee is about $1^{\circ} 10' 39'' 52''$. But the moon's apogee moves unequally. When she is in syzygy with the sun, it moves forwards; but, in the quadratures, backwards; and these progressions and regressions are not equable, but it goes forward slower when the moon is in the quadratures, or perhaps goes retrograde; and, when the moon is in the syzygy, it goes forward the fastest of all.

APOGRA'PHON, *f.* [*απογραφον*, Gr. of *απο*, and *γραφω*, to write.] An inventory of goods, a copy or transcript of some book or writing, a pattern or draught.

APO'RIDES, *f.* in antiquity, those condemned for life to the public works, or exiled into some island, and thus divested of the privileges of Roman citizens.

APOLLINARIAN GAMES, were instituted in the year of Rome 542. The occasion was a kind of oracle delivered by the prophet Marcus after the fatal battle at Cannæ, declaring, that to expel the enemy, and cure the people of an infectious disease which then prevailed, sacred games were to be annually performed in honour of Apollo; the prætor to have the direction of them, and the decemviri to offer sacrifices after the Grecian rite. The first prætor by whom they were held was P. Cornelius Sylla. For some time they were moveable or indistinct; but at length were fixed, under P. Licinius Varus, to the fifth of July, and made perpetual. The men, who were spectators at these games, wore garlands on their heads; the women performed their devotions in the temples at the same time. The Apollinarian games were merely scenical; no chariot races, wrestling, or laborious exercises of the body, being ever practised at them.

APOLLINARIANS, or **APOLLINARISTS**, called by Epiphanius *Dimarita*, ancient heretics, who denied the proper humanity of Christ, and maintained that the body which he assumed was endowed with a sensitive, and not a rational, soul, but that the Divine Nature supplied the place of the intellectual principle in man. This sect derived its name from Apollinaris, bishop of Laodicea, in the 4th century. Their doctrine was first condemned by a council of Alexandria in the year 362, and afterwards in a more formal manner by a council at Rome in 375; and by another council in 378, which deposed Apollinaris from his bishopric. Notwithstanding all, his doctrine spread through most of the churches of the east; and his followers were sub-divided into various sects. In 388, the emperor Theodosius enacted a law, forbidding them to hold assemblies, to have any ecclesiastics or bishops, or to dwell in cities. The rigorous execution of this law, in concurrence with the decrees of different councils, reduced them to a very small number, and their doctrine had no long duration.

APOLLINARIS (Caius Sulpicius), a learned gram-

marian, born at Carthage, lived in the second century, under the Antonines; he is supposed to be the author of the verses which are prefixed to the comedies of Terence, and contain the arguments of them. He had for his successor in the profession of grammar Helvius Pertinax, who had been his scholar, and was afterwards emperor.

APOLLINARIS SIDONIUS (Caius Lollius), an eminent Christian writer and bishop in the 5th century, was born of a noble family in France. He made a prodigious progress in the arts and sciences, but particularly in poetry and polite literature. After he had left the schools, he applied himself to the profession of war. He married Papianilla, the daughter of Avitus, who was consul, and afterwards emperor, by whom he had three children. But Majorianus in the year 457 having deprived Avitus of the empire, and taken the city of Lyons, in which Apollinaris resided, he fell into the hands of the enemy. However, the reputation of his learning softened Majorianus's resentments, so that he treated him with the utmost civility, in return for which Apollinaris composed a panegyric to his honour; which was so highly applauded, that he had a statue erected to him at Rome, and was honoured with the title of *count*. In the year 467 the emperor Anthemius rewarded him farther, by raising him to the post of governor of Rome, and afterwards to the dignity of a patrician and senator. But he soon quitted these secular employments for the service of the church. The bishopric of Clermont being vacant in 472, Apollinaris was chosen to succeed him, in which he acted with the greatest integrity. Clermont being besieged by the Goths, he animated the people to the defence of that city, and would never consent to the surrender of it; so that, when it was taken about the year 480, he was obliged to retire; but was soon restored by Evariges king of the Goths, and continued to govern the church as he had done before. He died the 21st of August, 487; and his festival is still observed in the church of Clermont, where his memory is held in great veneration. His chief pieces in poetry are the three panegyrics upon the emperors Avitus, Majorianus, and Anthemius. His nine books of Letters contain a variety of particulars relating to polite literature, and profane history.

APOLLINARIUS (Claudius), a learned bishop of Hierapolis, who, about the year 170, presented to Marcus Aurelius an excellent Apology in Behalf of the Christians.

APOLLINARIUS the YOUNGER, thus called to distinguish him from his father, called *Apollinarius the Elder*, was first lecturer or reader of Laodicea, and afterwards bishop of that city. He was esteemed the greatest man of his age, both for learning and piety, and a most accurate and nervous defender of the Christian faith; but notwithstanding this, on his advancing some opinions that were not approved, he was anathematized as an heretic by the second general council of Constantinople in 381.

APOL'LO, in mythology, a Pagan deity worshipped by the Greeks and Romans. Cicero mentions four of his name: the most ancient of whom was the son of Vulcan; the second a son of Corybas, and born in Crete; the third an Arcadian, called *Nomian*, from his being a great legislator; and the last, to whom the greatest honour is ascribed, the son of Jupiter and Latona. Apollo had a variety of other names, either derived from his principal attributes, or from the places where he was worshipped. He was called the *Healer*, from his enlivening warmth and cheering influence; *Pæan*, from the pestilential heats: to signify the former, the ancients placed the Graces in his right hand; and, for the latter, a bow and arrows in his left: *Nomius*, or the shepherd, from his fertilizing the earth, and thence sustaining the animal creation: *Delius*, from his rendering all things manifest: *Pythius*, from his victory over Python; *Lycias*, *Phæbus*, and *Phaneta*, from his purity and splendour. As Apollo is almost always confounded by the Greeks with the sun, it is no wonder that he should be dignified with so many attributes. It was natural for the most glorious object in nature, whose influence is felt

by all the creation, and seen by every animated part of it, to be adored as the fountain of light, heat, and life. The power of healing diseases being chiefly given by the ancients to medicinal plants and vegetable productions, it was natural to exalt into a divinity the visible cause of their growth. Hence he was also styled the *God of Physic*; and that external heat which cheers and invigorates all nature, being transferred from the human body to the mind, gave rise to the idea of all mental effervescence coming from this god; hence, likewise, poets, prophets, and musicians, are said to be *Numine afflati*, inspired by Apollo.

Whether Apollo represented a real personage, or only the great luminary, many have doubted. Indeed, Vossius has taken great pains to prove this god to be only a metaphorical being, and that there never was any other Apollo than the sun: "He was styled the *son of Jupiter* (says this author), because that god was reckoned by the ancients the author of the world. His mother was called *Latona*, a name which signifies 'hidden;' because, before the sun was created, all things were wrapped up in the obscurity of chaos. He is always represented as beardless and youthful, because the sun never grows old or decays. And what else can his bow and arrows imply, but his piercing beams?" And adds, "that all the ceremonies which were performed to his honour had a manifest relation to the great source of light which he represented. Whence (he concludes) it is vain to seek for any other divinity than the sun, which was adored under the name of Apollo." However, though this be in general true, yet it appears, from many passages in ancient authors, that there was some illustrious personage named *Apollo*, who, after his apotheosis, was taken for the sun; as Osiris and Orus in Egypt, whose existence cannot be called in question, were, after their death, confounded with the sun, of which they became the symbols, either from the glory and splendour of their reigns, or from a belief that their souls had taken up their residence in that luminary.

Of the four Apollos mentioned by Cicero, it appears that the three last were Greeks, and the first an Egyptian; who, according to Herodotus, was the son of Osiris and Isis, and called *Orus*. Pausanias is of the same opinion as Herodotus, and ranks Apollo among the Egyptian divinities. The testimony of Diodorus Siculus is still more express; for, in speaking of Isis, after saying he had invented the practice of medicine, he adds, that she taught this art to her son Orus, named *Apollo*, who was the last of the gods that reigned in Egypt. It is easy to trace almost all the Grecian fables and mythologies from Egypt. If the Apollo of the Greeks was said to be the son of Jupiter, it was because Orus the Apollo of the Egyptians had Osiris for his father, whom the Greeks confounded with Jupiter. If the Greek Apollo was reckoned the god of eloquence, music, medicine, and poetry, the reason was, that Osiris, who was the symbol of the sun among the Egyptians, as well as his son Orus, had there taught those liberal arts. If the Greek Apollo was the god and conductor of the Muses, it was because Osiris carried with him in his expedition to the Indies singing women and musicians. This parallel might be carried on still further; but enough has been said to prove that the true Apollo was that of Egypt. To the other perfections of this divinity the poets have added beauty, grace, and the art of captivating the ear and the heart, no less by the sweetness of his eloquence than by the melodious sounds of his lyre. But the most remarkable incident in the history of Apollo, is his defeat of the serpent Python. The waters of Deucalion's deluge, says Ovid, which had overflowed the earth, left a slime from whence sprung innumerable monsters; and among others the serpent Python, which made great havoc in the country about Parnassus. Apollo, armed with his darts, put him to death; which, physically explained, implies, that the heat of the sun having dissipated the noxious steams, those monsters soon disappeared; or, if this fable be referred to history, the serpent was a robber, who haunting the country about Delphos, and very

much infesting those who came thither to sacrifice; a prince, who bore the name of Apollo, or one of the priests of that god, put him to death. This event gave rise to the Pythian games, so frequently mentioned in the Grecian history; and it was from the legend of Apollo's victory over the Python, that the god himself acquired the name of *Pythius*, and his priests that of *Pythia*. The city of Delphos, where the famous oracles were so long delivered, was frequently styled *Pytho*.

As Apollo was the god of the fine arts, those who cultivated them were called *his sons*. Of this number was Philammon of Delphos, whom the poets and mythologists make the twin-brother of Autolychus, by the nymph Clione, and Apollo and Mercury. It is pretended that both these divinities were favoured by the nymph on the same day, and that their fires were known from their different talents. Philammon, a great poet and musician, was reported to be the offspring of the god who presides over those arts; and Autolychus, from the craftiness and subtilty of his disposition, was said to have sprung from Mercury, god of theft and fraud. Philammon is one of the first, after Apollo, upon fabulous record, as a vocal performer, who accompanied himself with the sound of the lyre: his son was the celebrated Thamyris.

There can be no doubt but that Apollo was more generally revered in the Pagan world than any other deity; having, in almost every region of it, temples, oracles, and festivals, as innumerable as his attributes: the wolf and hawk were consecrated to him, as symbols of his piercing eyes; the crow and the raven, because these birds were supposed to have by instinct the faculty of prediction; the laurel, from a persuasion that those who slept with some branches of that tree under their heads received certain vapours, which enabled them to prophesy. The cock was consecrated to him, because by his crowing he announces the rising of the sun; and the grasshopper on account of his singing faculty, which was supposed to do honour to the god of music. Most of the ancient poets have celebrated this tuneful insect, but none equal to Anacreon, Ode 43. Plato says that the grasshopper sings all summer without food, like those men who, dedicating themselves to the Muses, forget the common concerns of life. The swan was regarded by the ancients as a bird sacred to Apollo in two capacities; first, as being, like the crow and raven, gifted with the spirit of prediction; and, secondly, for his extraordinary vocal powers. The sweetness of his song, (see ANAS,) especially at the approach of death, was not only extolled by all the poets of antiquity, but by historians, philosophers, and sages; and to call a great writer the *swan* of his age and nation, was a full acknowledgment of his sovereignty; Horace calls Pindar the *Theban swan*.

Plutarch, who was himself a priest of Apollo, impressed with the highest respect and veneration for him and for music, in his dialogue upon that art, makes one of his interlocutors say, that an invention so useful and charming could never have been the work of man, but must have originated from some god, such as Apollo, the inventor of the flute and lyre, improperly attributed to Hyagnis, Marsyas, Olympus, and others; and the proofs he urges in support of this assertion, shew, if not its truth, at least that it was the common and received opinion of the age in which he lived.

APOLLO BELVIDERE, one in the first class of the ancient statues. The excellence of this statue consists in the expression of something divine, whereas the rest excel only in things that are common to men. This statue may perhaps justly claim the preference; even in the superior and distinguished class of the best remains of antiquity. There are about twenty ancient statues which the moderns have discovered that are referred to the first class, and considered each as the chief beauty in its kind.

APOLLODORUS, a celebrated architect, under Trajan and Adrian, was born at Damascus, and flourished about the year of Christ 100. He had the direction of the

stone bridge which Trajan ordered to be built over the Danube in the year 104, which was esteemed the most magnificent of all the works of that emperor. Adrian, one day as Trajan was discoursing with this architect upon the buildings he had raised at Rome, would needs give his judgment, in which he shewed that he knew nothing of the matter. Apollodorus turned upon him bluntly, and said to him, "Go paint citruls, for you are very ignorant of the subject we are talking upon." Adrian at this time boasted of his painting citruls well. This was the first step towards the ruin of Apollodorus; a slip which he was so far from attempting to retrieve, that he even added a new offence, and that too after Adrian was advanced to the empire, upon the following occasion: Adrian sent to him the plan of a temple of Venus; and, though he asked his opinion, yet to shew that he had no need of him, and that he did not mean to be directed by it, the temple was already built. Apollodorus wrote his opinion very freely, and remarked such essential faults in it, as the emperor could neither deny nor remedy. This put Adrian into a great passion, and prompted him to the destruction of Apollodorus. He banished him at first; then under the pretext of certain supposed crimes, of which he had him accused, he at last put him to death.

APOLLODORUS, a celebrated painter of Athens, about 408 years before the birth of Christ, was the first who invented the art of mingling the colours, and of expressing the lights and shades. He was admired also for his judicious choice of subjects, and for the beauty and strength of colouring surpassed all the masters that went before him. He excelled likewise in statuary.

APOLLODORUS the Athenian, a famous grammarian, the son of Asclepiades and disciple of Aristarchus. He wrote many works; but his most famous production was the *Bibliotheca*, concerning the origin of the gods. This work consisted of twenty-four books, but only three are now in being. Several other pieces of his are to be found in Fabricius's *Bibliotheca Græca*. There were various other persons of this name. Scipio Testi, a Neapolitan, has written a treatise of the Apollodoruses, which was printed at Rome in 1555; and Dr. Thomas Gale published a work of the same kind in 1675.

APOLLONIA, the name of several ancient cities, particularly a colony of the Milesians in Thrace, from which Lucullus took away a colossus of Apollo, and placed it in the capitol. The greatest part of the town was situated in a small island on the Euxine, in which was a temple of Apollo. Pliny says the colossus was thirty cubits high, and cost 300 talents. There was also an Apollonia at mount Parnassus, near Delphi. Troezen was formerly called *Apollonia*.

APOLLONIA, feasts sacred to Apollo, instituted upon the following occasion. Apollo, having vanquished Python, went with his sister Diana to Ægialeæ; but, being driven from thence, he removed to the island of Crete. The Ægialeans were soon after visited with a plague; upon which, consulting the soothsayers, they were ordered to send seven young men, and as many virgins, to appease those deities, and bring them back into their country. Apollo and Diana, being thus appeased, returned to Ægialeæ: in memory of which, they dedicated a temple to Pitho, the goddess of persuasion; whence a custom arose of choosing every year seven young men, and as many virgins, to go as it were in search of Apollo and Diana.

APOLLONIA, in geography, a promontory of Africa, on the coast of Guinea, near the mouth of the river Mancu.

APOLLO'NIUS, author of the *Argonautics*, surnamed *The Rhodian*, from the place of his residence, is supposed to have been a native of Alexandria, where he is said to have recited some portion of his poem while he was yet a youth. Finding it ill received by his countrymen, he retired to Rhodes; where he is conjectured to have published and completed his work, supporting himself by the profession of rhetoric, and receiving from the Rhodians the freedom of their city. He at length returned, with con-

siderable honour, to the place of his birth; succeeding Eratosthenes in the care of the Alexandrian library in the reign of Ptolemy Euergetes, who ascended the throne of Egypt the year before Christ 246. That prince had been educated by the famous Aristarchus, and rivalled the preceding sovereigns of his liberal family in the munificent encouragement of learning. Apollonius was a disciple of the poet Callimachus; but their connection ended in the most violent enmity. The learned have vainly endeavoured to discover the particulars of their quarrel. The only work of Apollonius which has descended to modern times is his poem above-mentioned, in four books, on the Argonautic expedition. The ancient scholia upon this work, still extant, are extremely useful, and full of learning.

APOLLONIUS, of Perga, in Pamphilia, was a celebrated geometrician, who flourished in the reign of Ptolemy Euergetes, about 240 years before Christ; being about sixty years after Euclid, and thirty years later than Archimedes. He studied a long time in Alexandria, under the disciples of Euclid; and afterwards he composed several curious and ingenious geometrical works, of which only his books of Conic Sections are now extant, and even these not perfect. For it appears from the author's dedicatory epistle to Eudemus, a geometrician in Pergamus, that this work consisted of eight books; only seven of which however have come down to us. His work upon Conics was doubtless the most perfect of the kind among the ancients; and in some respects among the moderns also.

APOLLONIUS, a Pythagorean philosopher, born at Tyana, in Cappadocia, about the beginning of the first century. At sixteen years of age he became a strict observer of Pythagoras's rules, renouncing wine, women, and all sorts of flesh; not wearing shoes, letting his hair grow, and wearing nothing but linen. He soon after set up for a reformer of mankind, and chose his habitation in a temple of Æsculapius, where he is said to have performed many wonderful cures. Philostratus has written the life of Apollonius, in which there are numberless fabulous stories recounted of him. We are told that he went five years without speaking; and yet, during this time that he stopped many seditions in Cilicia and Pamphylia; that he travelled, and set up for a legislator; and gave out, that he understood all languages, without having ever learned them; that he could tell the thoughts of men, and understood the oracles which birds gave by their singing. Apollonius wrote four books of judicial astrology; a treatise upon the sacrifices, shewing what was proper to be offered to each deity; and a great number of letters; all of which are now lost.

APOL'LOS, in scripture-history, a Jew of Alexandria, who came to Ephesus during the absence of St. Paul, who was gone to Jerusalem, Acts xviii. 24. Apollos was an eloquent man, and well versed in the scriptures; and, as he spoke with zeal and fervour, he taught diligently the things of God: but knowing only the baptism of John, he was no more than a catechumen, or one of the lowest order of Christians, and did not as yet distinctly know the mysteries of the Christian doctrine. Aquila and Priscilla having heard him, took him home with them; instructed him, and baptized him, probably in the name of Jesus Christ; after which he became the companion of St. Paul. The Greeks make him bishop of Duras; others say, he was bishop of Iconium, in Phrygia; and others, that he was bishop of Cæsarea.

APOL'LYON, [*Ἀπολλων*, of *ἄπο*, and *ἄλυν*, to destroy.] A name in the Revelations, which signifies *The Destroyer*, and answers to the Hebrew word *Abaddon*, which see.

APOLOGE'TIC, or APOLOGE'TICAL, *adj.* [from *ἀπολογεω*, to defend.] That which is said in defence of any thing or person.—I design to publish an essay, the greater part of which is *apologetical*, for one sort of chymists. *Boyle.*

APOLOGE'TICALLY, *adv.* In the way of defence or excuse.

APO'LOGIST,

APOLOGIST, *f.* He that makes an apology; a pleader in favour of another.

To APOLOGIZE, *v. n.* To plead in favour of any person or thing.—It will be much more seasonable to reform than *apologize* or *rhetoricate*; and therefore it imports those, who dwell secure, to look about them. *Decay of Piety.* It has the particle *for* before the subject of apology.—I ought to *apologize* for my indiscretion in the whole undertaking. *Wake.*—The translator needs not *apologize* for his choice of this piece, which was made in his childhood. *Pope.*

APOLOGUE, *f.* [*apologus*, Lat. of *απολογος*, of *απολογεω*, to utter.] An ingenious method of conveying instruction by means of a feigned relation, called a *moral fable*. The only difference between a parable and an *apologue* is, that the former, being drawn from what passes among mankind, requires probability in the narration; whereas the *apologue*, being taken from the supposed actions of brutes, or of things inanimate, is not tied down to the strict rules of probability. *Æsop's fables* are a model of this kind of writing.

APOLOGY, *f.* [*apologie*, Fr. *apologia*, Lat. of *απολογία*, of *απολογεω*, Gr. to reject, or not admit.] Defence; excuse. *Apology* generally signifies rather excuse than vindication, and tends rather to extenuate the fault than prove innocence. This is, however, sometimes unregarded by writers :

In her face excuse
Came prologue, and *apology* too prompt;
Which with bland words at will she thus address'd. *Milton.*
It has *for* before the object of excuse.—It is not my intention to make an *apology* for my poem: some will think it needs no excuse, and others will receive none. *Dryden.*

APOLY'SIS, *f.* among physicians, the exclusion of any thing; as of the birth, the fæces, or the like; a relaxation by which any part of the whole is weakened.

APOMAG'NA, *f.* [from *απομαρτο*, to absterge.] Any thing used to wipe away fordes, as a handkerchief, or a sponge, &c.

APOMECONOMETRY, *f.* [*απο*, from *μετρο*, distance, and *μετρεω*, to measure.] The art of measuring things at a distance.

APO'MELI, *f.* A sweet liquor made with honey-combs, diluted and boiled with water. Galen says, that Hippocrates, and others, called *apomeli* by the names of *oxygliei* and *oxygliticum*; and that some were made with, and others without, vinegar; some being sweet, and others sour and sweet. It is simple oxyinel.

APO'MYOS DEUS, [*απο*, and *μυια*, fly.] In the heathen mythology, a name under which Jupiter was worshipped at Elis; and Hercules, as well as Jupiter, at the Olympic games. These deities were supplicated under this name, to destroy or drive away the vast number of flies which always attended at the great sacrifices.

APONEURO'SIS, *f.* [of *απο*, from, and *νευρον*, a nerve.] Any tendinous expansion. The tendon or tail of a muscle, called by Hippocrates, *τενον*, a tendon or cord. These expansions of tendons, called *aponeuroses*, or *fasciæ*, grow thinner and thinner, till they are lost in the cellular membrane. Instances of these are frequently met with, e. g. the outward muscles of the thigh are bound down by one of these expansions, viz. the *fascia lata*. Dr. Hunter describes this aponeurosis as proceeding from the musculus *fasciæ latæ*, called *membranofus musculus*, on the external part of the thigh, and from the gluteus maximus on the posterior part. There are also other *fasciæ*, as those of the legs, which, like those of the thighs, cover the muscles. The soles of the feet are strong *fasciæ*, which prevent the flexor muscles of the toes being hurt, when we tread. The *fasciæ* on the thighs and legs bind down the muscles while in action, and also increase their strength by compressing them. When matter is formed immediately under any of the *fasciæ*, it cannot point where it was first formed, but runs under them to some distance, to gain

an exit: to prevent inconveniences from this cause, as soon as matter can be felt under a fascia, it is right to give it vent immediately, and not to wait for its pointing, as in other situations; when this happens under the temporal muscle, great difficulties attend.

APO'NIA, *f.* [*α* priv. and *πον*, labour.] Among physicians, a state of indolence, or the absence of pain; in which sense the word amounts to the same with *anodynia*. Hence also *apona* is used by some for medicines which do not excite pain.

APO'NO (Peter d'), one of the most famous philosophers and physicians of his age, born in the year 1259, in a village about four miles from Padua. He studied some time at Paris, and was there promoted to the degree of doctor in philosophy and physic. When he came to practice as a physician, he is said to have insisted on very large sums for his visits: we are not told what he demanded for the visits he made in the place of his residence; but it is affirmed, that he would not attend the sick in any other place under 150 florins a day; and, when he was sent for by pope Honorius IV. he demanded 400 ducats for each day's attendance. He was suspected of magic, and prosecuted by the Inquisition on that account. "The common opinion of almost all authors (says Naude) is, that he was the greatest magician of his age; that he had acquired the knowledge of the seven liberal arts, by means of the seven familiar spirits, which he kept inclosed in a crystal; and that he had the dexterity to make the money he had spent come back into his purse." The same author adds, that he died before the process against him was finished, being then in the eightieth year of his age; and that, after his death, they ordered him to be burnt in effigy, in the public place of the city of Padua; designing thereby to strike a fear into others of incurring the like punishment; and to suppress the reading of three books which he had wrote; the first being the *Heptameron*, which is printed at the end of the first volume of Agrippa's work; the second, that which is called by Trithemius, *Elucidarium Necromanticum Petri de Albano*; and the last, that which is intitled by the same author, *Liber experimentorum Mirabilium de Annulis Secundum xxviii. Manfones Luna*. His body, being secretly taken up by his friends, escaped the vigilance of the inquisitors, who would have burnt it. It was removed several times, and was at last placed in the church of St. Augustin, without an epitaph or any mark of honour. The most remarkable book which Apono wrote, was that which procured him the surname of *Conciliator*; he wrote also a piece intitled *De Medicina Omnimoda*.

APONOGE'TON, *f.* in botany, a genus of the dodecandria tetragynia class, in the natural order of *inunada*. The generic characters are—Calyx: none, except a spatheaceous scale surrounding the outer side of the flower, simple, sessile, ovate, obtuse, entire, upright, smooth, coloured. Stamina: filaments eleven to nineteen, in the upper flowers fewer, inserted between the spathe and the capsules, subulate, smooth, white, many times shorter than the spathe. Pistillum: germs usually four, seldom three or five; styles none; stigmas subulate, bent in. Pericarpium: capsules four, seldom three or five, ovate, subulate, acute, gibbous on the outside, flat on the inner side, smooth, one-celled. Seeds: in each capsule three, affixed to the base of it, sessile, obovate, very blunt, subcompressed, smooth.—*Essential Character.* Calyx, an ament; capsule three-seeded.

Species. 1. *Aponogeton monostachyon*, or single-spiked *aponogeton*: spike simple, leaves cordate-oval. Observed by Koenig to be common in the fields that are flooded for rice in the East Indies.

2. *Aponogeton distachyon*, or broad-leaved *aponogeton*: spike bifid, leaves linear-oblong, floating, bractes entire, flowers many-stamened. Found at the Cape of Good Hope, in brooks, by Thunberg. It flowers almost all the year, and was introduced in the year 1788 by Mr. Francis Masson.

3. *Aponogeton*

3. *Aponogeton angustifolium*, or narrow-leaved aponogeton: spike bifid, leaves linear-lanceolate, erect; bracts two-parted; flowers six-stamened. A native of the Cape of Good Hope; introduced in 1788 by Mr. Masson. It flowers almost all the year. These plants are inhabitants of the greenhouse or Cape stove; and may be increased by offsets from the bulbs.

APO'NUS, a hamlet near Patavium, with warm baths. It was the birth-place of Livy, and is now called *Albano*. Lat. 45. 15. lon. 10. 0. E.

APOPEM'PTIC, *f.* in the ancient poetry, a hymn addressed to a stranger on his departure from a place to his own country. The ancients had certain holidays, wherein they took leave of the gods with *apopemptic* songs, as supposing them returning each to his own country.

APO'PHASIS, *f.* [Lat. *αποφασις*, a denying.] A figure in rhetoric, by which the orator, speaking ironically, seems to wave what he would plainly insinuate; as, Neither will I mention those things; which if I should, you notwithstanding could neither confuse nor speak against them.

AOPHLEGMA'TICS, or **AOPHLEGMA'TIZANTS**, *f.* [of *απο*, from, and *φλεγμα*, phlegm.] Medicines suited to promote a discharge of mucus or phlegm, from the mouth and nose; and, according to the part from whence the discharge is made, so are they denominated. If from the mouth, *masicatories*; if from the Schneiderian membrane, *errhins*. Hence, pellitory of the wall, horse-radish, &c. Snuff also, and whatever occasions an excretion of mucus, or serum from the head and parts above the throat, come under this denomination. Any medicine possessed of this power, is called *masicatorium* and *commansum*.

AOPHRA'DES, *f.* [from the singular *αποφρας*, unfortunate.] Those days in which an acute distemper comes to a fatal crisis, or on which there is no crisis at all, when expected.

AOPH'THEGM, *f.* [*apophthegme*, Fr. *apoteigma*, It. *apophthegma*, Sp. *apophthegma*, Lat. *αποφθειγμα*, of *απο* and *φθειγγωμαι*, Gr. to pronounce.] A short, sententious, and instructive, remark, pronounced by a person of distinguished character. Such is that of Cyrus: "He is unworthy to be a magistrate, who is not better than his subjects." Or this: "He that will not take care of his own business, will be forced to take care of that of others." Or that of Artaxerxes Mnemon, when reduced to hunger: "How much pleasure have I hitherto lived a stranger to!" Or that of Cato: "*Homines nihil agendo discunt male agere.*"

AOPHTHORA, *f.* [*αποφθορα*, of *αποφθειρω*, to corrupt.] An abortion; the bringing forth a child putrefied in the womb.

AOPHYGE, *f.* in architecture, a concave part or ring of a column, lying above or below the flat member. The French call it *le conge d'en bas*, or *d'en haut*: the Italians, *cavo di basso*, or *di sopra*; and also *il vivo di basso*. The apophyge originally was no more than the ring, or ferril, at first fixed on the extremities of wooden pillars, to keep them from splitting; which afterwards was imitated in stone.

AOPHYSIS, *f.* [*αποφυσις*, of *απο*, from, and *φυω*, to grow.] The prominent parts of some bones; the same as process. It differs from an epiphysis, as it is a continuance of the bone itself; whereas the latter is somewhat adhering to a bone, and of which it is not properly a part.—It is the *apophysis*, or head, of the os tibiae, which makes the knee. *Wyseman*.

AOPLEC'TIC, *adj.* Relating to an apoplexy.—A lady was seized with an *apoplectic* fit, which afterward terminated in some kind of lethargy. *Wyseman*.

AOPLEC'TICAL, *adj.* Relating to an apoplexy.—We meet with the same complaints of gravity in living bodies, when the faculty locomotive seems abolished; as may be observed in supporting persons inebriated, *apoplectical*, or in lipothymies and swoonings. *Brown*.

APOPLEX, *f.* Apoplexy. The last syllable is cut away; but this is only in poetry:

Present punishment pursues his maw,
When surfeited and swell'd, the peacock raw
He bears into the bath; whence want of breath,
Repletions, *apoplex*, intestate death. *Dryden*.

APO'PLEXED, *adj.* Seized with an apoplexy:

Sense, sure, you have,
Else could you not have motion: but sure that sense
Is *apoplex'd*. *Shakespeare*.

A'POPLEXY, *f.* [from *αποπλησσω*, to strike or knock down, or smite suddenly; the Latins call it *attonitus morbus*.] A sudden deprivation of all internal and external sensation, and of all motion, unless of the heart and thorax. See **MEDICINE**.

APO'RIA, *f.* [*απορια*.] A figure in rhetoric, by which the speaker shews, that he doubts where to begin for the multitude of matter, or what to say in some strange and ambiguous thing; and doth, as it were, argue the case with himself. Thus Cicero says, "Whether he took them from his fellows more impudently, gave them to a harlot more lasciviously, removed them from the Roman people more wickedly, or altered them more presumptuously, I cannot well declare."

APO'RON, or **APO'RIME**, *f.* A problem difficult to resolve, and which has never been resolved, though it be not, in itself, impossible. The word is derived from *απορος*, which signifies something difficult, and impracticable; being formed from the privative *α* and *πορος*, passage. Such we conceive the quadrature of the circle; the duplicature of the tube; the trisection of an angle, &c. This word is also used by some law writers for an inexplicable speech or discourse.

APORRHOE'IA, *f.* [*απορροια*.] Effluvium; emanation; something emitted by another: not now in use.—The reason of this he endeavours to make out by atonical *aporrhoeas*, which passing from the cruentate weapon to the wound, and being incorporated with the particles of the salve, carry them to the affected part. *Glanville*.

APORRHOEA, *f.* in astrology, is when the moon separates from one planet and applies to another.

APOSCEPARNISMUS, *f.* [*σκειπαρνον*, an axe, or hatchet.] A species of fracture of the skull or other bone, wherein a piece is taken clearly off, as if cut out with a hatchet.

APOSIOPE'SIS, *f.* [*αποσιωπησις*, from *απο*, after, and *σιωπω*, to be silent.] A form of speech, by which the speaker, through some affection, as sorrow, bashfulness, fear, anger, or vehemency, breaks off his speech before it be all ended. A figure, when, speaking of a thing, we yet seem to conceal it, though indeed we aggravate it; or when the course of the sentence begun is so stayed, as thereby some part of the sentence, not being uttered, may be understood.

AOSPHRAGIS'MA, *f.* [from *απο* and *σφραγιζω*, I seal.] In antiquity, the figure or impression of a seal. It was forbid among the ancients to have the figure or image of God on their rings and seals; but in process of time it was usual enough to have the figures of Egyptian and other deities, as well as of heroes, monsters, friends, ancestors, &c. on their *dactyli*, or ring-seals.

AOSPONGIS'MUS, *f.* [*απο* and *σφογγιζω*, *spongia tergo*.] It is the using of a sponge either dry or moist, for the deterring of the filth from the skin, alleviating pains and itching, recovering the spirits, or for other purposes.

APOSTAG'MA, or **APOSTALAG'MA**, *f.* [*αποσταζω*, distilled.] The sweet liquor that distils from grapes before they are pressed.

APOSTA'SIS, *f.* [from *αφιστημι*, to abscede.] It is when a fragment of a bone comes away by a fracture; and is the same with *absciss*. Hippocrates uses the word also, first, when a distemper passes off by some outlet, and this is an *apostas* by excretion: secondly, when the morbid matter, by its own weight, falls and settles on every part; this is an *apostas* by settlement: thirdly, when one disease turns

turns to another; this is an *apostasis* metastasis. So Pliny calls the *apostema*.

APOSTASY, *f.* [*apostase*, Fr. *apostasia*, Lat. of *αποστασία*, of *ἀφίσταμαι*, Gr. to depart.] Departure from what a man has professed: it is generally applied to religion; sometimes with the particle *from*.—The canon law defines *apostasy* to be a wilful departure from that state of faith, which any person has professed himself to hold in the Christian church. *Ayliffe*.—Whoever do give different worships, must bring in more gods; which is an *apostasy* from one God. *Stillingfleet*. The primitive church distinguished several kinds of apostasy. The first, of those who went over entirely from Christianity to Judaism; the second, of those who mingled Judaism and Christianity together; and the third, of those who complied so far with the Jews, as to communicate with them in many of their ceremonies, without making a formal profession of their religion. But the fourth sort was of those who, after having been some time Christians, voluntarily relapsed into paganism. The apostasy of a Christian to Judaism, paganism, &c. was punished by the emperors Constantius and Julian with confiscation of goods; to which the emperors Theodosius and Valentinian added capital punishment, in case the apostate endeavoured to pervert others to the same iniquity. A punishment too severe for temporal laws to inflict; and yet the zeal of our ancestors imported it into this country; for we find by Bracton, that in his time apostates were burnt to death. Doubtless the preservation of Christianity, as a national religion, is, abstracted from its own intrinsic truth, of the utmost consequence to the civil state; which a single instance will sufficiently demonstrate. The belief of a future state of rewards and punishments, the entertaining just ideas of the moral attributes of the supreme Being, and a firm persuasion that he superintends, and will finally compensate, every action in human life, are the grand foundation of all judicial oaths; which call God to witness the truth of those facts, which perhaps may be only known to Him, and the party attesting: all moral evidence therefore, all confidence in human veracity, must be weakened by apostasy, and overthrown by total infidelity. But yet the loss of life is a heavier penalty than the offence, taken in a civil light, deserves; and, taken in a spiritual light, our laws have no jurisdiction over it. This punishment, therefore, has become obsolete; and the offence of apostasy was for a long time the object only of the ecclesiastical courts, which corrected the offender *pro salute animæ*. But about the close of the last century, the civil liberties to which we were then restored being used as a cloak of maliciousness, and the most horrid doctrine subversive of all religion being publicly avowed both in discourse and writings, it was thought necessary again for the civil power to interpose. To this end it was enacted by 9 and 10 W. III. c. 32. that if any person educated in, or having made profession of, the Christian religion, shall by writing, printing, teaching, or advised speaking, deny the Christian religion to be true, or the holy scriptures to be of divine authority, he shall upon the first offence be rendered incapable to hold any office or place of trust; and for the second be rendered incapable of bringing any action, or of being guardian, executor, legatee, or purchaser of lands, and shall suffer three years imprisonment without bail. To give room, however, for repentance, if, within four months after the first conviction, the delinquent will in open court publicly renounce his error, he is discharged for that once from all disabilities.

APOSTATA CAPIENDO, *f.* in the English law, a writ that formerly lay against a person who, having entered into some order of religion, broke out again, and wandered up and down the country.

APOSTATE, *f.* [*apostata*, Lat. *αποστατης*, Gr.] One that has forsaken his profession; generally applied to one that has left his religion.—The angels, for disobedience, thou hast reserved to a miserable immortality; but unto man, equally rebellious, equally *apostate* from thee and

goodness, thou hast given a Saviour. *Rogers*. Among the Romanists, it signifies a man who, without a legal dispensation, forsakes a religious order of which he had made profession.

APOSTATICAL, *adj.* After the manner of an apostate.

To APOSTATIZE, *v. n.* To forsake one's profession: it is commonly used of one who departs from his religion.

—None revolt from the faith, because they must not look upon a woman to lust after her, but because they are restrained from the perpetration of their lusts. If wanton glances, and libidinous thoughts, had been permitted by the gospel, they would have *apostatized* nevertheless. *Bentley*.

To APOSTEMATE, *v. n.* To become an aposteme; to swell and corrupt into matter.—There is care to be taken in abscesses of the breast and belly, in danger of breaking inwards; yet, by opening these too soon, they sometimes *apostemate* again, and become crude. *Wifeman*.

APOSTEMAT'ION, *f.* The formation of an aposteme; the gathering of a hollow purulent tumour.—Nothing can be more admirable than the many ways nature hath provided for preventing or curing of fevers; as vomitings, *apostemations*, salivations, &c. *Grew*.

APOSTEME, or **APOSTUME**, *f.* [*αποσυμα*, of *ἀφίσταμαι*, to depart.] A hollow swelling, filled with purulent matter; an abscess.—With equal propriety we may affirm, that ulcers of the lungs, or *apostemes* of the brain, do happen only in the left side. *Brown*.—The opening of *apostemes*, before the suppuration be perfected, weakeneth the heat, and renders them crude. *Wifeman*.

A POSTERIO'RI, *f.* or demonstration *à posteriori*. See **DEMONSTRATION**.

APOS'TIL, *f.* The same with a marginal note.

APOS'TLE, *f.* [*apotre*, Fr. *apostolus*, Lat. of *αποστολος*, of *αποστέλλω*, Gr. to send on a message.] In general signifies a messenger, a person sent upon some special errand, for the discharge of some peculiar affair of him that sent him; but is more particularly applied to the disciples whom our Saviour sent to preach the gospel to all nations. He selected only twelve of his disciples to be invested with the apostleship. Their names were Simon Peter, Andrew, James the greater, John, Philip, Bartholomew, Thomas, Matthew, James the less, Jude surnamed Lebbeus or Thaddeus, Simon the Canaanite, and Judas Iscariot. Of these Simon, Andrew, James the greater, and John, were fishermen; and Matthew a publican, or receiver of the public revenues: of what profession the rest were, we are not told in Scripture; though it is probable they were fishermen. There are various conjectures as to the reason of our Saviour's making choice of *twelve* apostles. The most probable is, that it might be in allusion to the twelve patriarchs, as the founders of their several tribes; or to the twelve chief heads or rulers of those tribes, of which the body of the Jewish nation consisted. This opinion seems to be countenanced by what our Saviour tells his apostles, that "when the Son of man shall sit in the throne of his glory, they also shall sit upon twelve thrones, judging the twelve tribes of Israel." The first commission of our Saviour to his apostles was in the third year of his public ministry, about eight months after their solemn election; at which time he sent them out by two and two. They were to make no provision of money for their subsistence, but to expect it from those to whom they preached. They were to declare, that the kingdom of heaven was at hand; and to confirm their doctrine by miracles. They were to avoid going either to the Gentiles or to the Samaritans, and to confine their preaching to the people of Israel. In obedience to their Master, the apostles went into all the parts of Palestine inhabited by the Jews, preaching the gospel, and working miracles. The evangelical history is silent as to the particular circumstances attending this first preaching of the apostles; and only informs us, that they returned, and told their Master of all that they had done. Their second commission was of a more extensive nature. They were not to confine their preaching to the Jews, but to "go and teach all nations, baptizing them in the name

of the Father, and of the Son, and of the Holy Ghost." Accordingly they began publicly, after the ascension, to exercise their ministry, working miracles, and making great numbers of converts to the Christian faith.

After the apostles had exercised their ministry for twelve years in Palestine, they resolved to disperse themselves in different parts of the world, and agreed to determine by lot what parts each should take. According to this division, St. Peter went into Pontus, Galatia, and other provinces of Lesser Asia. St. Andrew had the vast northern countries of Scythia and Sogdiana allotted to his portion. St. John's was partly the same with Peter's, namely, the Lesser Asia. St. Philip had the Upper Asia, with some parts of Scythia and Colchis. Arabia Felix fell to the lot of St. Bartholomew. St. Matthew preached in Chaldaea, Persia, and Parthia. St. Thomas preached likewise in Parthia; as also to the Hyrcanians, Bactrians, and Indians. St. James the less continued in Jerusalem, of which church he was bishop. St. Simon had Egypt, Cyrene, Libya, and Mauritania. St. Jude, Syria and Mesopotamia; and St. Matthias, who was chosen in the room of Judas Iscariot, Cappadocia and Colchis. Thus, by the dispersion of the apostles, Christianity was quickly planted in many parts of the world; yet we have but very short and imperfect accounts of their travels and actions. The appellation is given in like manner to those persons who first planted the Christian faith in any place. Thus, Dionysius of Corinth is called the *apostle of France*; Xavier, the *apostle of the Indies*, &c. In the East Indies the Jesuit missionaries are also called *apostles*.

APOSTLE is also used among the Jews for a kind of officer anciently sent into the several parts and provinces, in their jurisdiction, by way of visitor or commissary, to see that the laws were duly observed, and to receive the monies collected for the reparation of the temple, and the tribute payable to the Romans. The Theodosian code, lib. 14. *De Judæis*, calls those *apostoli, qui ad exigendum aurum atque argentum a patriarcha certo tempore diriguntur*. Julian the apostate remitted the Jews the *apostole, ἀποστολη*; that is, as he himself explains it, the tribute they had been accustomed to send him. These apostles were a degree below the officers of the synagogues called *patriarchs*, and received their commissions from them. Some authors observe, that St. Paul had borne this office; and that it is this he alludes to in the beginning of the epistle to the Galatians: as if he had said, Paul, no longer an apostle of the synagogue, nor sent thereby to maintain the law of Moses, but now an apostle and envoy of Jesus Christ, &c.

APOSTLE, in the Greek liturgy, is particularly used for a book containing the epistles of St. Paul, printed in the order wherein they are to be read in churches, through the course of the year. Another book of the like kind, containing the Gospels, is called *Εὐαγγέλιον, Gospel*. The apostle, of late days, has also contained the other canonical epistles, the Acts of the Apostles, and the Revelations. Hence it is also called *Acts of the Apostles*, *Πράξεις ἀποστόλων*: that being the first book in it.

APOSTLE is also thought by many to have been the original name for bishops, before the denomination *bishop* was appropriated to their order. Thus, Theodorus says expressly, the same persons were anciently called promiscuously both bishops and presbyters, whilst those who are now called bishops were called *apostles*.

APOSTLES' CREED: a *formula*, or summary of the Christian faith, drawn up, according to Rufinus, by the apostles themselves: who, during their stay at Jerusalem, agreed upon this *creed*, as a rule of faith, and as a *word of disinction* by which they were to know friends from foes. Baronius, and some other authors, conjecture, that they did not compose it till the second year of the reign of Claudius, a little before their dispersion. But there are reasons which may induce us to question whether the apostles composed any such creed as this. For, first, neither St. Luke, in the Acts, nor any other ecclesiastical writer before the fifth century, make any mention of an as-

sembly of the apostles in order to the composing of a creed. Secondly, the fathers of the three first centuries, in disputing against the heretics, endeavour to prove that the doctrine contained in this creed was the same which the apostles taught; but they never pretend that the apostles composed it. Thirdly, if the apostles had made this creed, it would have been the same in all churches, and in all ages; and all authors would have cited it after the same manner. But the case is quite otherwise. In the second and third ages of the church, there were as many creeds as authors, and one and the same author sets down the creed after a different manner in several places of his works: which is an evidence that there was not, at that time, any creed which was reputed to be the apostles'. In the fourth century, Rufinus compares together the three ancient creeds of the churches of Aquileia, Rome, and the East, which differ very considerably in the terms. From these reasons it may be gathered, that, though this creed may be said to be that of the apostles in regard to the doctrines contained therein, yet it is not to be referred to them as the authors and first composers of it. Who was the true author of it, is not easy to determine; though its great antiquity may be inferred from hence, that the whole form, as it now stands in the English liturgy, is to be found in the works of St. Ambrose and Rufinus, the former of whom flourished in the third century, and the latter in the fourth century. The primitive Christians, in regard they always concealed this and their other mysteries, did not publicly recite the creed, except at the times of baptism; which, unless in cases of necessity, were only at Easter and Whitsuntide. The constant repeating it was not introduced into the church till the end of the fifth century; about which time Petrus Gnephus, bishop of Antioch, prescribed the recital of it every time divine service was performed.

APOSTLES'HIP, *f.* The office or dignity of an apostle.—God hath ordered it, that St. Paul hath writ epistles; which are all confined within the business of his *apostleship*, and so contain nothing but points of Christian instruction. *Locke.*

APOSTOLA'RE, APOSTOLICA'RE, *apostolizing*, in some middle-age writers, denotes the being preferred to the dignity of pope.

APOSTOLATE, *f.* in a general sense, is used for mission. In this sense, Olearius has a discourse concerning the apostolate of Christ. But it more properly denotes the dignity or office of an apostle of Christ; but it is also used, in ancient writers, for the office of a bishop. In this sense we meet with several letters, petitions, requests, &c. directed to bishops, under the title of your *apostolate*, or *apostolatus vester*. But, as the title *apostolicus* had been appropriated to the pope, so that of *apostolate* became at length restrained to the sole dignity of the popedom. Every bishop's see was anciently dignified with the title of *sedes apostolica*, an apostolical see, which is now the peculiar denomination of the see of Rome.

APOSTOLI, *f.* in law, denote those letters missive which are demanded in cases of appeal.

APOSTOLIC, *adj.* [the accent is placed by Dryden on the antepenult.] Taught by the apostles; belonging to an apostle.—Their oppositions, in maintenance of public superstition against *apostolic* endeavours, were vain and frivolous. *Hooker.*

APOSTOLIC, in the primitive church, was an appellation given to all such churches as were founded by the apostles; and even to the bishops of those churches, as being the reputed successors of the apostles. These were confined to four, viz. Rome, Alexandria, Antioch, and Jerusalem. In after-times, however, other churches assumed the same quality, because all bishops held themselves successors of the apostles, or acted in their dioceses with similar authority. The first time the term *apostolical* is attributed to bishops, is in a letter of Clovis to the council of Orleans, held in 511, though that king does not there expressly denominate them *apostolical*, but (*apostolica*

foliâ fide digniffimi) highly worthy of the apostolical see. In 581, Guntram calls the bishops, met at the council of Maçon, *apostolical pontiffs, apostolici pontifices*.

APOSTO'LICAL, *adj.* Delivered or taught by the apostles; belonging to the apostles.—Declare yourself for that church which is founded upon scripture, reason, *apostolical* practice, and antiquity. *Hooker*.

APOSTOLICAL CONSTITUTIONS. See **CONSTITUTION**.

APOSTOLICAL TRADITIONS. See **TRADITION**.

APOSTOLICAL FATHERS, is an appellation usually given to the writers of the first century who employed their pens in the cause of Christianity.

APOSTO'LICALLY, *adv.* In the manner of the apostles.

APOSTO'LICALNESS, *f.* The quality of relating to the apostles; apostolical authority.

APOSTO'LICI, or **APOSTOLICS**, was a name assumed by three different sects, on account of their pretending to imitate the manners and practice of the apostles. The first apostolici rose out of the Encratitæ, and Cathari, in the third century. They made profession of abstaining from marriage, and the use of wine, flesh, money, &c. Gerhard Sagarelli was the founder of the second sect; he obliged his followers to go from place to place as the apostles did, to wander about clothed in white, with long beards, dishevelled hair, and bare heads, accompanied with women, whom they called their spiritual sisters. They likewise renounced all kinds of property and possessions, inveighed against the growing corruption of the church of Rome, predicted its overthrow, and the establishment of a purer church on its ruins. Sagarelli was burnt alive at Parma in the year 1300, and was afterwards succeeded by Dulcinus, who added to the character of an apostle those of a prophet and a general, and carried on a bloody and dreadful war for more than two years against Raynerius, bishop of Vercelli; he was at length defeated, and put to death, in the year 1307. Nevertheless, this sect subsisted in France, Germany, and in other countries, till the beginning of the fifteenth century, when it was totally extirpated under the pontificate of Boniface IX. The other branch of apostolici were of the twelfth century. These also condemned marriage, preferring celibacy, and calling themselves the chaste brethren and sisters; though each was allowed a spiritual sister, with whom he lived in a domestic relation; and on this account they have been charged with concubinage: they held it unlawful to take an oath; they set aside the use of baptism; and in many things imitated the Manichees. Bernard wrote vehemently against this sect.

APOSTO'LICUM, *f.* is a peculiar name given to a kind of song or hymn, anciently used in churches. Vossius understands it as spoken of the apostles' creed: Suicer thinks this impossible, for that this creed was then unknown in the churches of the east.

APOSTOO'LIANS, a sect of the Mennonites, which first sprung up in the year 1664, and derived its name from Apostool, one of the Mennonite ministers at Amsterdam. They concurred with them in doctrine, and admitted to their communion those only who professed to believe all the sentiments which are contained in their public confession of faith.

APOSTROPHE, *f.* [*αποτροπή*, from *απο*, from, and *τρέπω*, to turn.] In rhetoric, a figure by which a person who is either absent or dead is addressed as if he were present, and attentive to us. This figure, in boldness, is a degree lower than the address to personified objects, since it requires a less effort of imagination to suppose persons present who are dead or absent, than to animate insensible beings and direct our discourses to them. The poems of Ossian abound with the most beautiful instances of this figure. "Weep on the rocks of roaring winds, O Maid of Inishore! Bend thy fair head over the waves, thou fairer than the ghost of the hills when it moves in a sun-beam at

noon over the silence of Morven! He is fallen! Thy youth is low; pale beneath the sword of Cuchullin!"

APOSTROPHE, in grammar, the contraction of a word by the use of a comma: as *call'd* for *called*, *tho'* for *though*, &c.

To **APOS'TROPHIZE**, *v. n.* To address by an apostrophe.—There is a peculiarity in Homer's manner of *apostrophizing* Eumæus, and speaking of him in the second person: it is generally applied only to men of account. *Pope*.

A'POSTUME, *f.* [this word is properly *apostem*.] A hollow tumour filled with purulent matter.—How an *apostume* in the mesentery, breaking, causes a consumption in the parts, is apparent. *Harvey*. See **APOSTEME**.

To **APOSTUME**, *v. n.* To apostemate.

APOSYR'MA, *f.* [*αποσυρμα*, of *αποσυρω*, to draw, pull, or take off.] That which is drawn, shaved, or pared off.

APOTAC'TITÆ, or **APOTACTICI**, an ancient sect, who, affecting to follow the evangelical counsels of poverty, and the examples of the apostles and primitive Christians, renounced all their effects and possessions.

APOTEICHIS'MUS, *f.* in the ancient military art, a line of circumvallation drawn round a place in order to besiege it. This was also called *periteichismus*; which generally consisted of a double wall, or ramparts, raised of earth; the innermost to prevent sudden sallies from the town, the outermost to keep off foreign enemies from coming to the relief of the besieged. This answered to what are called *lines of contravallation* and *circumvallation* among the moderns.

APO'THECARY, *f.* [*apothecaire*, Fr. *apothecarius*, Lat. of *αποθήκη*, of *απο* τίθημι, to mix with, or add to, because of their compounding things together for medicine.] One who practises the art of pharmacy, keeps a physical shop, and sells medicines. In London, the apothecaries are one of the city-companies. They were incorporated by a charter of king James I. till which time they only made a part of the grocers' company; plumbs, sugar, spice, Venice treacle, mithridate, &c. were sold in the same shop and by the same person. The reason of separating them was that medicines might be better prepared, and in opposition to divers persons who imposed unwholesome drugs on the people. By an act which was made perpetual in the ninth year of George I. they are exempted from serving upon juries, or in ward and parish offices. They are obliged to make up their medicines according to the formulas prescribed in the college dispensatory; and are liable to have their shops visited by the censors of the college, who are empowered to destroy such medicines as they think not good. They have a noble hall in Water-lane, Blackfriars, which has been lately enriched with the curious and valuable museum of the late Dr. Hunter, presented to them by parliament. Here are also two fine laboratories, out of which all the surgeons' chests are supplied with medicines for the royal British navy.

The charitable dispensation of medicines by the Chinese is well deserving of notice. They have a stone, which is ten cubits high, erected in the public squares of their cities; on this stone are engraved the names of all sorts of medicines with the price of each; and, when the poor stand in need of any relief from physic, they go to the public treasury, where they receive the price each medicine is to cost.

APO'THECARY, or **APOTHECA'RIOUS**, is also used to denote a store-keeper, or officer appointed to have the direction of a magazine, granary, &c. In which sense *apothecarii* is sometimes rendered by *horarii* and *rationarii*.

A'POTHEGM, *f.* [properly *apophthegm*; which see.] A remarkable saying.—By frequent conversing with him, and scattering short *apothegms*, and little pleasant stories, and making useful applications of them, his son was, in his infancy, taught to abhor vanity and vice as monsters. *Walton*.

APOTHE'OSIS, *f.* [*apothecose*, Fr. of *απθειωσις*, Gr. of *αποθεω*, to reckon or place among the gods.] A consecration, or solemn enrolling, of great men deceased, in the

number of the gods; anciently practised by the Romans, first begun by Augustus for Julius Cæsar. After the ceremony was finished, the deified emperor was worshipped as a god, and with as much veneration as any of the rest of their gods; so that Minutius Felix says, that a person might more safely swear falsely by Jupiter himself than by the genius of the deified person; and this was continued in Christian Rome by the pope, by the name of canonization.

The doctrine of Pythagoras, which he borrowed from the Chaldees, taught that virtuous persons after their death were raised into the order of the gods. And hence the ancients deified all the inventors of things useful to mankind; and those who had done any important service to the commonwealth.

APOTHERA'PIA, *f.* [from ἀποθεραπεύω, I cure.] In physic, denotes a complete or finished cure.

APOTHERAPIA is also used in the gymnastic art, for the last part of all regular exercise, viz. friction or unction with oil, before as well as after bathing. The design of this was partly to cleanse the skin, and partly to remove weariness.

APOTHER'MUM, *f.* An acrimonious kind of pickle, as with mustard, vinegar, &c.

APOT'HESES, *f.* [from ἀποτίθημι, to reposit, or from ἀπο and τίθημι, to place.] The reduction of a dislocated bone.

APOT'OME, *f.* in geometry, the remainder or difference between two lines or quantities which are only commensurable in power. Such is the difference between 1 and $\sqrt{2}$, or the difference between the side of the square and its diagonal. The term is used by Euclid; and a full explanation of such quantities is given in the tenth book of his Elements, where he distinguishes six kinds of apotomes, and shews how to find them all geometrically.

The doctrine of apotomes, as delivered in the tenth book of Euclid, is a very curious subject, and has been much admired and cultivated by all mathematicians who have rightly understood this part of the elements; and therefore Peter Ramus has greatly exposed his judgment by censuring that book. The first algebraical writers in Europe have commonly employed a considerable portion of their works on an algebraical exposition of that book, which led them to the doctrine of surd quantities; as Lucas de Burgo, Cardan, Tartalea, Stifelius, Peletarius, &c. &c. See also Pappus, lib. 4, prop. 3, and the introduction to lib. 7. And Dr. Wallis's Algebra, p. 109.

APOTOME, in music, is the difference between a greater and less semitone, being expressed by the ratio of 128 to 125.

APOTROPÆ'A, *f.* [from ἀποτρέπω, I avert.] In the ancient poetry, verses composed for averting the wrath of incensed deities.

AP'OZEM, *f.* [apozeme, Fr. apozema, Lat. of ἀποζυμα, of ἀποζέω, to decoct.] A medicinal decoction of herbs, flowers, roots, barks, &c.

To **APPA'L**, *v. a.* [appallir, Fr. It might more properly have been written *appale*.] To fright; to strike with sudden fear; to depress; to discourage:

Give with thy trumpet a loud note to Troy,
Thou dreadful Ajax; that th' *appalled* air
May pierce the head of thy great combatant. *Shakespeare.*

The monster curls
His flaming crest, all other thirst *appall'd*,
Or shiv'ring flies, or choak'd at distance stands. *Thomson.*

APPA'LEMENT, *f.* Depression; discouragement; impression of fear.—The furious slaughter of them was a great discouragement and *appalement* to the rest. *Bacon.*

APPAMAT'TOX, a river of Virginia, in North America, navigable as far as Broadways, by vessels of any size that can cross the bar in James's river; it afterwards keeps eight or nine feet water up to Fisher's bar; and from four to five feet or upwards, from thence to Petersburg, where its navigation ceases.

AP'PANAGE, *f.* [appanagium, low Lat. probably from panis, bread.] Lands set apart by princes for the maintenance of their younger children:

Had he thought it fit
That wealth should be the *appanage* of wit,
The god of light could ne'er have been so blind,
To deal it to the worst of human kind. *Swift.*

APPARA'TUS, *f.* [Lat.] Things provided as means to any certain end, as a set of instruments for any art or science; the utensils or tools of a trade; the furniture of a house; ammunition for war; equipage; show.—Our-selves are easily provided for; it is nothing but the circumstances, the *apparatus* or equipage of human life, that costs so much. *Pope.*

APPARATUS, in chemistry. See **CHEMISTRY**.

APPARATUS, in surgery. See **SURGERY**.

APPA'REL, *f.* [appareil, Fr.] Dress; vesture. External habiliments.—At public devotion, his resigned carriage made religion appear in the natural *apparel* of simplicity. *Tatler.* It has no plural.

To **APPA'REL**, *v. a.* To dress; to clothe.—With such robes were the king's daughters that were virgins *apparelled*. 2 Sam. xiii. 18.—To adorn with dress.—She did *apparel* her apparel, and with the preciousness of her body made it most sumptuous. *Sidney.*—To cover, or deck, as with dress.—Shelves, and rocks, and precipices, and gulfs, being *apparelled* with a verdure of plants, would resemble mountains and valleys. *Bentley.*—To fit out; to furnish: (not in use).—It hath been agreed, that either of them should send ships to sea well manned and *apparelled* to fight. *Hayward.*

APPA'RENT, *adj.* [apparent, Fr. apparens, Lat.] Plain; indubitable; not doubtful.—The main principles of reason are in themselves *apparent*. For to make nothing evident of itself unto man's understanding, were to take away all possibility of knowing any thing. *Hooker.*—Seeming; in appearance; not real.—The perception intellectual often corrects the report of phantasy, as in the *apparent* bigness of the sun, the *apparent* crookedness of the staff in air and water, &c. *Hale.*—Visible; in opposition to *secret*.—The outward and *apparent* sanctity of actions should flow from purity of heart. *Rogers.*—Open; evident; known; not merely suspected. Certain; not presumptive:

He is the next of blood
And heir *apparent* to the English crown. *Shakespeare.*

APPARENT, *f.* Elliptically used for *heir apparent*:

Draw thy sword in right.—
—I'll draw it as *apparent* to the crown,
And in that quarrel use it. *Shakespeare.*

APPARENT, among mathematicians and astronomers, denotes things as they *appear* to us, in contradistinction from their *real* state, either as to distance, figure, magnitude, position, &c. &c. Thus,

APPARENT DIAMETER, or **MAGNITUDE**, as for example of the heavenly bodies, is not the real length of the diameter, but the angle which they subtend at the eye, or under which they appear. And hence, the angle, or apparent extent, diminishing with the distance of the object, a very small object, as AB, may have the same apparent diameter as a very large one FG; and indeed the objects have all the same apparent diameter that are contained in the same angle FEG. And, if these are parallel, the real magnitudes are directly proportional to their distances.

But the apparent magnitude varies not only by the distance, but also by the position of it. So, if the object
CD

CD be changed from the direct position to the oblique one CE, its apparent magnitude would then be only the angle CED, instead of the angle CED.

If the eye E be placed between two parallels AB, CD, these parallels will appear to converge or come nearer and nearer to each other the further they are continued out, and at last they will appear to coincide in that point where the sight terminates, which will happen when the optic angle BED becomes equal to about one minute of a degree, the smallest angle under which an object is visible. Also the apparent magnitudes of the same object FG or BD, seen at different distances, that is the angles FEG, BED, are in a less ratio than the reciprocal ratio of the distances, or the distance increases in a greater ratio than the angle or apparent magnitude diminishes. But when the object is very remote, or the optic angle is very small, as one degree or thereabouts, the angle then varies nearly as the distance reciprocally. But, although the optic angle be the usual or sensible measure of the apparent magnitude of an object, yet habit, and the frequent experience of looking at distant objects, by which we know that they are larger than they appear, has so far prevailed upon the imagination and judgment, as to cause this also to have some share in our estimation of apparent magnitudes; so that these will be judged to be more than in the ratio of the optic angles.

The apparent magnitude of the same object, at the same distance, is different to different persons, and different animals, and even to the same person, when viewed in different lights, all which may be occasioned by the different magnitudes of the eye, causing the optic angle to differ as that is greater or less: and since, in the same person, the more light there comes from an object, the less is the pupil of the eye, looking at that object; therefore the optic angle will also be less, and consequently the apparent magnitude of the object. Every one must have experienced the truth of this, by looking at another person in a room, and afterwards abroad in the sunshine, when he always appears smaller than in a room where the light is less. So also, objects up in the air, having more light coming from them than when they are upon the ground, or near it, may appear less in the former case than in the latter; as the ball of the cross on the top of St. Paul's church, which is six feet in diameter, appears less than an object of the same diameter seen at the same distance below, near the ground. And this may be the chief reason why the sun and moon appear so much larger when seen in the horizon, where their beams are weak, than when they are raised higher, and their light is more bright and glaring. Again, if the eye be placed in a rare medium, and view an object through a denser, as glass or water, having plane surfaces, the object will appear larger than it is: and contrariwise, smaller. And hence it is that fishes, and other objects, seen in the water, by an eye in the air, always appear larger than in the air. In like manner, an object will appear larger when viewed through a globe of glass or water, or any convex spherical segments of these; and, on the contrary, it will appear smaller when viewed through a concave of glass or water.

APPARENT DISTANCE, is that distance which we judge an object to be from us, when seen afar off. This is commonly very different from the true distance; because we are apt to think that all very remote objects, whose parts cannot well be distinguished, and which have no other visible objects near them, are at the same distance from us; though perhaps they may be thousands or millions of miles off; as in the case of the sun and moon. The apparent distance

of objects are also greatly altered by the refraction of the medium through which they are seen.

APPARENT FIGURE, is the figure or shape which an object appears under when viewed at a distance; and is often very different from the true figure. For a straight line, viewed at a distance, may appear but as a point; a surface, as a line; and a solid, as a surface. Also these may appear of different magnitudes, and the surface and solid of different figures, according to their situation with respect to the eye: thus, the arch of a circle may appear a straight line; a square, a trapezium, or even a triangle; a circle, an ellipsis; angular magnitudes, round; and a sphere, a circle. Also all objects have a tendency to roundness and smoothness, or appear less angular, as their distance is greater: for, as the distance is increased, the smaller angles and asperities first disappear, by subtending a less angle than one minute; after these, the next larger disappear, for the same reason; and so on continually, as the distance is more and more increased; the object seeming still more and more round and smooth. So, a triangle, or square, at a great distance, shews only as a round speck; and the edge of the moon appears round to the eye, notwithstanding the hills and valleys on her surface. And hence it is also, that near objects, as a range of lamps, or such like, seen at a great distance, appear to be contiguous, and to form one uniform continued magnitude, by the intervals between them disappearing, from the smallness of the angles subtended by them.

APPARENT MOTION, is either that motion which we perceive in a distant body that moves, the eye at the same time being either in motion or at rest; or that motion which an object at rest seems to have, while the eye itself only is in motion. The motions of bodies at a great distance, though really moving equally, or passing over equal spaces in equal times, may appear to be very unequal and irregular to the eye, which can only judge of them by the mutation of the angle at the eye. And motions, to be equally visible, or appear equal, must be directly proportional to the distances of the objects moving. Again, very swift motions, as those of the luminaries, may not appear to be any motions at all, but like that of the hour-hand of a clock, on account of the great distance of the objects: and this will always happen, when the space actually passed over in one second of time is less than about the 14000th part of its distance from the eye; for the hour-hand of a clock, and the stars about the earth, move at the rate of fifteen seconds of a degree in one second of time, which is only the 13751 part of the radius or distance from the eye. On the other hand, it is possible for the motion of a body to be so swift, as not to appear any motion at all; as when through the whole space it describes there constantly appears a continued surface or solid as it were generated by the motion of the object, as when any thing is whirled very swiftly round, describing a ring, &c.

Also, the more oblique the eye is to the line which a distant body moves in, the more will the apparent motion differ from the true one. So, if a body revolve with an equable motion in the circumference of the circle ABCD, &c. and the eye be at E in the plane of the circle; as the body moves from A to B and C, it seems to move slower and slower along the line ALK, till when the body arrives at C, it appears at rest at K; then when it really moves from C by D to F, it appears to move quicker and quicker from K by L to A, where its motion is quickest of all; after this it appears to move slower and slower from A to N while the body moves from F to H: there, becoming stationary again, it appears to return from N to A in the straight line, while it really moves from H by I to A in the circle. And thus it appears to move in the line KN

by a motion continually varying between the least, or nothing, at the extremes K and N, and the greatest of all at the middle point A. Or, if the motion be referred to the concave side of the circle, instead of the line KN, the appearances will be the same.

If an eye move directly forwards from E to Q, &c. any remote object at rest at P, will appear to move the contrary way, or from P to Q, with the same velocity. But, if the object P move the same way, and with the same velocity as the eye, it will seem to stand still. If the object have a less velocity than the eye, it will appear to move back towards Q with the difference of the velocities; and, if it moves faster than the eye, it will appear to move forwards from Q with the same difference of the velocities. And so likewise when the object P moves contrary to the motion of the eye, it appears to move backwards with the sum of the motions of the two. And the truth of all this is experienced by persons sitting in a boat moving on a river, or in a wheel-carriage when running fast, and viewing houses or trees, &c. on the shore or side of the road, or other boats or wheel-carriages also in motion.

APPARENT HEIR, in law. See HEIR.

APPARENTLY, *adv.* Evidently; openly.—Vices apparently tend to the impairing of men's health. *Tillotson.*

APPARITION, *f.* [from *apparco*, Lat. to appear.] Appearance; visibility.—My retirement tempted me to divert those melancholy thoughts which the new apparitions of foreign invasion and domestic discontent gave us. *Denham.* The thing appearing; a form; a visible object:

I have mark'd

A thousand blushing apparitions

To start into her face; a thousand innocent flames

In angel whiteness bear away those blushes. *Shakespeare.*

A spectre; a walking spirit.—Tender minds should not receive early impressions of goblins, spectres, and apparitions, wherewith maids fright them into compliance. *Locke.* See GHOST.

APPARITION, in astronomy, denotes a star's or other luminary's becoming visible, which before was hid. So, the heliacal rising is rather an apparition than a proper rising.

APPARITORS, *f.* [from *apparco*, Lat. to be at hand.] Such persons as are at hand to execute the proper orders of the magistrate or judge of any court of judicature. The lowest officer of the ecclesiastical court; a summoner.—They swallowed all the Roman hierarchy, from the pope to the apparitor. *Ayliffe.*

APPAUME'E, *f.* in heraldry, denotes one hand extended, with the full palm appearing, and the thumb and fingers at full length.

To APPA'Y, *v. a.* [appayer, old Fr. to satisfy.] To satisfy; to content: whence *well appayed*, is *pleased*; *ill appayed*, is *uneasy*. It is now obsolete.

To APPEA'CH, *v. a.* To accuse; to inform against any person. To censure; to reproach; to taint with accusation: Nor canst nor durst thou, traitor, on thy pain, Approach my honour, or thine own maintain. *Dryden.*

APPEACH'MENT, *f.* Charge exhibited against any man; accusation.

To APPE'AL, *v. n.* [appello, Lat.] To transfer a cause from one to another; with the particles *to* and *from*.—From the ordinary therefore they appeal to themselves. *Hooker.*—To refer to another as judge.—Force, or a declared sign of force, upon the person of another, where there is no common superior on earth to appeal to for relief, is the state of war; and it is the want of such an appeal gives a man the right of war, even against an aggressor, though he be in society, and a fellow-subject. *Locke.*—To call another as witness.—Whether this, that the soul always thinks, be a self-evident proposition, I appeal to mankind. *Locke.*—To charge with a crime; to accuse: a term of law:

One but flatters us,

As well appeareth by the cause you come,
Namely, t' appeal each other of high treason. *Shakespeare.*

APPEAL, *f.* An appeal is a provocation from an inferior to a superior judge, whereby the jurisdiction of the inferior judge is for a while suspended, in respect of the cause; the cognizance being devolved to the superior judge.

Appeals lie from all the ordinary courts of justice to the house of lords. In ecclesiastical cases, if an appeal is brought before a bishop, it may be removed to the archbishop; if before an archdeacon, to the court of arches, and thence to the archbishop; and from the archbishop's court to the king in chancery.

APPEAL, in common law, hath two significations; one is, the removing a cause from an inferior court, or judge, to a superior; as from one or more justices of the peace to the quarter sessions. The other kind of appeal is a prosecution against a supposed offender, by the party's own private action; prosecuting also for the crown, in respect of the offence against the public. 2 *Haw.* 155. In which latter sense, an appeal may be brought in three cases: 1. By a man for a wrong done to his ancestor. 2. By a wife for the death of her husband. 3. For wrong done to the appellants themselves; as in case of robbery, rape, or maihem. *Wood, b. 4. c. 5.*

By statute 6 Edw. I. c. 9. all appeals of death must be sued within a year and a day after the completion of the felony. And if a man be acquitted on an indictment of murder, or found guilty and pardoned by the king, yet he ought not (in strictness) to go at large, but be imprisoned or let to bail till the year and day be past, within which time an appeal may be brought. 3 Hen. VII. c. 1. If the appellee is convicted, the ancient usage was, so late as Henry the Fourth's time; that all the relations of the slain should drag the appellee to the place of execution. 4 *Bl.* 316.

Forasmuch as an appeal is the suit of the party, as well as of the king, hence it is that the king cannot pardon an offender found guilty upon an appeal, as he may when found guilty upon an indictment; for in such case he can only pardon for himself, but not for the party. 2 *Haw.* 155. However the punishment of the offender may be remitted and discharged by the concurrence of all parties interested; and, as the king by his pardon may frustrate an indictment, so the appellant by his release may discharge an appeal. 4 *Blackst.* 316. If the person appealed be acquitted on the appeal, the appellor shall be imprisoned for a year, and restore damages to the party, and be grievously fined to the king, 13 Edw. I. st. 1. c. 12. that is, if the appeal shall appear to the court to have been malicious. 2 *Haw.* 198. And, being acquitted on the appeal, he cannot afterwards be indicted for the same offence. 4 *Blackst.* 315. But appeal is now entirely disused, on account of the great nicety required in conducting it, and the charges of prosecution; and indictment is the only method now taken.

APPEAL'ANT, *f.* He that appeals:

Lords appellants,

Your differences shall all rest under gage,
Till we assign you to your days of trial. *Shakespeare.*

APPEAL'ER, *f.* One who makes an appeal.

To APPE'AR, *v. n.* [apparco, Lat.] To be in sight; to be visible.—As the leprosy appeareth in the skin of the flesh. *Lev.* xiii. 43.—To become visible as a spirit.—For I have appeared unto thee for this purpose, to make thee a minister and a witness. *Acts*, xxvi. 16.—To stand in the presence of another, generally used of standing before some superior; to offer himself to the judgment of a tribunal.—When shall I come and appear before God? *Psalms*, xlii. 2.—To be object of observation.—Let thy work appear unto thy servants, and thy glory unto their children. *Psalms*, xc. 16.—To exhibit one's self before a court of justice.—This morning see you do appear before them. *Shakespeare.*—To be made clear by evidence.—Egfrid did utterly waste and subdue it, as appears out of Beda's complaint against him; and Edgar brought it under his obedience,

dience, as *appears* by an ancient record. *Spenser*.—To seem, in opposition to reality.—His first and principal care being to *appear* unto his people such as he would have them be, and to be such as he *appeared*. *Sidney*.—To be plain beyond dispute.—From experiments, useful indications may be taken, as will *appear* by what follows. *Arbutnot*.

APPEAR'ANCE, f. The act of coming into sight; as, They were surprised by the sudden *appearance* of the enemy. The thing seen; as, The remarkable *appearances* in the sky. Phenomena; that quality of any thing which is visible.—The advancing day of experimental knowledge discloseth such *appearances*, as will not lie even in any model extant. *Glanville*.—Semblance; not reality.—The hypocrite would not put on the *appearance* of virtue, if it was not the most proper means to gain love. *Addison*.—Outside; show.—Under a fair and beautiful *appearance* there should ever be the real substance of good. *Rogers*.—Entry into a place or company.—Do the same justice to another, which will be done us hereafter by those, who shall make their *appearance* in the world, when this generation is no more. *Addison*.—Apparition; supernatural visibility.—I think a person terrified with the imagination of spectres, more reasonable than one who thinks the *appearance* of spirits fabulous. *Addison*.—Exhibition of the person to a court:

I will not tarry; no, nor ever more
Upon this business my *appearance* make
In any of their courts.

Shakespeare.

Presence; mein.—Health, wealth, victory, and honour, are introduced; wisdom enters the last, and so captivates with her *appearance*, that he gives himself up to her. *Addison*.—Probability; seeming; likelihood.—There is that which hath no *appearance*, that this priest being utterly unacquainted with the true person, according to whose pattern he should shape his counterfeit, should think it possible for him to instruct his player. *Bacon*.

APPEARANCE, in law, signifies the defendant's filing common or *special* bail, when he is arrested on any process out of the courts at Westminster. Anciently, the sheriff, on execution of the writ, was obliged to take the defendant into custody, in order to produce him in court upon the return, however small and minute the cause of action might be. For not having obeyed the original summons, he had shewn a contempt of the court, and was no longer to be trusted at large. But when the summons fell into disuse, and the *capias* became, in fact, the first process, it was thought hard to imprison a man for a contempt which was only supposed; and therefore in common cases, by the gradual indulgence of the courts, (at length authorized by the statutes 12 Geo. I. c. 9. and 5 Geo. II. c. 27.) the sheriff or his officer can now only personally serve the defendant with the copy of the writ or process, and with notice in writing to appear by his attorney in court to defend this action; which in effect reduces it to a mere summons. And, if the defendant thinks proper to appear upon this notice, his *appearance* is recorded, and he puts in sureties for his future attendance and obedience; which sureties are called *common bail*, being two imaginary persons, usually named *John Doe* and *Richard Roe*; or, if the defendant doth not appear upon the return of the writ, or within four (or in some cases eight) days after, the plaintiff may enter an *appearance* for him, as if he had really appeared; and may file common bail in the defendant's name, and proceed thereupon as if the defendant had done it himself. But, if the plaintiff will make affidavit that the cause of action amounts to 10l. or upwards, then the defendant upon the arrest must either go to prison, or put in *special* bail; which is done by entering into a bond to the sheriff, with one or more sureties, (not fictitious persons, as in the former case of common bail, but real, substantial, responsible, men,) to insure the defendant's *appearance* at the return of the writ, which is called the

bail bond; and, on the return of the writ, or within four days after, the defendant must appear according to the exigency of the writ. Which *appearance* is effected by putting in bail to the *action*, and is commonly called putting in bail *above*. This bail above, or bail to the action, must be put in either in open court, or before one of the judges thereof; or else, in the country, before a commissioner appointed for that purpose by virtue of the statute 4 Wm. c. 4. 3 Blackst. 287, 289. *Appearance* saves error in mesne process. 1 Vez. 386.

APPEARANCE, in perspective, is the representation or projection of a figure, body, or the like object, on the perspective plane. The *appearance* of an objective right line, is always a right line. See **PERSPECTIVE**.

APPEAR'ER, f. The person that appears.—That owls and ravens are ominous *appearers*, and presignify unlucky events, was an augurial conception. *Brown*.

APPEAS'ABLE, adj. That may be pacified; reconcilable.

APPEAS'ABLENESS, f. The quality of being easily appeased; reconcilableness.

To APPE'ASE, v. a. [*appaier*, Fr.] To quiet; to put in a state of peace.—By his counsel he *appeaseth* the deep, and planteth islands therein. *Ecclus.* xliii. 23.—To pacify; to reconcile; to still wrath.—So Simon was *appeased* towards them, and fought no more against them. 1 Mac. xiii. 47.

O God! if my deep prayers cannot *appease* thee,
Yet execute thy wrath on me alone. *Shakespeare.*

The rest shall hear me call, and oft be warn'd
Their sinful state, and to *appease* betimes
Th' incensed Deity.

Milton.

APPEASEMENT, f. A state of peace.—Being neither in numbers nor in courage great, partly by authority, partly by entreaty, they were reduced to some good *appeasements*. *Hayward*.

APPEAS'ER, f. He that pacifies others; he that quiets disturbances.

APPEL'LANT, f. [*appello*, Lat. to call.] A challenger; one that summons another to answer either in the lists or in a court of justice:

These shifts refuted, answer thy *appellant*,
Though by his blindness maim'd for high attempts,
Who now defies thee thrice to single fight. *Milton.*

One that appeals from a lower to a higher power.—An appeal transfers the cognizance of the cause to the superior judge; so that, pending the appeal, nothing can be attempted in prejudice of the *appellant*. *Ayliffe*.

APPEL'LATE, f. [*appellatus*, Lat.] The person appealed against.—An appellatory libel ought to contain the name of the party appellant; the name of him from whose sentence it is appealed; the name of him to whom it is appealed; from what sentence it is appealed; the day of the sentence pronounced, and appeal interposed; and the name of the party *appellee*, or person against whom the appeal is lodged. *Ayliffe*.

APPELLA'TION, f. [*appellatio*, Lat.] Name; word by which any thing is called.—Good and evil commonly operate upon the mind of man, by respective names or *appellations*, by which they are notified and conveyed to the mind. *South*.

APPEL'LATIVE, f. [*appellativum*, Lat.] Words and names are either common or proper. Common names are such as stand for universal ideas, or a whole rank of beings, whether general or special. These are called *appellatives*. So fish, bird, man, city, river, are common names; and so are trout, eel, lobster; for they all agree to many individuals, and some to many species. *Watts*.

APPEL'LATIVELY, adv. According to the manner of nouns appellative; as, This man is a Hercules. *Hercules* is used *appellatively* to signify a strong man.

APPEL'LATORY, adj. That which contains an appeal.

APPELLE'E,

APPELLE'E, f. One who is appealed against, and accused.

To APPEND, v. a. [*appendo*, Lat. to hang to any thing.] To hang any thing upon another; as, The inscription was *appended* to the column: the seal is *appended* to the record. To add to something, as an accessory, not a principal part.

APPENDAGE, f. [French.] Something added to another thing, without being necessary to its essence, as a portico to the house.—Modesty is the *appendage* of sobriety, and is to chastity, to temperance, and to humility, as the fringes are to a garment. *Taylor*.

APPENDANT, adj. [French.] Hanging to something else. Belonging to; annexed; concomitant.—Riches multiplied beyond the proportion of our character, and the wants *appendant* to it, naturally dispose men to forget God. *Rogers*.

APPENDANT, f. That which belongs to another thing, as an accidental or adventitious part.—A word, a look, a tread, will strike, as they are *appendants* to external symmetry, or indications of the beauty of the mind. *Grew*.

APPENDANT, [from *appendens*, Lat.] in law, is a thing of inheritance belonging to another that is more worthy. As an advowson may be appendant to a manor, land appendant to an office, a seat in a church appendant to an house. 1 *Inst.* 121. So there is common appendant; which differs from common appurtenant. Common appendant is a right belonging to the owners or occupiers of arable land, to put commonable beasts upon the lord's waste, and upon the lands of other persons within the same manor. Common appurtenant arises from no connexion of tenure, but may be annexed to lands in other lordships, or extended to other beasts besides such as are generally commonable, as to hogs, goats, and the like. 2 *Blackst.* 33. If a thing appendant to another be granted by itself, without the thing to which it is appendant, the appendancy is destroyed, and that which was appendant is become in gross: as if an advowson appendant be granted without the manor to which it is appendant; or the manor be granted, saving the advowson.

To APPENDICATE, v. a. [from *appendo*, Lat.] To add to another thing.—In a palace there is the case or fabric of the structure, and there are certain additions; as, various furniture, and curious notions of divers things *appendicated* to it. *Hale*.

APPENDICATION, f. Adjunct; appendage; annexion.—There are considerable parts and integrals, and *appendications*, unto the *mundus aspectabilis*, impossible to be eternal. *Hale*.

APPENDITIA, in law, the appendages or pertinencies of an estate. Hence the word *penthouse*, for the appendage of an house.

APPENDIX, f. [*appendices*, plur. Lat.] Something appended or added to another thing.—Normandy became an *appendix* to England, the nobler dominion, and received a greater conformity of their laws to the English, than they gave to it. *Hale*. An adjunct or concomitant.—All concurrent *appendices* of the action ought to be surveyed, in order to pronounce with truth concerning it. *Watts*.

To APPERTA'IN, v. n. [*appartenir*, Fr.] To belong to as of right: with *to*.—The honour of devising this doctrine, that religion ought to be enforced by the sword, would be found *appertaining* to Mahomed the false prophet. *Raleigh*.

The Father, & whom in heav'n supreme Kingdom, and power, and glory, *appertains*, Hath honour'd me, according to his will. *Milton*.

To belong to by nature or appointment.—If the soul of man did serve only to give him being in this life, then things *appertaining* to this life would content him, as we see they do other creatures. *Hooker*.

APPERTAINMENT, f. That which belongs to any rank or dignity.

APPERTENANCE, f. [*appartenance*, Fr.] That which belongs or relates to another thing.—Can they which be-

hold the controversy of divinity condemn our enquiries in the doubtful *appertenances* of arts, and receptaries of philosophy. *Brown*.

APPER'TINENT, adj. Belonging; relating.

You know how apt our love was to accord

To furnish him with all *appertinents*

Belonging to his honour.

Shakespeare.

APPETENCE, or AP'PETENCY, f. [*appetentia*, Lat.] Carnal desire; sensual appetite.

Bred only and completed to the taste

Of lustful *appetence*; to sing or dance,

To dress, to trouble the tongue, and roll the eye. *Milton*.

APPETIBILITY, f. The quality of being desirable.—That elicitation which the schools intend, is a deducing of the power of the will into act, merely from the *appetibility* of the object, as a man draws a child after him with the sight of a green bough. *Bramhall*.

APPETIBLE, adj. [*appetibilis*, Lat.] Desirable; that which may be the object of appetite.—Power both to slight the most *appetible* objects, and to controul the most unruly passions. *Bramhall*.

APPEN'SA, amulets, or things hanging about the necks of diseased persons, to free them from some distemper, as a dried toad to stop bleeding, &c.

APPETITE, f. [*appetitus*, Lat.] The natural desire of good; the instinct by which we are led to seek pleasure.—The will properly and strictly taken, as it is of things which are referred unto the end that man desireth, differeth greatly from that inferior natural desire which we call *appetite*. The object of *appetite* is whatsoever sensible good may be wished for: the object of will is that good which reason does lead us to seek. *Hooker*. The desire of sensual pleasure:

Why, she would hang on him,

As if increase of *appetite* had grown

By what it fed on.

Shakespeare.

Violent longing; eagerness after any thing.—Hopton had an extraordinary *appetite* to engage Waller in a battle. *Clarendon*. The thing eagerly desired.—Power being the natural *appetite* of princes, a limited monarch cannot gratify it. *Swiss*. Keenness of stomach; hunger; desire of food.—There be four principal causes of *appetite*; the refrigeration of the stomach, joined with some dryness: contraction; velleitation, and absterfion; besides hunger, which is an emptiness. *Bacon*. It has sometimes of before the object of desire.—The new officer's nature needed some restraint to his immoderate *appetite* of power. *Clarendon*. Sometimes *to*.—We have generally such an *appetite* to praise, that we greedily suck it in.

Appetites are passions directed to general objects, in contradistinction to passions directed to particular objects, which retain their proper name. Thus we say, an *appetite* for fame, for glory, for conquest, for riches; but we say the *passion* of love, of gratitude, of envy, &c. Appetite may be also distinguished from passion, since the latter has no existence till a proper object be presented: whereas the former exists first, and then is directed to an object. "A good *appetite* needs no sauce." Fr. *A bon appetit il ne faut point de sauce*. The Latins say, *Optimum cibi condimentum fames*. The Germans, *Hunger ist de ver best loch*. (Hunger is the best sauce or cook.) The meaning is, that a good appetite makes our food go down more favourably than the best sauces without it, and, where the former is, the latter ought to be avoided, as very destructive to our constitution.

APPETITION, f. [*appetitus*, Lat.] Desire.—We find in animals an estimative or judicial faculty, and *appetition* or averfation. *Hale*.

APPETITIVE, adj. [from *appetite*.] That which desires; that which has the quality of desiring.—The will is not a bare *appetitive* power, as that of the sensual appetite; but is a rational appetite. *Hale*.

APPIA VIA, or **APPIAN WAY**, an ancient paved highway of Italy. It began within the city of Rome, at the place where Constantine's triumphal arch is erected. The first projector of it, Appius Claudius Cæcus, at an immense expence from the public treasury, carried it as far as Capua; Julius Cæsar, from Capua to Benevento; and Augustus thence to Brundisium. The Appian Way, a great part of which remains entire till this day, was 350 miles in length, and about 15 feet in breadth. Caius Græchus placed stones along it, called cippi, for travellers to sit and rest on, and riders to mount at, who, in those days, had no stirrups; also mile-stones, called millaria, or lapides. It was laid with very hard stone, and was so wide, that several waggons could go abreast. Statius calls it *the queen of roads*. Its course is described by Horace, Strabo, and Antonine.

APPIADES, a name given to these five deities, Venus, Pallas, Vesta, Concord, and Peace; because they had a temple near the Appian waters, at Rome.

APPIAN, an eminent writer of the Roman history in Greek, under the reign of Trajan and Adrian. He was of a good family at Alexandria in Egypt; whence he went to Rome, and there distinguished himself so well as an advocate, that he was chosen one of the procurators of the empire, and the government of a province was committed to him. He did not complete the Roman history in a continued series; but wrote distinct histories of all nations that had been conquered by the Romans, in which he placed every thing relating to those nations in the proper order of time. His style is plain and simple: in the opinion of Phocius, he manifested the greatest knowledge of military affairs, and the happiest talent at describing them; for, while we read him, we in a manner see the battles he describes. Of all this voluminous work there remains only what treats of the Punic, Syrian, Parthian, Mithridatic, and Spanish, wars, with those against Hannibal, the civil wars, and the wars in Illyricum, and some fragments of the Celtic or Gallic wars.

APPIUS CLAUDIUS, a Sabine by birth, one of the principal inhabitants of Regillum. His shining merit having drawn the envy of his fellow-citizens upon him, he retired to Rome with all his family. Appius was admitted into the senate, and was made consul, with Publius Servilius Priscus, in 258 from the building of Rome: but he was hated by the plebeians, being an austere opposer of their clamours and seditions. The Claudian family continued long one of the most illustrious of the patrician families in Rome; and several in succession of the name of Appius supported the same stern character that distinguished their first founder.

To **APPLAUD**, *v. a.* [*applaudo*, Lat.] To praise by clapping the hands. To praise in general.

Nations unborn your mighty names shall sound,
And worlds *applaud* that must not yet be found. *Pope.*

APPLAUD'ER, *f.* [from *applaud*.] He that praises or commends.

APPLAU'SE, *f.* [*applausus*, Lat.] Approbation loudly expressed; praise: properly a clap with the hands, &c.

See their wide-streaming wounds; they neither came
For pride of empire, nor desire of fame;
Kings fight for kingdoms, madmen for *applause*,
But love for love alone, that crown the lover's cause. *Dryd.*

APPLAUSE, in antiquity, differed from *acclamation*, as the latter was articulate and performed with the voice, the former with the hands. Among the Romans, applause was an artificial musical kind of noise, made by the audience or spectators to express their satisfaction. There were three species of applause, viz. *Bembus*, *Imbrices*, and *Testæ*; the first a confused din, made either by the hands or the mouth; the second and third, by beating on a sort of sounding vessels placed in the theatres for this purpose. Persons were instructed to give applause with skill, and there were even masters who professed to teach the art.

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The proficients in this way let themselves out for hire to the vain-glorious among the poets, actors, &c. on purpose to support a loud applause. These they called *Laudicani*, and *Σοφοκλεις*. At the end of the play, a loud peal of applause was expected, and even asked of the audience, either by the chorus or the person who spoke last. The formula was, *Spectatores plaudite*, or *Valite et plaudite*. The *plausores*, or applauders, were divided into chori, and disposed opposite to each other, like the choristers in cathedrals, so that there was a kind of concert of applauds.

APPLE, CUSTARD, *f.* in botany. See **ANNONA**.

APPLE of the EYE, a name not unfrequently given to the pupil.—He kept him as the *apple of his eye*. Deut. xxxii. 10.

APPLE, LOVE. See **SOLANUM**.

APPLE, MAD. See **SOLANUM**.

APPLE, PINE. See **BROMELIA**.

APPLE, PURPLE. See **ANNONA**.

APPLE, SOUR. See **ANNONA**.

APPLE, THORN. See **DATURA**.

APPLE-TREE. See **PYRUS**.

APPLE, WATER. See **ANNONA**.

APPLEBY, [called by the Romans *Ahallaba*,] is the county town of Westmoreland, and where the assizes are held. It was formerly of great extent; but, a great part of it having been destroyed by the Scots, it is now reduced to a small, but pleasant, town; it consists principally of one street, running about 40 yards wide, with three narrow streets running from it. The market is kept on Saturdays, and is generally well supplied, and very reasonable; fish are scarce, (being so far from the sea,) except trout, which are caught in great plenty in the river Eden, which runs close by the town, and divides the London road from it. The fairs are on Whitfun-eve, Whit-Monday, June 10, and August 10. It is the only borough in Westmoreland, and sends two members to parliament: it is a town-corporate, consisting of a mayor, recorder, 12 aldermen, 16 common council, two chamberlains, two serjeants, and two beades. Here is an excellent free-grammar-school, founded in the year 1507; the standing salary 120*l*. The church, which is very ancient, is dedicated to St. Lawrence, in the diocese of Carlisle. At the upper end of the town is the castle, formerly belonging to the countess of Pembroke, but now to the earl of Thanet. The steep, on whose brow this noble edifice is erected, is richly clothed with wood; save only where a rugged cliff of a red hue breaks through the trees, and gives an agreeable variety to the landscape. The front of the castle is irregular and antique. Over its front, the top of a fine square tower is discovered, whose corners rise in turrets; the landscape to the left is richly wooded: to the right it is divided by hanging gardens, which adjoin the town, overtopped with dwellings. The prospect from the terrace, which is under the eastern front of the castle, is very beautiful. To the right, the river Eden forms a winding lake, whose banks are clothed with lofty hanging woods, descending in a swift, but regular, sweep, to the brink of the stream. On the left, lofty cliffs and precipices arise perpendicular from the water, over whose brows, oaks and ashes hanging, render their aspect more romantic by the solemn shade. On the ground above, the public road leading to Appleby winds up the hill, on whose side some cottages are scattered; whilst all behind the distant ground is formed by mountains, shadowed with clouds. Here is an hospital for 13 poor widows, endowed by the countess of Pembroke.

APPLEDORE, a small town in Kent, situated on the south side of the county, nine miles from New Romney, and 54 from London, in the direct road to Tenterden, on the banks of the river Rother. It had anciently a market, which has long been disused, but has a fair in July. Here is a court-leet, which extends itself over Town-borough and Horse-borough. It is said, the sea formerly flowed up as far as this town.

APPLI'ABLE, *adj.* That which may be applied. For this word the moderns use *applicable*; which see.

APPLI'ANCE, *f.* The act of applying; the thing applied:

Diseases desperate grown
By desperate *appli'ance* are reliev'd. *Shakespeare.*

APPLICABILITY, *f.* The quality of being fit to be applied to something.—The action of cold is composed of two parts; the one pressing, the other penetration, which require *applicability*. *Digby.*

APPLICABLE, *adj.* That which may be applied, as properly relating to something.—What he says of the portrait of any particular person, is *applicable* to poetry. In the character, there is a better or a worse likeness; the better is a panegyric, and the worse a libel. *Dryden.*

APPLICABLENESS, *f.* Fitness to be applied.—The knowledge of faults may possibly, by that little part which we have already delivered of its *applicableness*, be of use in natural philosophy. *Boyle.*

APPLICABLY, *adv.* In such a manner as that it may be properly applied.

APPLICATE, *f.* A right line drawn across a curve, so as to bisect the diameter thereof.

APPLICATION, *f.* The act of applying any thing to another; as, he mitigated his pain by the *application* of emollients. The thing applied; as, he invented a new *application*, by which blood might be stanch'd. The act of applying to any person, as a solicitor or petitioner. The employment of means for a certain end.—If a right course be taken with children, there will not be much need of the *application* of the common rewards and punishments. *Locke.*—Intenseness of thought; close study.—I have discovered no other way to keep our thoughts close to their business, but by frequent attention and *application*, getting the habit of attention and *application*. *Locke.* Attention to some particular affair: with the particle *to*.—His continued *application* to such public affairs, as may benefit his kingdoms, diverts him from pleasures. *Addison.* Reference to some case or position; as The story was told, and the hearers made the *application*.

APPLICATION, in geometry, is used for the act or supposition of putting or placing one figure upon another, to find whether they be equal or unequal; which seems to be the primary way in which the mind first acquires both the idea and proof of equality. And in this way Euclid, and other geometers, demonstrate some of the first or leading properties in geometry. Thus, if two triangles have two sides in the one triangle equal to two sides in the other, and also the angle included by the same sides equal to each other; then are the two triangles equal in all respects: for, by conceiving the one triangle placed on the other, it is proved that they coincide or exactly agree in all their parts. And the same happens if, of two triangles, one side and the two adjacent angles of the one triangle, are equal, respectively, to one side and the two corresponding angles of the other. Thus also may be proved that the diameter of a circle divides it into two equal parts, as also that the diagonal of a square or parallelogram bisects or divides it into two equal parts.

APPLICATION, in astrology, the approaching of two planets to each other.

APPLICATION of one science to another, as of algebra to geometry, is said of the use made of the principles and properties of the one for augmenting and perfecting the other. Indeed all arts and sciences mutually receive aid from each other. But the application here meant, is of a more express and immediate nature. The first and principal applications of algebra were to arithmetical questions and computations, as being the first and most useful science in all the concerns of human life. Afterwards algebra was applied to geometry and all the other sciences in their turn.

APPLICATIVE, *adj.* That which applies.—The directive command for counsel is in the understanding, and the *applicative* command for putting in execution is in the will. *Bramhall.*

APPLICATORY, *adj.* That which comprehends the act of application.

APPLICATORY, *f.* That which applies.

To APPLY, *v. a.* [*applico*, Lat.] To put one thing to another.—He said, and to the sword his throat *applied*. *Dryden.* To lay medicaments upon a wound.—God has addressed every passion of our nature, *applied* remedies to every weakness, warned us of every enemy. *Rogers.* To make use of as relative or suitable to something.—This brought the death of your father into remembrance, and I repeated the verses which I formerly *applied* to him. *Dryden.* To put to a certain use.—The profits thereof might be *applied* towards the support of the year. *Clarendon.* To use as means to an end.—These glorious beings are instruments in the hand of God, who *applies* their services, and governs their actions, and disposes even their wills and affections. *Rogers.* To fix the mind upon; to study: with *to*. *Locke* uses *about*, less properly.—Every man is conscious to himself that he thinks; and that which his mind is *applied about*, whilst thinking, is the ideas that are there. *Locke.*—To have recourse to, as a solicitor or petitioner; with *to*: as, I *applied* myself to him for help. To address to:

Sacred vows and mystic song *apply'd*,
To grisly Pluto and his gloomy bride.

Pope.

To busy; to keep at work: an antiquated sense; for which we now use *ply*. To act upon; to ply.

To APPLY, *v. n.* To suit; to agree. To have recourse to, as a petitioner. To attach by way of influence.—God knows every faculty and passion, and in what manner they can be most successfully *applied*. *Rogers.*

APPOGIATU'RA, in music, a small note inserted by the practical musician, between two others, at some distance.

To APPOINT, *v. a.* [*appointer*, Fr.] To fix any thing, as to settle the exact time for some transaction.—Now there was an *appointed* sign between the men of Israel and the liars in wait. *Judges*, xx. 38. To establish any thing by decree.—It was before the Lord, which chose me before thy father, and before all his house, to *appoint* me ruler over the people of the Lord. *2 Sam.* vi. 21. To furnish in all points; to equip; to supply with all things necessary: used anciently in speaking of soldiers.—The English, being well *appointed*, did so entertain them, that their ships departed terribly torn. *Hayward.*

APPOINTEE, a foot-soldier, formerly in the French army, &c. who for his long service and bravery received pay above a private sentinel. Till the year 1670, they had also captains and lieutenants under the appellation of *appointees*, who, without residing in the regiment, received pay.

APPOINTEE, in heraldry, the same as *aguisee*: Thus we say, a cross *appointee*, to signify that with two angles at the end cut off, so as to terminate in points.

APPOINT'ER, *f.* He that settles or fixes any thing or place.

APPOINTMENT, *f.* [*appointment*, Fr.] Stipulation; the act of fixing something in which two or more are concerned. Decree; establishment.—The ways of death be only in his hands, who alone hath power over all flesh, and unto whose *appointment* we ought with patience meekly to submit ourselves. *Hooker.* Direction; order. Equipment; furniture:

Here art thou in *appointment* fresh and fair,
Anticipating time with starting courage. *Shakespeare.*

An allowance paid to any man, commonly used of allowances to public officers.

To APPORTION, *v. a.* [from *portio*, Lat.] To let out in just portions.—An office cannot be *apportioned* out like a common, and shared among distinct proprietors. *Collier.*

APPOR'TIONMENT, *f.* in law, signifies a division or partition of a rent, a common, or the like; that is, a making of it into parts or portions. If a man hath a rent-charge to him and his heirs issuing out of certain land, if he purchase any parcel of this to him and his heirs, all the rent-charge is extinct, because the rent is intire, and issuing out of every part of the land, and therefore,

fore, by purchase of part, it is extinct in the whole, and cannot be apportioned. *Lit.* 222. But if a man, which hath a rent service, purchase parcel of the land out of which the rent is issuing, this shall not extinguish all, but only the parcel. For a rent-service in such case may be apportioned according to the value of the land. *Id.* But if one holdeth his land of his lord by the service to render to his lord yearly at such a feast a horse, a spear, a rose, and such like; if in this case the lord purchase parcel of the land, such service is taken away, because such service cannot be severed nor apportioned. *Id.* If the tenant holdeth by fealty, and a bushel of wheat, or a pound of cummin, or of pepper, or such like, and the lord purchases part of the land, there shall be an apportionment, as well as if the rent were in money: and yet, if the rent were by one grain of wheat, or one seed of cummin, or one pepper corn; by the purchase of part, the whole shall be extinct. 1 *Inst.* 149. But if an entire service be for the public good, as castle-guard, cornage, and the like, or if it be for defence of the realm, or to repair a bridge or a way, or to keep a beacon, or for advancement of justice and peace, as to attend the sheriff in the execution of process; though the lord purchase part, the service remains. *Id.*

If a man hath common of pasture without number in twenty acres of land, and ten of those acres descend to another person, the common without number is intire and uncertain, and cannot be apportioned, but shall remain. But if it had been a common certain (as for ten beasts), in that case the common should be apportioned. And so it is of common of estovers, turbary, fishery, and the like. *Id.* But apportionment of rent or common is usually settled by covenant or special agreement.

APPOR'TUM, [*apport*, Fr.] signifies properly the revenue or profit which a thing brings in to the owner. It was commonly used for a corody or pension. It was also applied to the payment made by the alien priories here in England to the superior house abroad; or sometimes it was what remained over and above the sustenance of such alien priory.

APPO'SAL of sheriffs, is the charging them with money received upon their account in the exchequer.

To APPOSE, *v. a.* [*appono*, Lat.] To put questions to. This word is not now in use, except that, in some schools, to put grammatical questions to a boy is called to *pose* him; and we now use *pose* for puzzle. A Latinism. To apply to.—By malignant putrid vapours, the nutriment is rendered unapt of being *apposed* to the parts. *Harvey.*

APPO'SER, *f.* an examiner. In the court of exchequer, there is an officer called the *foreign apposer*. In the office of confirmation, in the first liturgy of Edward VI. the rubric directs the bishop, or such as he shall appoint, to appose a child; and a bishop's examining chaplain was anciently called his *posser*.

APPOSITE, *adj.* [*appositus*, Lat.] Proper; fit; well adapted to time, place, or circumstances.—The duke's delivery of his mind was not so sharp, as solid and grave, and *apposite* to the times and occasions. *Wotton.*

APPOSITELY, *adv.* Properly; fitly; suitably.—When we come into a government, and see this place of honour allotted to a murderer, another filled with an atheist or blasphemer, may we not *appositely* and properly ask, Whether there be any virtue, sobriety, or religion, among such a people? *South.*

APPOSITENESS, *f.* Fitness; propriety; suitability.—Judgment is either concerning things to be known, or of things done, of their congruity, fitness, rightness, *appositeness*. *Hale.*

APPOSITION, *f.* [*appositio*, Lat.] The addition of new matter, so as that it may touch the first mass.—Urine, inspected with a microscope, will discover a black sand; wherever this sand sticks, it grows still bigger, by the *apposition* of new matter. *Arbuthnot.* In grammar, the putting of two nouns in the same case; as *Liber Susanna matris*, the book of his mother Susan.

To APPRA'ISE, *v. a.* [*apprecier*, Fr.] To set a price upon any thing, in order to sale.

APPRAISER, *f.* A person appointed to set a price upon things to be sold. They are usually called *sworn appraisers*, from their taking an oath to do justice between party and party.

APPRAISEMENT, in law, see INVENTORY.

To APPREHEND', *v. a.* [*apprehendo*, Lat.] To take hold of. To lay hold on.—There is nothing but hath a double handle, or at least we have two hands to *apprehend* it. *Taylor.* To seize in order for trial or punishment.—It was the rabble, of which no body was named; and not one *apprehended*. *Clarendon.* To conceive by the mind.—The First Being is invisible and incorruptible, and can only be *apprehended* by our minds. *Stillingfleet.* To think on with terror; to fear.—From my grandfather's death I had reason to *apprehend* the stone; and from my father's life, the gout. *Temple.*

APPREHENDER, *f.* Conceiver; thinker.—Gross *apprehenders* may not think it any more strange, than that a bullet should be moved by the rarefied fire. *Glanville.*

APPREHENSIBLE, *adj.* That which may be apprehended, or conceived.—The north and southern poles are incommunicable and fixed points, whereof the one is not *apprehensible* in the other. *Brown.*

APPREHENSION, *f.* [*apprehensio*, Lat.] The mere contemplation of things, without affirming or denying any thing concerning them. So we think of a horse, high, swift, animal, time, matter, mind, death, &c.—Simple *apprehension* denotes no more than the soul's naked intellection of an object, without either composition or deduction. *Glanville.* Opinion; sentiments; conception.—To be false, and to be thought false, is all one in respect of men who act not according to truth, but *apprehension*. *South.* The faculty by which we conceive new ideas, or power of conceiving them:

I nam'd them as they pass'd, and understood
Their nature, with such knowledge God endu'd
My sudden *apprehension*.

Milton.

Fear.—After the death of his nephew Caligula, Claudius was in no small *apprehension* for his own life. *Addison.* Suspicion of something to happen, or be done.—That he might take away the *apprehension*, that he meant suddenly to depart, he sent out orders, which he was sure would come into the enemies hands, to two or three villages; that they should send portions of corn into Basinghouse. *Clarendon.* Seizure:

See that he be convey'd unto the Tower:
And go we brothers to the man that took him,
To question of his *apprehension*.

Shakespeare.

The power of seizing, catching, or holding.—A lobster hath the chely or great claw of one side longer than the other, but this is not their leg, but a part of *apprehension* whereby they seize upon their prey. *Brown.*

APPREHENSION, is painted as a young, sprightly, and active, damsel, clad in white, and in a listening posture, holding in one hand a camelion, and in the other a looking-glass. Youth denotes her aptness to apprehend and learn; in white because it is the ground of all colour; on tip-toe shews the readiness she is in to apprehend, learn, and understand; the glass, because the imprints on herself, and makes all she hears and sees her own.

APPREHENSIVE, *adj.* Quick to understand.—If conscience be naturally *apprehensive* and sagacious, certainly we should trust and rely upon the reports of it. *South.* Fearful.—The inhabitants of this country, when I passed through it, were extremely *apprehensive* of seeing it the seat of war. *Addison.* Perceptive feeling:

Thoughts, my tormentors, arm'd with deadly stings,
Mangle my *apprehensive* tend'rest parts.

Milton.

APPREHENSIVELY, *adv.* In an apprehensive manner.

APPRE-

APPREHENSIVENESS, *f.* The quality of being apprehensive.—Whereas the vowels are much more difficult to be taught, you will find, by falling upon them last, great help by the *apprehensiveness* already gained in learning the consonants. *Holder.*

APPRENTICE, *f.* [*apprentisse*, Fr. of *apprehendere*, Lat. to learn.] One who is bound by covenant to serve a tradesman or artificer a certain time, upon condition of the master's instructing him in his art or mystery. Apprentices are usually bound by deed *indented*, to serve their masters, and be maintained and instructed by them. 1 *Blackst.* 426. And hereby an infant is bound, though under age. Nevertheless they cannot bind themselves so as to intitle the master to an action of covenant, or other action, for departing the service, or other breaches of the indenture; therefore it is usual for the father or some friend of the apprentice to be bound with him for the faithful discharge of his office, according to the terms agreed on. 8 *Mod.* 190.

The churchwardens and overseers of the poor may bind any such poor children apprentices, whose parents they shall judge not able to maintain them; till such man child shall attain the age of twenty-one, and such woman child the age of twenty-one, or marriage. 43 *Eliz. c. 2.* 18 *Geo. III. c. 47.* Also they may, by the consent of two justices, bind out any boy, of the age of ten years, who shall be chargeable, or whose parents shall be chargeable, or who shall beg for alms, to be apprentice to the sea-service till he shall attain the age of 21 years. 2 & 3 *An. c. 6.*

A master may by law correct his apprentice, for negligence or other misbehaviour, so it be done with moderation. 1 *Blackst.* 428. Disputes between masters and apprentices are in most cases determinable before the justices of the peace.

Inticing an apprentice to depart from his master is not an offence for which an indictment will lie; but the party's remedy is by an action on the case, which he may well maintain. *Bur. Mansf.* 1306. An apprentice gains a settlement where he serves the last forty days of his time.

An apprenticeship, being a personal trust, becomes determined by the death of the master, unless there are special words in the indenture to the contrary. *Bur. Set. Cas.* 320. Persons, having served seven years as apprentices to any trade, have an exclusive right to set up that trade in any part of England, except where they are prohibited by the bye-laws or local privileges of divers corporations. And if a man shall in any town exercise a trade, without having served an apprenticeship for seven years, he shall forfeit 40s. a month. The whole law, with respect to apprentices, is as follows:

Who may take Apprentices.—Every person being an householder, and having and using half a plough-land in tillage, may take an apprentice above the age of ten years, and under eighteen, to serve in husbandry till twenty-one at the least, or till twenty-four, as the parties can agree. 5 *Eliz. c. 4. f. 25.*

Every person being an householder, and twenty-four years old at the least, dwelling in any city or town corporate, and exercising any art, mystery, or manual occupation, may retain the son of a freeman, not occupying husbandry, nor being a labourer, and inhabiting in the same, or in any other city or town corporate, to serve as an apprentice, after the custom and order of the city of London, for seven years at the least, so as such apprenticeship do not expire before the apprentice shall be twenty-four years of age. 5 *Eliz. c. 4. f. 26.* But no person dwelling in any city or town corporate, being a merchant, mercer, draper, goldsmith, ironmonger, embroiderer, or clothier, shall take any apprentice except he be his son, or else that the father and mother of such apprentices shall have an estate of inheritance or freehold of 40s. a year, to be certified under the hands and seals of three justices where the lands lie, to the mayor of that city or town corporate, and to be inrolled among the records there. *f. 27.* And the reason of this seems to be, for that such as are to be bound apprentices in towns corporate, if their parents be of a

competent livelihood, then their masters shall be not only better secured, but such apprentices also in likelihood shall have the better means to set up their trades after their times expired. And concerning such, whose parents have not 40s. a year, they are fitter to be bound apprentices to husbandry, and the like, in the country. *Dalt. c. 58.* But, by reason of the great alteration in the value of money since that time, this provision is become of little use; for an estate of 40s. a year then was equal to more than 10l. a year now. But the citizens of London and Norwich may take and have apprentices, as before this act. *f. 40.*

Every person being an householder, and twenty-four years old at the least, and not occupying husbandry, nor being a labourer, dwelling in any market-town not corporate, and exercising any art, mystery, or manual occupation, may have to apprentice the child or children of any other artificer, not occupying husbandry, nor being a labourer, inhabiting in the same or any other such market town in the same shire. 5 *Eliz. c. 4. f. 28.* But no person dwelling in any such market-town, being a merchant, mercer, draper, goldsmith, ironmonger, embroiderer, or clothier, shall take any apprentice except he be his son, or else that his father and mother shall have an estate of inheritance or freehold of 3l. a year, to be certified under the hands and seals of three justices of the shire where the lands lie, to the head officer of such market-town where such apprentice shall be taken, there to be inrolled of record. *f. 29.*

Any person using the art of a smith, wheelwright, ploughwright, millwright, carpenter, rough mason, plaisterer, sawyer, lineburner, brickmaker, bricklayer, tyler, slater, helier, tylemaker, linen-weaver, turner, cooper, miller, earthen-potter, woollen-weaver weaving household cloth only, fuller, otherwise called tucker or walker, burner of oare and woad ashes, thatcher or shingler, wheresoever he shall dwell, may take the son of any person as apprentice, albeit his parents have no land. 5 *Eliz. c. 4. f. 30.*

Every owner of a ship or vessel, and every householder exercising the trade of the seas by fishing or otherwise, and every gunner commonly called a cannoner, and every shipwright, may take apprentices for ten years or under; and every apprentice so taken, being above seven years of age, shall be by the same covenants bound, or ordered and used to all intents, according to the custom of London, so that the covenant or bond of apprenticeship be made by writing indented, and inrolled in the town where the apprentice shall be inhabiting, if it be a town corporate; if not, then in the next town corporate: for which inrollment shall be paid not above 12d. 5 *Eliz. c. 5. f. 12.*

Every person that shall have three apprentices in any the crafts of a clothmaker, fuller, sheerman, weaver, taylor, or shoemaker, shall keep one journeyman; and for every other apprentice above three, one other journeyman, on pain of 10l. half to the king, and half to him that shall sue in the sessions or other court of record; or, if it is in a town corporate, then to be applied as by the charter. 5 *Eliz. c. 4. f. 33.* No hatmaker shall have above two apprentices at one time, nor those for any less term than seven years, on pain of 5l. a month, half to the king, and half to him that shall sue in any court of record: but this not to extend to his own son, in his own house, so as he be bound by indenture for seven years, and his term not to expire before he be twenty-two years of age. 1 *Jac. c. 17. f. 3, 5.* Weavers of stuffs in Norfolk and Norwich, that shall employ two apprentices, shall also employ two journeymen; and no master shall have above two apprentices, or any week boy, to weave in the said trade; on pain of 5l. a month to the king. 13 and 14 *Car. II. c. 5. f. 18.*

Who are compellable to be bound Apprentices.—If any person shall be required by any householder using half a plough-land at least in tillage, to be an apprentice and to serve in husbandry, or in any other art, mystery, or science, before expressed, and shall refuse so to do, then on complaint of such housekeeper to one justice (or head officer) he shall send for the person refusing; and if he shall think the said person meet to serve, and such person refuse to be bound,

he may commit him to ward, there to remain until he be contented, and will be bound. 5 Eliz. c. 4. f. 35. But no person shall be bound to enter into any apprenticeship, other than such as be under the age of twenty-one years. Id. f. 46.

Although these laws are still in force, concerning the value of the parent's estate, and such like; yet, as they are become entirely obsolete, they had better be repealed. The restrictions were originally intended (as appears by the statute, 9 Hen. IV. c. 17.) for the encouragement of husbandry, by reason of the scarcity of labourers in ancient time. And this statute of the 5 Eliz. is only a re-enacting, as it were, of former statutes; and expresseth, that any person being a householder may take apprentice the son of any freeman, *not occupying husbandry, nor being a labourer.*

Of Binding.—No one can be bound an apprentice without deed. 1 *Salk.* 68. And, by the 5 Eliz. c. 4. it must be by deed *indented.* f. 25. M. 1 Geo. II. *Smith and Birch.* An action was brought against the defendant, for enticing away and detaining the plaintiff's apprentice, who had agreed by writing to serve for seven years. Upon evidence it appeared, that the style of the writing began, *This indenture, &c.* but in fact the parchment was not indented, but was a deed poll. On exception taken to the deed, it was insisted, that the young man was not an apprentice, because he was not bound by an indenture. An infant can be bound no other way than as the statute 5 Eliz. directs, which is by indenture, and nothing can make this good. The deed cannot now be indented, for that would be a forgery. Therefore unless the plaintiff shews the apprentice to be of full age at the time of signing such deed, he cannot be accounted his apprentice, and by consequence no action can lie for detaining the apprentice; neither can the plaintiff prove him to be his servant by his deed, for he has declared for an apprentice, and must prove him so to be. Therefore the plaintiff was nonsuited. 1 *Seff. Ca.* 222. But with respect to settlements, it is enacted by the 31 Geo. II. c. 11. that the apprentice may gain a settlement under such writing, although it shall not be indented. And an apprentice must be retained by the name of apprentice expressly, otherwise he is no apprentice though he be bound. *Dalt.* c. 58. And all indentures, covenants, promises, and bargains, for having or taking apprentices otherwise than by statute of 5 Eliz. shall be clearly void in the law to all intents and purposes; and every person that shall take any apprentice contrary to the said act shall forfeit *vol.* half to the king, and half to him that shall sue in the sessions, or other court of record; or, if it is in a town corporate, then to the use of such town as by the charter. 5 Eliz. c. 4. f. 41.

By the several stamp acts, the binding (except it be of parish apprentices) shall be on a 7s. stamp; and the same shall not be given in evidence in any court till it be stamped, and the duties paid. And by the 8 Anne, c. 9. beside the said stamps and duties, there shall be paid the duty of 6d. for every 20s. of every sum of 50l. or under; and the duty of 1s. for every 20s. of every sum above 50l. given with any apprentice; and proportionably for greater or lesser sums; to be paid by the master. f. 32. And where any thing, not being money, shall be given with such apprentice, the duties shall be answered for the value thereof. f. 45. But this shall not extend to any apprentice, put out at the common charge of any parish or township, or out of any public charity. f. 40. And the full sum shall be inserted in the indenture in words at length, and shall bear date on the day of the execution thereof; on pain that the master shall forfeit double, half to the king, and half with full costs to him that shall sue. f. 35. And no such indenture shall be given in evidence in any suit to be brought by any of the parties thereunto, unless such party, on whose behalf the same shall be given in evidence, do first make oath, that, to the best of his knowledge, the sum therein inserted was really and truly all that was directly or indirectly to be given with such apprentice. f. 43. The said indentures, within the bills, shall be

brought to the head office to be stamped with a stamp for that purpose, and the duties paid within one month after date. f. 36. And elsewhere shall be brought either to the head office within the bills, or to a collector of the stamp-duties out of the said limits, in two months after date, and the duties thereupon shall be paid, and the indenture stamped, if it be at the said head office; otherwise such collector shall indorse on the indenture a receipt for the duties in words at length, and subscribe his name thereto. f. 37. And, if it is within fifty miles of the limits of the bills of mortality, the indenture shall within three months after date, and elsewhere within six months, be brought to the head office to be stamped. f. 38. And all such indentures wherein shall not be inserted the full sum directly and indirectly given, or whereupon the duties shall not be paid, or which shall not be stamped within the time limited, shall be void, and not available in any court or place, or to any purpose whatsoever; and the apprentice shall be incapable of exercising the said trade. f. 39.

Moreover, by the 9 Anne, c. 21. If the master shall neglect to pay the duties within the time limited, he shall forfeit 50l. half to the king, and half with full costs to him who shall sue. f. 66. And by the 18 Geo. II. c. 22. If he shall neglect to pay the same as aforesaid, he shall, besides all other penalties, forfeit double duty. f. 23, 24. And by the 20 Geo. II. c. 45. If any master, having forfeited the double duty, shall pay the same, and tender the indenture to be stamped, within two years after the determination of the apprenticeship, and before suit hath been commenced for the penalties, the indenture shall be valid, and the penalties discharged. f. 5. And, if after the master shall have forfeited the double duty, the apprentice shall in the presence of, or by writing under his hand signed in the presence of, one witness, require his master to pay the same, and the master shall not do it in three months, and such apprentice shall at any time within two years after the determination of his apprenticeship, pay the double duty; he may in three months after such payment demand of his master double the sum contracted for in the indenture, and if not paid in three months after, may recover the same by action at law, with full costs. And the apprentice immediately after payment of the said double duties (if his apprenticeship shall not be then expired) and signifying by writing under his hand, that he desires to be discharged from his apprenticeship, shall be discharged accordingly, and shall have the same benefit of the time he hath served as he would have had in case he had been assigned, or turned over to a new master. f. 6, 7. And where any prosecution shall be commenced against the master for the penalties, if the apprentice shall pay the double duty at any time in two years after the end of his apprenticeship, he may thereupon exercise his trade, and the indenture shall be valid, and may be given in evidence. f. 8.

Finally, by the 5 Geo. III. c. 46. Every chamberlain and other proper officer of every city and corporate town, and company, where any clerk or apprentice or servant obtains his freedom by servitude, shall enter in a book to be kept for that purpose, the names of all such clerks, apprentices, and servants, as shall be put out within the jurisdiction of such city or town corporate, and also the names and places of abode of the masters or mistresses, and of the sums of money [but it is not said, or other things equivalent] given or contracted for, and the trade or profession which they are to learn; and the date of the indentures: on pain of 20l. half to the king, and half to him that shall sue in any court of record, with full costs. f. 18, 41. And all printed indentures shall have the following memorandum printed under the same; viz. *The indenture, covenant, article, or contract, must bear date the day it is executed; and what money or other thing is given or contracted for with the clerk or apprentice, must be inserted in words at length; and the duty paid to the stamp office, if in London, or within the weekly bills of mortality, within one month after the execution, and if in the country, and out of the said bills of mortality, within two months, to a distributor of the stamps, or his substitute; otherwise the indenture*

indenture will be void, the master or mistress forfeit 50*l.* and another penalty, and the apprentice be disabled to follow his trade, or to be made free. And if any printer, stationer, or other person, shall sell or cause to be sold any such indenture, without such memorandum being printed under the same, he shall forfeit 10*l.* in like manner. s. 19.

It seems clearly agreed, that by the common law infants, or persons under the age of twenty-one years, cannot bind themselves apprentices, in such a manner as to intitle their masters to an action of covenant, or other action, for departing the service, or other breaches of their indentures: which makes it necessary, according to the usual practice, to get some of their friends to be bound for the faithful discharge of their offices, according to the terms agreed on. *Bac. Abr.* Master and servant. But by the statute of 5 Eliz. c. 4. Forasmuch as there hath been some doubt, whether any person under twenty-one years of age, and bound to serve as an apprentice, in any other place than the city of London, shall be bound, accepted, and taken, as an apprentice; it is enacted, that every such person who shall be bound by indenture, to serve as an apprentice, in any art, science, occupation, or labour, according to this statute, albeit he be within the age of twenty-one years, shall be bound as amply to every intent, as if he were of full age at the time of making the indentures. s. 43, 43. But this is to be understood of a compulsion by the means prescribed by the statute; for although an infant may voluntarily bind himself apprentice, and if he continue apprentice for seven years, he may have the benefit to use his trade; yet neither at the common law, nor by any words of this statute, a covenant or obligation of an infant for his apprenticeship shall bind him, but, if he misbehave himself, the master may correct him in his service, or complain to a justice to have him punished, according to the statute. But no remedy lieth against an infant upon such covenant. *Co. Car.* 179.

T. 17 Geo. III. *K. and Evered.* Two justices committed Robert Collehall for running away from his master; the case was, he had been bound an apprentice when an infant for six years by indenture, and being now of age ran away, alleging afterwards that he did so with an intent to avoid the apprenticeship made when he was an infant, and to his prejudice: he had run away twice before. Two objections were taken; first, that the binding was only for six years, and the 5 Eliz. requires it to be for seven; the other was, that an infant could make no contract but such as was voidable, though for his benefit; and *K. v. St. Nicholas in Ipswich* was cited, where it was adjudged, that such an indenture was voidable by the parties; that in the present case, the apprentice had done every thing in his power to avoid the indenture, having left his master, and said he would live with him no longer. In answer thereto, it was insisted, that the apprentice who had submitted to the indenture as long as he had benefit from it, and till he had learned his trade, should not be permitted to desert his service as soon as he became useful in it; but that the contract at the time of its commencement, which was during infancy, (the time when almost all apprenticeships are entered into,) was beneficial to the infant, and might legally be made, and therefore could not be abandoned. L. Mansfield: it has been adjudged that an infant may bind himself for his own benefit, and it is settled in the case in 2 Str. 1066. S. C. that a binding for four years gives a settlement.—Aston J. Supposing the indentures voidable, I cannot conceive that the apprentice's running away can avoid them; had he served regularly, and during such service declared his intention to depart, it might have been different; here he would make use of his offence in order to avoid the punishment that attends it: but it is too late to do it before a justice when charged with a crime. Willes and Ashurst J. agreed. *Cal. Caf.* 26.

But if his father, or other person, doth covenant for him; such covenant shall bind the father, or such other person: as in the case of *Whitley and Loftus*, M. 10 Geo. II. In the indenture of apprenticeship, the father covenants

to pay the apprenticeship money; the son covenants to account for his master's goods; and, in the conclusion, the father and son each bind themselves for the true performance of all covenants and agreements therein. By the court: The end of binding the father was to answer wrongs done by the son, and he must answer for any; and the covenant that each did bind himself must be so, where the son is bound to perform the thing for which the covenant was made; and this clause is usually inserted, that the covenants may be taken distributively, to wit, that each of the covenantors should perform his part; and this makes the covenant of the son bind the father, who covenanted for him as well as for himself. 8 Mod. 190.

So in the case of *Branch and Ewington*, M. 21 Geo. III. On an action of covenant by the master against the father of the apprentice, the indenture was in the common form of the statute, the master covenanting to find the apprentice meat and lodging, the father to find him clothes and washing, and the apprentice that he would serve faithfully; and for the true performance of all and every the said covenants, each of the said parties bound himself to the other. The breach assigned was, that the apprentice had absented himself from the service. For the father it was contended, that the parties were only bound for the express covenants which they had severally entered into. That it would be absurd to construe the general words so as to render the father liable for breaches of such of the covenants as were to be performed only by the son. The same construction would render the father liable to the son, or the son to the father, for those which the master was to perform. In all covenants the intention is to govern. The master has other remedies besides an action of covenant against the apprentice if he absent himself: he may, by application to the justices, have him punished under the statute of Elizabeth; or, if he wants compensation for the loss of service, he may compel him to make it up by subsequent service under 6 Geo. III. c. 23. Lord Mansfield stopped the counsel who was to have argued on the other side, and said, nothing was clearer than that the father was bound for the performance of the covenants by the son. *Douglas*, 500.

And as an infant may be bound by indenture, so the apprenticeship may be determined by consent of all the parties concerned; which, in the case of parish poor children, includes the parish officers; in other cases, the father, (or guardian,) master, and infant. *Burr. Sett. Caf.* 362, 766: *K. v. Justices of Devonshire*. Where a master receives money of an apprentice of full age to vacate his indentures, the relation is dissolved, though the indentures remain uncanceled. T. 17 Geo. III. *K. v. Justices of Devonshire, Cal. Caf.* 32. But a covenant between the master and a third person, the infant not being party, maketh not an apprenticeship. 2 Salk. 479. If an apprentice is bound, it is not necessary to the validity of his indenture, that the master should sign a counterpart. T. 17 Geo. III. *Cal. Caf.* 31. This was the case of a poor apprentice.

Of binding Poor Apprentices.—The churchwardens and overseers, or the greater part of them, by the assent of two justices, (one of the *quorum*,) may bind any such children, whose parents they shall judge not able to maintain them, to be apprentices where they shall see convenient, till such man child shall come to the age of twenty-one, (18 Geo. III. c. 47.) and such woman child to the age of twenty-one or marriage; the same to be as effectual to all purposes, as if such child were of full age, and by indenture of covenant bound him or her self. 43 Eliz. c. 2. s. 5.

By the assent of two justices. T. 29 Geo. III. *K. v. Hamfall Ridware*. Anne Cradock was bound by indenture by the parish officers of Rudgeley apprentice to Susannah Cotton of the same place, who assigned her by deed to S. Walker of Hamfall Ridware, with whom she resided there under the indenture for more than forty days and until his death, when she was removed by two justices from Hamfall Ridware to Rudgeley. The indenture was separately assented to by two justices, by signing the same, but the two justices did not assent to or sign the same at the same time, or in the

the presence of each other. The sessions quashed the order of removal. Bearcroft and Sayer, in support of the order of sessions, admitted that wherever the magistrates are to exercise a judgment upon the subject, it is necessary they should meet, in order that their act may be the result of their joint opinion; as in making orders of removal, orders of filiation, and appointing of overseers; but contended that where the justices acted only *ministerially* as allowing a poor rate, they may act separately, and that the assent of the justices in the present case fell within the latter description. The words in 43 Eliz. c. 2. f. 1. by which the parish officers, *by and with the consent of two justices*, are directed to raise competent sums for the relief of the poor, are nearly similar to those in the fifth section of that act, on which the question arises. For the words in this clause are, "that it shall be lawful for the churchwardens and overseers, *by the assent of two justices*, to bind such children to be apprentices, &c." And as under the first clause the court said in *K. v. Justices of Dorchester*, "The two justices are necessary to sign the rate only by way of form;" so under the fifth clause they are not to exercise any discretion, it being left to the parish officers to judge of the propriety of binding out the apprentices. If indeed there be any difference between the penning of the two sections, it is rather in favour of the construction now contended for in this instance, namely, that the justices may assent to the indenture *separately*; for, as was said in *Billings v. Binn*, "Assent may be by individuals, *consent* by the body." And great inconveniences will ensue from determining this indenture to be void, because it will invalidate many indentures in different parts of the kingdom, that are now supposed to be binding; for, owing to the inconvenience of procuring a meeting of justices in many places, it has been found necessary to sign them separately.—*Leicester contra* was stopped by the court. L. Kenyon, Ch. J. Perhaps the rule requiring the concurrence of two magistrates at the same time, may be sometimes attended with inconvenience. But the rule has been long settled to be that the concurrence of justices together is not necessary where the act to be done is merely *ministerial*; but they must confer together and form a joint opinion, where the act is of a *judicial* nature. It has been held (whether rightly so or not we are not now to enquire), that the allowance of a poor rate is an act merely *ministerial*; and, that being once established, the consequence results that the two magistrates need not meet when they allow the rate. The words indeed of the section on which this question arises are nearly similar to those used in the first, under which the poor rate is to be allowed: but, when the nature of this case is considered, it appears to be one of the most serious subjects that fall within the decisions of the justices. For they are empowered by this act to take children out of the arms of their parents, and to bind them out as apprentices till they are twenty-one years of age. The law has made them the guardians for those children, who have no others to take care of them. And who ought to judge of the fitness of the persons, to whom the poor children are thus to be apprenticed? Not the overseers; they are frequently obscure people, and perhaps in managing the business of the parish are not always attentive to the feelings of parents. But the legislature intended that the magistrates should have a check and controul over the parish officers in this instance; and in my mind they are called upon to examine with the most minute and anxious attention the situations of the masters, to whom the apprentices are to be bound, and to exercise their judgment solemnly and soberly before they allow or disallow the act of the parish officers; for which purpose it is necessary that they should confer together.—*Ashhurst, J.* The act of the justices in this case is in its nature an act of judgment. They are the guardians of the morals of the people, and ought to take care that the apprentices are not placed with masters who may corrupt their morals. The justices therefore should enquire particularly whether or not they ought to allow the binding by the parish officers; and I

think they would be guilty of a breach of duty if they implicitly gave their assent without examining into the circumstances of the case.—*Buller, J.* It is not easily to be reconciled with any principle of common sense to say that an act, which is merely *ministerial*, must be done with the *consent of two justices*. And I much doubt whether the person who brought in the act (43 Eliz. c. 2.) requiring the consent of two magistrates to the allowance of a poor rate, intended that the act of allowing it should be only *ministerial*; for it seems absurd to require the assent of two justices, and yet not to give them the power of withholding it, if they see occasion. But the legislature has not given them any authority to exercise their judgment upon that subject; and therefore this court has said, on the construction of that statute, that their allowance of the rate is merely *ministerial*. But the act of assenting to the binding of parish apprentices is purely *judicial*; for, on appeal, the justices at the sessions are not only to consider the propriety of binding out the apprentice, but also whether the master be bound to take him.—*Grose, J.* This act is peculiarly of a judicial nature; for the magistrates are appointed the guardians of those who have no other guardians. They should therefore exercise their judgment in this case with great deliberation. Order of session quashed. *Durnf. and East, 3 V. 380.*

By the several stamp acts, the indenture must be on a sixpenny stamped piece of paper or parchment; but it is exempted from the additional stamps and duties for money given with the apprentice. And by 32 Geo. III. c. 57. after reciting, that in indentures of parish apprentices, it hath been usual to insert several agreements and covenants to be done and performed by the several parties thereto, and, amongst other things, that the master shall, during the term of such apprenticeship, find and allow to such apprentice, sufficient meat, drink, apparel, lodging, and all other things needful for an apprentice; it is enacted, that in all parish indentures which shall be made after 1st July 1792, where no more than 5l. shall be given with such apprentice, there shall be annexed to the covenant in such indentures for such maintenance as aforesaid, a proviso declaring, that such covenant shall not be made to continue and be in force longer than three calendar months next after the death of such master, in case he shall die during the term of such apprenticeship: and in case such proviso be omitted in such indenture, the covenant for maintenance shall be in force for no longer time than three calendar months next after the death of such master, any thing in any such covenant the contrary notwithstanding. f. 1. And, where any poor child shall be appointed to be bound apprentice by the 43 Eliz. the person to whom he is appointed to be bound shall receive and provide for him, and also execute the other part of the indentures; and if he shall refuse so to do, oath being thereof made by one of the churchwardens or overseers, before two justices, he shall forfeit 10l. by distress and sale, by warrant of such justices, to the use of the poor; saving always to the person to whom any poor child shall be appointed to be bound apprentice, if he shall think himself aggrieved thereby, his appeal to the next sessions, whose order therein shall be final. 8 and 9 Will. c. 30. f. 5. And, as the churchwardens and overseers have power to place out poor children, therefore they are proper judges of persons who are fit to be their masters; and those are, all persons, who by their profession or manner of living have occasion to keep servants; but the same are to be approved of by the justices, and, if such master is dissatisfied, he may appeal to the sessions. *Dalt. c. 58.*

T. 13 Will. *Minchamp's case.* Two justices bound an apprentice to a merchant; He appealed to the sessions, and the order was discharged. And now the court, in consideration of the matter, confirmed the order of sessions; because the act having made persons compellable to take apprentices, and given an appeal to the sessions, it was in the discretion of the justices at sessions to determine, whether it was or was not fitting to put an apprentice

upon any one; and therefore the court would not disturb what the sessions had done, but confirmed the order. 2 *Salk.* 491.

M. 12 Geo. III. K. and Botley. The parish officers of Botley appointed an apprentice to be bound to Edward Clowerley; who appealed to the sessions. The sessions discharge the appointment, and state the case specially: That it appears to them upon the evidence, that Edward Clowerley resides in the parish of Hound, but is owner and occupier of an estate in the parish of Botley, of the yearly value of 30*l.* upon which there is a house inhabited by a weekly labourer of the said Edward for the better managing the farm: that the said Edward did not reside or lodge in the said parish of Botley, but paid church and poor rates for the premises: that a very considerable part of the lands of Botley is occupied by persons residing in other parishes. In support of the order of sessions, it was contended, that the sessions have a discretionary power to judge of the fitness or unfitness of binding apprentices to particular persons, and having by their determination declared, that Clowerley ought to be relieved from the apprentice, they had determined the question, and the court could not entertain any question of law about it. It was suggested, that the only question agitated at the sessions and intended to be referred to this court was, whether occupiers of land, not living within the parish where the land lies, are bound by law to take apprentices. And it not appearing in the state of the case, whether the sessions had determined on the unfitness of that particular person, or on the point of law in general, of his not being liable in respect of his living out of the parish; *L. Mansfield* said that there was no coming at the point on that state of the case by the sessions; but he thought, if they had determined it on the latter ground, they had done very right. *Mr. J. Aston* was of the same opinion, and observed how hard it might be to bind an apprentice on a person occupying lands in one parish, and being a housekeeper in a very distant parish. *Mr. J. Willes* assented. And the rule for quashing the order of sessions was discharged, and the sessions order confirmed. *Bott.* 389. *Lofft.* 79.

H. 29 Geo. III. K. v. John Clapp. The parish officers of Sowton, Devon, having, with the assent of two justices, apprenticed Sarah Hellier, a poor child of Sowton, to the defendant according to the statute; he appealed to the sessions, who confirmed the order, subject to the opinion of the court on the following case.—The apprentice was bound (*prout* the indenture) to the appellant, who resided in the parish of Pinhoe, on an estate which he rented and occupied in the parish of Sowton of 20*l. per ann.* which was divided by the highway from the house in which he lived. There was no house on the estate of which he was the occupier. The indenture, together with the apprentice, was tendered to the appellant in the parish of Sowton, in the highway adjoining to the said estate lying in the parish of Sowton.—*East* argued in the support of the order of sessions: and *Fanshaw* and *Clapp contra.*—*L. Kenyon, Ch. J.* It is highly fit that this question should not remain any longer undecided. I remember a much older case than either of those mentioned at the bar, in which this question was discussed, but not decided. The question arises on the fifth section of 43 *Eliz. c. 2.* The general purview of that statute was to make a provision for the maintenance of the poor; and the first clause, in mentioning those who are to contribute to such maintenance, describes two sorts of persons, namely, *inhabitants* and *occupiers of lands, &c.* Amongst other provisions for the poor, the fifth section gives power to the parish officers, with the assent of two magistrates, to bind poor children apprentices *where they shall see convenient.* It is true indeed that those words cannot be taken so generally as they purport, because they cannot compel mere strangers, who stand in no relation to the parish, to take such apprentices. But I think that the context of the statute furnishes the means of circumscribing the general extent of those words; and that context I take from the first clause, which imposes other

burdens of the same nature on *occupiers of lands, &c.* as well as inhabitants. The general object of the act was to compel all those, who had any property in the parish, to contribute their due proportion towards the maintenance of the poor; and the receiving apprentices is one mode of contributing to their general relief. In construing these words, I see no reason for confining the power of binding to the *inhabitants* of the parish; they ought to be extended to persons *occupying lands in the parish, though residing out of it.* Then it is said that if this construction be put upon the statute, the party may be doubly charged; in the parish where he lives in respect of his inhabitancy; and in that in which he has lands, in respect of his occupation of them. But, if he find himself aggrieved, he may appeal to the sessions; and we must take it for granted that the justices will do what is right. They are to adapt the charge to the size of the property which the person charged possesses: and these are incidental charges which fall on him in respect of that property. I remember it was argued in a former case on this subject that, if this construction of the statute were to prevail, some parishes would disburthen themselves of many of their poor by apprenticing out their poor children to persons living out of the parish: but the answer to any such argument is that, at the time when the 43 *Eliz.* was passed, the 13 and 14 *Car. II.* was not in existence. However the ground of my decision here is, that this is one of the modes provided for the maintenance of the poor in this statute, which imposes the duty in respect of the property.—The other judges concurred. Order of sessions confirmed. *Dunf. and East,* 3 *V.* 107.

And by 32 *Geo. III. c. 57.* Where any parish apprentice shall have been discharged for misbehaviour in the master, and such master shall have been convicted of such offence on indictment, or action at law, the churchwardens and overseers shall not bind any other apprentice upon such person; but that, when he ought or would be compellable to take a parish apprentice, two justices, on application by such churchwardens and overseers, may order that such person shall pay into the hands of such churchwardens and overseers, any sum not exceeding 10*l.* nor less than 5*l.* for the purpose of binding out such child (intended to be bound) an apprentice, with the approbation of such justices; and on his refusing payment thereof, such justices may levy the same by distress, together with the reasonable expences of such distress. Provided that any such master, from whom any such apprentice shall be discharged by virtue of 20 *Geo. II. c. 19.* may appeal against such discharge, or order for the payment of any money in consequence thereof as aforesaid, or in lieu of a subsequent binding by virtue of this act, to the next sessions, who shall finally determine the same, and in their discretion allow to all parties their reasonable costs. And no such distress for enforcing the payment of such money last mentioned, shall be taken until after the next general quarter sessions next after such order shall be made, in case the person ordered to pay the same shall, within seven days after notice given to him of such order, give notice to such churchwardens and overseers or one of them, of such intended appeal; and if he shall not appear at such sessions in support of his appeal, then 40*s.* shall be added to the expences of distress before directed to be taken and levied accordingly. *f. 12.*

E. 13 Anne. Q. and Wagstaff. It was moved to quash an order to compel a person to take an apprentice, because in the close of the indenture it was said, that the master, at the end of the term, shall give his apprentice two suits of clothes. Upon debate, the court held this to be ill; for the justices during the term of his apprenticeship cannot order him wages, they must only order him a maintenance as an apprentice, and cannot order him any thing after the term is ended. So the order was quashed. *Foley* 205, 1 *Seff. C.* 43.

And by 32 *Geo. III. c. 57.* After reciting, that it frequently happens, that persons are compellable by 9 and 10 *Will.* to take a greater number of parish apprentices than it

it is convenient for them to maintain or employ in their own families, and are therefore forced to place out or assign over such apprentice to other persons, and it is proper that such assignment should be legally made, under the inspection and controul of the magistrates, as well for the benefit of the apprentice, as that the original master may be discharged from his covenants in respect of such apprentice; and it is fit that such apprentice and the person to whom he is so assigned, should be made subject to the ordinary jurisdiction of justices of the peace with respect to masters and parish apprentices; it is enacted, that any such master as aforesaid, by indorsement on the indenture, or by other instrument in writing, with the consent of two justices of the place where such master shall dwell, testified under their hands, to assign such apprentice for the residue of the term, to any person who is willing to take him. Provided, that such person shall, at the same time, by indorsement on the counter part of the indenture, or by writing under his hand stating the said indenture, and the indorsement and consent aforesaid, declare his acceptance of such apprentice, and acknowledge himself, his executors and administrators, to be bound by the agreements and covenants mentioned in such indenture; and in such case such apprentice shall be deemed and taken to be the apprentice of such subsequent master, and so from time to time as often as it shall be convenient for any such subsequent master to part with any such apprentice; and all justices shall have the like power with respect to such subsequent masters and apprentices as they shall then have by any law for the regulating parish apprentices. f. 7.

And whereas no express provision has been made for the discharge of any such parish apprentice from a master who is become insolvent, or so far reduced as to be unable to employ or maintain such apprentice; it shall be lawful for two justices where such master shall live, on request of such master that such apprentice may be discharged for the reasons aforesaid, to enquire into the matter of such allegations, and to discharge such apprentice, in case they shall find the same to be true. f. 8. Provided, that nothing herein shall extend to any parish apprentice with whom more than 5l. shall be given, but the same shall remain subject to the like rules and regulations as if this act had not been made. f. 9. Provided also, that no indorsement made in pursuance of this act, shall be chargeable with any stamp-duty; and no such other instrument or writing herein directed to be made, shall be chargeable with a higher stamp-duty than parish indentures of apprenticeship. f. 10.

In hundreds or other districts incorporated by particular acts of parliament for relief of the poor, where, by such acts, power is given to bind poor children apprentices; the respective persons, to whom they shall be appointed to be bound, shall receive and provide for them according to the indentures to be executed by the directors and acting guardians, and shall execute the counter part of such indentures; and if any person shall refuse to receive such apprentice, or to execute such counter part of the indenture; he shall, on conviction on the oath of one of the said directors or acting guardians, or other credible witnesses, before two justices, forfeit 10l. to the poor within such incorporated district, to be levied by distresses. Saving always to such person his appeal to the next sessions, whose order therein shall be final. And provided, that nothing herein shall extend to compel any person to take any such poor child apprentice, unless he be an inhabitant and occupier of lands in the parish to which such child belongs. 20 Geo. III. c. 36.

Unless he be an inhabitant and occupier. H. 30 Geo. III. K. against the directors and guardians of the poor within the hundreds of Tunstead and Happing in Norfolk. Incorporated by 25 Geo. III. c. 27. The directors, under the powers given them by that act, bound a poor male child apprentice to one Reynolds, who was an *occupier* of land, but not an *inhabitant*, within the said hundreds. He appealed to the sessions; who were of opinion that he was

not bound to receive the apprentice, because he was not an inhabitant as well as an occupier. But the court of K. B. said, that incorporated districts under particular statutes, were to be governed as to binding out apprentices, by the same rule as other places. That for some purposes, *inhabitants* and *occupiers* are synonymous terms; that where a person derives a benefit from property which he occupies in a parish, he is liable to contribute to the ease of it. If indeed the legislature had used imperative words, the court must have been bound by them, but there are none such in this statute. Order of sessions quashed. *Dunf. and East*, 3 V. 523.

Of Money given or bequeathed to bind out Poor Apprentices.—By the 7 Jac. c. 3. All money given by any person to be continually employed for the binding out apprentices, shall be employed in manner following, unless otherwise ordered by the givers; viz. All corporations of cities, boroughs, and towns corporate, and in places not corporate, the minister, constables, churchwardens, overseers, or the most part of them, shall have the nomination and placing of such apprentices, and ordering of such money; and, if they shall not employ the same accordingly, every person offending shall forfeit 3l. 6s. 8d. half to the poor, and half to him that shall sue. f. 2. And the master that shall receive the money, shall be bound with one or two sureties in double the sum, unto such corporation, or to the other persons appointed by this act in places not corporate, to take care of it, on condition to repay it at the end of seven years, or within three months thereof; and, if the apprentice shall happen to die within the seven years, then within one year after such death; and, if the master shall die, then within one year after such master's death. f. 3. And the said money shall always be put forth in three months after it shall come to the said parties hands; and, if there are not then fit persons to be bound apprentices, within the places where the money is given to be employed, it shall be disposed of for binding some of the poorest children of any adjoining parish. f. 4. And choice shall always be made of the poorest children; and no such apprentice shall be above fifteen years of age when bound. f. 5. And the said persons in places not corporate, shall yearly, within a month after Easter, account to their successors before two justices dwelling in or next to the place. f. 6. And if any of the trustees shall break their trust, or commit any offence for which no penalty is given by this act; any person may petition the lord-chancellor, who may issue a commission to hear and determine the same, and may levy the money misemployed upon such defaulters, or otherwise upon such able inhabitants of the place, as they shall think fittest; and persons aggrieved may appeal to the lord-chancellor. f. 7.

Of binding Poor Apprentices to the Sea-Service.—It shall be lawful for two justices, and for the head officers in corporations, and for the churchwardens and overseers of the several parishes or townships, with the consent of such justices or head officers, to bind and put out any boy at the age of ten years or upwards, or who shall be chargeable, or whose parents shall be chargeable, or who shall beg for alms, to be an apprentice to the sea-service, to any subject being master or owner of any ship or vessel, until he shall attain the age of twenty-one years. 2 and 3 Anne, c. 6. f. 1. And every person to whom any poor parish boy shall be put apprentice by the 43 Eliz. may, with the consent of two justices dwelling near the parish where such poor boy was bound, or with the like consent of the chief officer in a corporation, at the request of the master, his executors, administrators, or assigns, by indenture assign over such poor boy apprentice, to any master or owner of a ship or vessel using the sea-service, during the remaining time of his apprenticeship. f. 6. And every master or owner of a ship, from thirty to fifty tons burden, shall be obliged to take one such apprentice, and one more for the next fifty tons, and one more for every hundred tons such ship shall exceed the burden of an hundred tons; on pain of forfeiting 10l. to the poor of the parish from whence such boy was bound. f. 8. But no master shall be obliged

to take any such apprentice, under thirteen years of age, or who shall not appear to be fitly qualified both as to health and strength of body for that service. 4 Anne, c. 19. f. 16. The boy's age shall be inserted in the indenture, being truly taken from a copy of the entry in the register-book (where it can be had), which copy shall be given and attested by the minister without fee: and, where no such entry can be found, two such justices, and such head officers, shall as fully as they can inform themselves of such boy's age, and from such information shall insert the same in the indentures. 2 and 3 Anne, c. 6. f. 1. And the churchwardens and overseers shall pay down to the master, at the time of the binding, the sum of 50s. for clothing and bedding; and the charges by this act appointed shall be allowed on their accounts. 2 and 3 Anne, c. 6. f. 2.

The churchwardens and overseers shall send the indentures to the collector of the customs at the port whereunto the master belongeth; who shall enter the indenture in a book, and make an indorsement upon the indenture of the registry thereof, subscribed by him, without fee. And if he shall neglect or refuse to enter such indentures, and indorse the same, or make false entries, he shall forfeit 5l. to the poor of the parish from whence such boy was bound. 2 and 3 Anne, c. 6. f. 5. Such apprentice shall be conveyed to the port to which his master belongeth, by the churchwardens and overseers, or their agents; and the charges thereof shall be paid as by the vagrant act of 11 and 12 Will. 2 and 3 Anne, c. 6. f. 10. That is to say, out of the gaol and marshal's money; which, by the 12 Geo. II. c. 29. is directed to be paid out of the general county rate.

The counter part of the indenture shall be sealed and executed by the master, and attested by the collector of the port, and the constable or other officer who carries the apprentice; which officer shall transmit such counter part to the churchwardens and overseers of the place from whence the apprentice was bound. 2 and 3 Anne, c. 6. f. 11. And the collector or his deputy shall transmit a certificate under his hand, to the commissioners of the admiralty, containing the name and age of such apprentice, and to what ship he belongs; and on receipt of such certificate, a protection shall be made and given *gratis* to such apprentice, till he attain the age of eighteen years. Id. f. 5.

Also every person who shall voluntarily bind himself apprentice to the sea-service, shall not be impressed for three years from the date of his indentures; which indentures shall be registered, and certificates thereof given and transmitted by the collector as aforesaid; on receipt of which certificates, protections shall be made and given for the first three years without fee. Id. f. 15. But by 4 Anne, c. 19. No person of the age of eighteen years shall have any protection from being impressed, who shall have been in any sea-service before he bound himself apprentice. f. 17. But every person not having before used the sea, who shall bind himself apprentice to serve at sea, shall be exempted from being impressed for three years: and the commissioners of the admiralty, on due proof of the circumstances, shall grant a protection accordingly, without fee. 12 Geo. II. c. 17.

When such parish or voluntary apprentice shall be impressed, or voluntarily enter into the king's service, the owner or master, his executors, administrators, or assigns, shall be intitled to able seamen's wages for such of the apprentices as shall upon due examination be found qualified for the same, notwithstanding their indentures of apprenticeship. 2 and 3 Anne, c. 6. f. 17. Such poor boys bound out, or assigned over, to the sea service, until they shall attain to the age of eighteen years, shall be exempted from the payment of 6d. a month to Greenwich hospital. Id.

Every master so obliged to take such apprentice, shall after his arrival into any port aforesaid, and before he clears out of such port, give an account in writing under his hand, to the collector, containing the names and number of such apprentices as are there remaining in his service. f. 9. And every custom-house officer shall insert at

the bottom of their coquets, the number of men and boys on-board their respective ships at their going out, describing the apprentices by their names, ages, and dates of their indentures, for which no fee shall be taken. f. 14. And the collector in the port shall keep a register, containing the number and burden of all ships belonging to the port, together with the masters or owners names, and also the names of all such apprentices in such ships, and from what parishes and places they were sent; and shall transmit *gratis* true copies thereof signed by him, to the quarter sessions, or to such towns corporate, parishes, or places, when and so often as he shall be reasonably required so to do; and every collector refusing or neglecting to send such copy, shall forfeit 5l. to the poor of the parish from whence such boy was bound. f. 13.

Two justices near the port, and mayors of towns corporate, in or near adjoining to such port to which such ship or vessel shall at any time arrive, may determine all complaints of ill usage from the master to such apprentice, and also of all such as shall voluntarily put themselves apprentices to the sea-service, and make such order therein as they are now enabled by law to do in other cases between masters and apprentices. f. 12. All the penalties aforesaid shall, by warrant of two justices of the county, city, or town corporate, be levied by distress and sale. f. 18. If any master, who hath been obliged to take such parish boy an apprentice, shall die, during the term; his widow, or his executor or administrator, may assign over such apprentice to any other master who hath not his complement of apprentices. 4 Anne, c. 19. f. 16.

By the 2 Geo. III. c. 15. Masters, apprentices, mariners, and others, employed in fishing-vessels upon the coasts, are exempted, during such their employment, from being impressed. f. 22, 23, 24, 25.

Of Differences arising between the Master and Apprentice.—A master may by law correct and chastise his apprentice, for neglect or other misbehaviour, so it be done with moderation. The master may not of his own accord discharge his apprentice; but, if they cannot agree, they may proceed in one of these two ways: either upon the statute of the 5 Eliz. c. 4. or upon the statute of 20 Geo. II. c. 19.

By the 5 Eliz. c. 4. "If any such master shall misuse or evil intreat his apprentice, or the said apprentice shall have any just cause to complain, or the apprentice do not his duty to his master, then the said master or apprentice being grieved, and having cause to complain, shall repair unto one justice of the county, or to the mayor or other head officer of the city, town corporate, or market-town, or other place where the master dwelleth; who shall by his wisdom and discretion take such order and direction between the master and his apprentice as the equity of the cause shall require: and if, for want of good conformity in the master, the said justice (or head officer) cannot compound and agree the matter, he shall take bond of the said master to appear at the next sessions; and on his appearance, and hearing of the matter there, if it be thought meet to discharge the said apprentice, then the justices, or four of them at the least, (one of the quorum,) or the said mayor or other head officer, with the consent of three other of his brethren, or men of best reputation in such city, town corporate, or market-town, shall have power, in writing under their hands and seals, to pronounce and declare, that they have discharged the said apprentice of his apprenticeship, and the cause thereof: and the said writing, being enrolled by the clerk of the peace, or town-clerk, amongst the records, shall be a sufficient discharge for the apprentice against his master, his executors and administrators. And, if the default should be found to be in the apprentice, then the said justices, or the said mayor, or other head officer, with the assistance aforesaid, shall cause such due correction and punishment to be administered unto him, as by their wisdom and discretions shall be thought meet." f. 35.

If any such master. That is, any such master as is before mentioned in this statute, in the trades therein specified; and

and the former resolutions confined the sense of the statute to such trades only, but the latter adjudications seem to extend the equity thereof to other trades not mentioned in the statute; as in the following instances:

M. 7 Will. K. and *Gately*. On a certiorari it was moved to quash an order of sessions, for the discharge of one Edward Green from his apprenticeship to the defendant Gately. The fact was, that Gately was a mountebank, and being at a place in Yorkshire, where he kept a public stage, Green was by indenture bound apprentice to him in this manner, viz. to Robert Gately, surgeon, to learn the trade he now useth; and immediately he went upon the stage, and ever since continued in the employ. After which, being with his master Gately in Middlesex, he complained to the justices, that his master did not teach him the trade. Upon which they discharged him. This being done, Green set up the trade of mountebank himself. It was moved to quash the order, the justices being willing, because they were imposed upon. And the exception was, that the statute of the 5 Eliz. in discharging apprentices is confined, and extends only to apprentices mentioned in that clause, and there neither surgeon nor mountebank is mentioned: and though a surgeon may be a trade within the statute, which a man cannot exercise without serving an apprenticeship to, because that clause of the statute is general; yet this part of the statute, relating to the discharge of apprentices, extends only to trades there mentioned. By the court: The clause relating to the discharge of apprentices is general, and goes to all manner of apprentices, even to those of merchants; but afterwards the court were of opinion, that the power of discharging reaches only to the trades mentioned in the statute, among which a surgeon is not mentioned; for that, though as to the serving seven years apprenticeship, a surgeon comes under the general term of arts and mysteries, yet the power of discharging reaches only to the trades particularly mentioned. 2 *Salk.* 471, 2. And M. 12 Anne, Q. and *Furness*. It was held, that the statute extends only to the trades therein mentioned; and therefore not to a glass-bottle-maker. *Caf. of S.* 29. On the other hand, in the case of K. and *Collingbourn*, M. 12 Geo. Exception was taken to an order of discharge, that the justices could not discharge the apprentice, because the trade to which he was bound, viz. a glazier, was not within the statute: But not allowed; for though formerly it was held, that the trade ought to be a trade within the statute, yet the latter resolutions have been otherwise. *L. Raym.* 1410. *Str.* 663.

Shall misuse or evil intreat his Apprentice. An apprentice to a surgeon was sent by his master to the East Indies: It was adjudged, that the master cannot compel his apprentice to go beyond the sea, except the master go with him; but he may send him to any part of England. 13 Jac. *Coventry* and *Windall*. *Brownl.* 67. But otherwise, if it be expressly agreed, or the nature of the apprenticeship doth import it; as if the master be a merchant adventurer, or sailor. *Hobart*, 134.

Evil intreat. E. 8 Geo. II. K. and *Easman*. An apprentice was discharged, the master having *used him unkindly*, and refusing to provide for and entertain him: But by the court, this is not a good ground for the discharge: for there is a power to oblige the master to receive and entertain the apprentice, and *using him unkindly* is too loose. *Str.* 1014.

Or the Apprentice do not his duty to his Master. T. 4 Geo. K. and inhabitants of *Hales Owen*. An order reciting that Joseph Higgin was bound out by indenture, as the statute requires, to John Parks, and being lame, and having the king's evil, and in the opinion of surgeons incurable, therefore the justices discharge the master from his apprenticeship. It was moved to confirm the order, because the master cannot now have the end of the binding, which was, the service of his apprentice. But it was answered, that the statute only impowers the justices to discharge for misbehaviour, and not for sickness. And quashed by the court; for the master takes the apprentice for better

and worse, and is to provide for him in sickness and in health. *Str.* 99.

Shall repair unto one justice. Upon an order made at the sessions to discharge an apprentice, it did not appear, that he applied himself to a justice first. And Holt, Ch. J. was of opinion, that the justice hath power to make an order, and, if obeyed by the master, then the sessions can have no power; if disobeyed, then the justice upon complaint may bind the master to the sessions, and that the sessions have no power otherwise. 1 *Salk.* 67.

T. 13 Will. K. and *Johnson*. Exception was taken to an order for discharging an apprentice, that the complaint was made originally at sessions, without any previous application to a single justice out of sessions: Holt, Ch. J. delivered the opinion of the court, That the order was good; if it had been a new question, he should have held a prior application to some justice out of sessions necessary; but after so many orders affirmed in this court, which have been otherwise, it is too late to settle that now. 1 *Salk.* 68. So also in the case of K. and *Gill*, H. 5 Geo. It was said by the court, It hath been so often resolved, that the sessions hath an original jurisdiction, that we will not suffer it now to be made a question, though it might be doubtful upon the statute itself. *Str.* 143. And, T. 12 Geo. K. and *Davie*. The court agreed, that it is a point not now to be disputed, that the sessions hath an original jurisdiction to discharge apprentices. *Str.* 704. And by Lord Hardwicke, Ch. J. in the case of K. and *Easman*, E. 8 Geo. II. This determination is right; for the application which the act directs to be made to a private justice, seems to mean only to arbitrate and accommodate the dispute. The statute says, if he cannot compound the matter, he is to take bond for the parties appearance at the sessions, so that they are not to take it by appeal. *Cases in the time of Lord Hardwicke*, 101.

Or to the mayor or other head officer. M. 12 Geo. K. and *Collingbourn*. An order of sessions was made at Hicks's Hall, for the discharge of an apprentice to a freeman of the city of London, and who was bound and inrolled there. And, the order being removed into the king's bench, the question was, whether the court of sessions at Hicks's Hall hath any jurisdiction to discharge an apprentice to a freeman of London (especially as there is a saving in the act, of the custom of the city of London); or whether he ought not to be discharged by the mayor's court only. It appeared that the apprentice lived with his master out of the city of London, and within the jurisdiction of the justices of Middlesex. To this exception it was answered, that the statute doth not regard where the binding or inrolling is, but gives the jurisdiction expressly to the justices where the master lives; and if this did not belong to the justices of Middlesex, where the master lives, there would be a failure of justice: for neither the chamberlain, nor any other city magistrate, have power to compel the master's appearance before them. The court affirmed the order of discharge, and said they would not take away the jurisdiction of the mayor's court, but only give a concurrent jurisdiction to the justices for the county. And it would be very inconvenient, to have apprentices to a freeman of London, who are bound there, and who live in distant counties, obliged to come up to the mayor's court to get themselves discharged: and the words of the statute are very plain; for they give the jurisdiction to the justices where the master dwelleth. *Str.* 663.

Who shall by his wisdom and discretion take such order and direction between the Master and his Apprentice as the equity of the case shall require. Hereupon the justice, if he sees cause, may, by consent of the master, discharge the apprentice from his apprenticeship: but this must not be by a verbal discharge; for the apprentice being by deed, cannot be discharged but by deed, that is, by order under the hand and seal of the justice. *Dalt. c.* 58. 6 *Mod.* 182.

If for want of good conformity in the master. If the master is dissatisfied, he may have the matter transferred to the sessions: but here is not the like option given to the apprentice;

apprentice; and the reason seems to be, because, the apprentice being most commonly an infant, the law presumes that the justice is more capable of judging what is for the infant's benefit.

On his appearance. E. 13 Will. Ditton's case. It was moved to quash an order made for the discharge of an apprentice. The question arose upon the clause of the statute which directs, that upon appearance of the master, the apprentice may be discharged by four justices, after one justice out of sessions hath endeavoured to compose the matter in difference. And in this case it was objected, that Ditton the master was bound over to appear, and did not; and the justices have but a limited jurisdiction, and it is expressly directed by the act, that the discharge is to be made on the appearance of the master; besides, there is another remedy, to proceed on the recognizance which is forfeited by not appearing. By the court: The act must have a reasonable construction, so as not to permit the master to take advantage of his own obstinacy; and it would be very hard, that supposing the master is profligate, and runs away, the apprentice shall never be discharged. 2 Salk. 490.

H. 5 Geo. K. and Gill. An order of sessions for discharging an apprentice was quashed, because it did not set forth, that the master was summoned, or did appear. Str. 143. So also, E. 8 Geo. II. K. and Eastman. The order was quashed, because it did not appear that the master was present or summoned, which it is plain the act intended he should be. Str. 1013.

Inrolled by the clerk of the peace. T. 4 Geo. K. and inhabitants of Hales Owen. The order of discharge was not inrolled; and by the court for that reason held ill. Str. 99.

Shall be a sufficient discharge for the apprentice against his master. But as the justices may discharge the apprentice from his master, for ill usage; so also they may discharge the master from the apprentice for evil and disorderly behaviour. Read. Appr.

Discharge. T. 13 Will. K. and Johnson. Exception was taken to an order of discharge, that the justices had ordered money to be returned: But by the court, the order is good. And Holt, Ch. J. said he never doubted of that matter, for it is a power consequential upon their jurisdiction to discharge. 1 Salk. 68. But in the case of K. and Vandeleur, M. 4 Geo. The justices at the sessions did order an apprentice to be discharged, and that the master, having received 3l. with him, should refund 3l. as a further provision for him. This was moved to be quashed, because the statute, which gives the justices power to discharge, gives them no authority to order any money to be returned. By the court: It is very hard, that, if the master misuses the apprentice the next day after he is bound, he should pay back nothing if he is discharged: it will be an encouragement to masters to treat their apprentices ill; but, the statute being silent, the order must be quashed. Str. 69. Nevertheless, this doctrine of refunding seemeth now to be established, is founded on great reason, though not expressly mentioned in the act; for the justices being authorized to discharge according to their discretions; when the end of the apprenticeship cannot be attained with one person, it is but justice the master should return part of the money he has received with his apprentice, to place him out with a new master. 2 Bac. Abr.

In the chancery. Jan. 22, 1745. Ex parte Sanby. The petitioner, on the tenth of Jan. 1744, was put apprentice to Ward, a bookseller at York, and the sum of 80l. was given with him as an apprentice for seven years. In July following, a commission of bankruptcy was taken out against Ward; and, being declared a bankrupt, assignees were chosen, who fell off the bankrupt's effects, and he is now the supervisor of the press to the purchaser, and becomes incapable of performing his part of the contract, nor is the petitioner able to raise any money to put him out an apprentice to another master; and, the commission being a recent one, probably no dividend may be made in a year, or a year and a half; so that all this time will be lost to

the petitioner. Upon these circumstances, the petitioner prayed, that on deducting 10l. out of the 80l. for his board with the bankrupt during the six months he lived with him, the assignees should be ordered to pay him the sum of 70l. out of the effects of the bankrupt already come to their hands, and not oblige him to prove it as a debt under the commission. The lord-chancellor Hardwicke was at first doubtful, and seemed inclined to grant the petition; but on ordering search to be made for precedents, and several being produced wherein it was directed that apprentices should come in as creditors only, after deducting for the time they lived with the bankrupt, upon the remaining sum; it was ordered accordingly in this case, and that the petitioner should be admitted a creditor for 70l. only. 1 Atkyns, 149.

Shall cause due correction and punishment to be administered. This being left indefinite, it seemeth most apposite, that the justice commit the apprentice to the house of correction for a time, to be kept to hard labour, or otherwise corrected, as the nature of the offence may require.

By the 20 Geo. II. c. 19. "On complaint unto two justices, by any parish apprentice, or other apprentice upon whose binding out no larger a sum than 5l. was paid, concerning any misusage, refusal of necessary provision, cruelty, or other ill treatment, they may summon the master or mistress, to appear before them at a reasonable time to be named in such summons; and, on proof upon oath of the truth of the said complaint, (whether the master or mistress be present or not, if service of the summons be also upon oath proved,) the said justices may discharge the apprentice by warrant or certificate under their hands and seals, for which warrant or certificate no fee shall be paid." f. 3.

And by 32 Geo. III. c. 57. Where any parish apprentice shall be so discharged, such two justices may order such master to deliver up to such apprentice his clothes; and also to pay to the churchwardens or overseers of the place to which such apprentice shall belong, any sum not exceeding 10l. to be applied by them, under the order of such justices, for the again binding out such apprentice, or otherwise for his benefit, as to such justices shall seem meet; and also to pay any sum not exceeding 5l. in case such master shall refuse to deliver up such clothes; and on his refusal to pay the sum so ordered, or any part thereof, such justices may levy the same by distress, together with the reasonable expences of such distress. And such justices may, if they think fit, compel such churchwardens and overseers, or one of them, to enter into recognizance for the effectual prosecution, by indictment, of such master, for such ill treatment of any such apprentice so discharged as aforesaid; and may also order that the expences of such prosecution shall be paid or reimbursed to such person entering into such recognizance as aforesaid, one moiety thereof out of the poor rates of the parish or place to which such apprentice shall belong, and the other moiety out of the county rate in which such place shall lie. And, in case the churchwardens and overseers shall refuse to pay such their moiety as aforesaid, such justices may levy the same by distress on the goods and chattels of such churchwardens and overseers, or any of them, together with the reasonable charges of such distress. f. 11.

"And such justices on complaint on oath by any master or mistress, against any such apprentice, concerning any misdemeanor, miscarriage, or ill behaviour, may hear and determine the same, and punish the offender, by commitment to the house of correction, there to remain and be corrected, and held to hard labour for a reasonable time, not exceeding one calendar month, or otherwise by discharging such apprentice." 20 Geo. II. c. 19. f. 4.

And in all cases where any parish apprentice shall be discharged for misbehaviour as aforesaid, such two justices may commit such offender to the house of correction, to be corrected and kept to hard labour, for any time not exceeding three calendar months. 32 Geo. III. c. 57. f. 13. Persons aggrieved by any determination, order, or warrant, of such justices (except any order of commitment), may appeal

appeal to the next sessions, who may award costs to either party not exceeding 40s. to be levied by distress and sale. 20 Geo. II. c. 19. s. 5. And no certiorari shall issue to remove any the said proceedings. s. 6.

If any apprentice in husbandry, or in any art or occupation aforesaid, shall flee into any other shire, the justices, mayors, or other head officers being justices, may issue writs of capias to the sheriffs of the counties or other head officers of the places whither he shall so flee, to take his body, returnable before them at what time shall please them; so that if he come by such process he may be put in prison, till he find sufficient surety well and honestly to serve his master. 5 Eliz. c. 4. s. 47. And by the 24 Geo. II. c. 55. If a justice shall issue a warrant against such person, and he shall escape into another shire; the constable or other person, on having the warrant indorsed by a justice in such other shire, may arrest him there, and carry him before a justice in such other shire; if the offence is bailable, to find bail, or else shall carry him back before a justice in the shire from whence the warrant did first issue.

Feb. 3, 1747. *Hill and Allen*. In chancery. The bill was by an apprentice, who against his master's consent quitted his service of a shipwright, before his time was out, and went on-board a privateer, which took a very considerable prize, whose share thereof, being 1200l. the master claimed. By L. Hardwicke: In general, the master is intitled to all that the apprentice shall earn; consequently, if he runs away, and goes to a different business, the master is intitled at law to all his earnings. And in this case, his lordship said, there was nothing in equity to relieve. But he said he would send the case to be tried at law, unless they would agree to compound the matter, which he recommended to them, and thought, as the boy's share of the prize was so very large, the balance ought to be in his favour. And the master agreed to accept 450l. *Vezey*, 83.

By the 6 Geo. III. c. 25. If any apprentice shall absent himself from his master's service, before the term of his apprenticeship shall be expired; he shall, at any time thereafter, whenever he shall be found (so it be within seven years after the expiration of his term), be compelled to serve his said master, for so long a time as he shall have absented himself; unless he shall make satisfaction to his master for the loss he shall have sustained by such absence. And if he shall refuse so to serve, or to make satisfaction, the master may complain upon oath to one justice where he shall reside; who shall issue his warrant for apprehending such apprentice. And such justice, on hearing the complaint, may determine what satisfaction shall be made to such master by the apprentice. And if the said apprentice shall not give security to make satisfaction according to such determination; such justice may commit him to the house of correction for any time not exceeding three months. Persons aggrieved by such determination, order, or warrant of the justice (except any order of commitment), may appeal to the next sessions, giving six days notice to the justice and to the parties, and entering into recognizance, within three days after such notice, before a justice, with sufficient surety, to try the appeal at, and to abide the order or judgment of, and pay such costs as shall be awarded by the justices at, such sessions: which said justices, at their said sessions, on proof of such notice given, and of entering into such recognizance, shall hear and determine the appeal, and give such relief and costs to either party as they shall judge reasonable. And their determination shall be final and conclusive to all parties concerned. Provided, that nothing herein shall extend to the stauneries in Devon or Cornwall; or to impeach or lessen the jurisdiction of the chamberlain of London, or of any other court within the said city, touching apprentices; nor to any apprentice whose master shall have received with him the sum of 10l.

Apprentice stealing his Master's Goods.—By the 21 Hen. VIII. c. 7. Servants going away with their master's goods, with intent to steal them, shall be guilty of felony; but not to extend to apprentices. And by 12 Anne, st. 1. c. 7. Per-

sons stealing to the value of 40s. being in a dwelling-house, or out-house thereto belonging, though such house be not broken, and though no person be therein, are excluded from the benefit of clergy. But this not to extend to apprentices under fifteen years of age. But, if they be fifteen years of age, they shall be guilty as other persons.

The enticing of an apprentice to depart from his master, is not an offence of a public nature, for which an indictment will lie; but the party's remedy is by an action on the case, which he may well maintain. 6 Mod. 182. *Bur. Mansf.* 1306. *Reavely v. Mainwaring* and others.

Assigning or turning over Apprentices.—The master assigning, and the apprentice himself consenting, will not make him an apprentice to the assignee within the fifth of Eliz. But by the custom of London, he may be turned over to another. *Dalt.* c. 58. And an assignment to the sea-service is good by act of parliament, as is before mentioned.

E. 3 Geo. K. and *Barnes*. Order returned on a certiorari. It was resolved by the justices at the sessions, where a person was bound an apprentice to *Barnes* by the parish officers, and *Barnes* had assigned him to another, that the assignment is void, and they direct *Barnes* to take his apprentice again. But by the court: The sessions had no power to judge of the validity of a deed, or to hinder a man from assigning his apprentice. The covenant to provide for him is well performed, if the person to whom he is bound assigns him to another to provide for him. Wherefore the order was quashed. *Foley*, 155. *Str.* 48. For the jurisdiction of the justices extends no farther, than to compel the master to take care of his apprentice; but in what manner he does it, whether in his own house or otherwise, is nothing to them. But, if the assignee of the apprentice doth not provide for him, the first master may be compelled to do it, and he may take his remedy over. 1 *Seff.* C. 110.

Master dying.—It hath been said, that if the master dies, the apprentice goes to the executors or administrator to be maintained, if there are assets; but the executor or administrator may bind him to another master for the remaining part of his time. But in the case of *K. and Peck*, M. 10 Will. Eyre, J. held, that an apprenticeship is a personal trust between the master and servant, and determines by the death of either of them; and by the death of either of them the end and design of the apprenticeship cannot be obtained, and it may be the executor is of another trade; he admitted covenant would lie against the executor, but in that there is no inconvenience, because the executor may make his defence by pleading no assets, or debts of a higher nature. *Holt*, Ch. J. said, that by the custom of London, the executor shall put the apprentice to another master of the same trade; and that, in other places, it would be very hard to construe the death of a master to be a discharge of the covenants; he said, it had been held, that the covenant for instruction failed, but that he still continues an apprentice with the executor, as to maintenance. 1 *Salk.* 66.

E. 20 Geo. II. *Baxter* (widow and executrix) against *Burfield*. In debt on bond, conditioned for Matthias Anderson's performance of the covenants in an indenture of apprenticeship, whereby he was bound to the plaintiff's testator, who was a mariner; the defendant pleaded, that Anderson served faithfully to the death of the testator: the plaintiff replied, that since the death of the testator, Anderson had absented from her service: to which there was a demurrer. And after argument at bar, *Lee*, Ch. J. delivered the resolution of the court, viz. That they were all of opinion the defendant should have judgment, and that the executrix could maintain no such action. The binding was to the *man*, to learn his *art*, and serve *him*, without any mention of executors. And as the words are confined, so is the nature of the contract; for it is fiduciary, and the apprentice is bound from a personal knowledge of the integrity and ability of the master. H. 3 Anne, *Horne* and *Blake*; an award that an apprentice should be assigned, was held void; unless there was a custom, or the concurrence of the apprentice. And they

held, it was not material, that, according to Cro. Eliz. 553, the assets were liable on the master's covenant to maintain. Therefore judgment was given for the defendant. *Str.* 1266.

In the court of chancery. M. 30 Car. II. In the case of *Soam* against *Boroden and Eyles*. The master received with the apprentice 250*l.* and died within two years, the apprentice having for that time been employed only in inferior affairs. It was decreed, after debts on specialties paid, that the executors repay the 250*l.* as a debt due on simple contract: deducting after the rate of 20*l.* a year for the maintenance of the apprentice, during the time he lived with his master. *Cha. Ca. Finch.* 396.

And by 32 Geo. III. c. 57. after reciting, that in the event of the death of the master of any parish apprentice during the apprenticeship, the agreement for service on the part of the apprentice is at an end, but the covenant for maintenance on the part of the master still continues in force as far as his assets will extend; or doubts have arisen with respect thereto: it is enacted, that after the 1st July, 1792, in case of the death of the master of any parish apprentice during the apprenticeship, upon which binding no larger sum than 5*l.* shall be paid, any covenant for the maintenance of such apprentice inserted in the indenture, shall not be in force longer than three calendar months next after the death of such master; and that during such three months, such apprentice shall continue to live with and serve as an apprentice, the executors and administrators of such master, or such person as they, or some or one of them, shall appoint: and such master and apprentice, during such three months, shall be subject to all the laws in force for regulating masters and parish apprentices. *f.* 4.

And whereas it is reasonable that such apprentice as aforesaid, in case of his master's death, should be obliged to make some satisfaction by his labour to the family or representatives of his deceased master, for the advantages he has received in his childhood, when his service could not be equal to his maintenance: it is enacted, that within such three calendar months after the death of such master, two justices, on the application of such master, or by the husband of the mistress, or by any son or daughter, brother or sister, or executor or administrator, of such person deceased, by indorsement on such indenture or counter part thereof, or by any other instrument or writing, may order and direct that such apprentice shall serve as an apprentice any one of such persons so making application as aforesaid (such person having lived with, or been part of, such master's family at the time of his death), as they shall think fit, during the residue of the term mentioned in such indenture; and the person obtaining such order, shall declare his acceptance of such apprentice, by subscribing his name to such order: and, after such order shall be made, the executors and administrators, and the personal assets, estate, and effects, of the master so dying, shall be discharged from any covenant in such indenture; and the person obtaining the same shall be deemed the master of such apprentice in like manner as if he had been originally bound to such master; and such last-mentioned master, his executors and administrators, shall be bound by the covenants contained in such indenture in like manner as if he had executed the counter part thereof: and such master and apprentice shall be subject to the several penalties, provisions, and regulations, which shall then be in force for governing apprentices: and all justices shall have the like power and authority with respect thereto, as they shall then have by any act of parliament relating to parish apprentices. *f.* 2, 3. But in case no such application shall be made as aforesaid, within three calendar months as aforesaid; or in case such two justices shall not think fit that such apprenticeship should be continued, then such apprenticeship shall be determined; and the indenture, and covenants therein contained, shall be at an end, in like manner as they would have been at the expiration of the term. *f.* 4.

And whereas delays must happen in bringing an action upon such covenant for maintenance as aforesaid: it is

enacted, that in case any such original master, or master appointed by virtue of this act as aforesaid, shall, during the term of any such parish apprenticeship as aforesaid, or the executors or administrators of such master, or any of them, having assets, shall, during three calendar months as aforesaid, refuse or neglect to maintain and provide for any such apprentice according to the terms of such covenant; two justices, on complaint of such apprentice, or of the churchwardens and overseers of such place, may levy by distress of the personal estate or assets and effects of such master, such sum as shall be necessary for the maintenance and clothing of such apprentice; and as shall also be necessary to reimburse to the churchwardens and overseers any sum that shall have been reasonably expended by them for that purpose. *f.* 6.

Of Apprentices setting up their Trades.—By the common law, no man may be prohibited to work in any lawful trade, or in more trades than one, at his pleasure. *11 Co.* 53. So that without an act of parliament no man may be restrained, either to work in any lawful trade, or to use divers mysteries or trades; therefore an act of parliament made to restrain any person herein must be taken strictly, and not favourably as acts made in affirmance of the common law. The restraining clause in the statute of 5 Eliz. c. 4. is as follows: "It shall not be lawful to any person, to set up, use, or exercise, any craft, mystery, or occupation, now used or occupied within the realm of England or Wales, except he shall have been brought up therein seven years at the least as an apprentice by this statute, nor to set any person on work therein, except he shall have been apprentice as aforesaid, or else having served as an apprentice will become a journeyman, or hired by the year; on pain of 40*s.* a month, half to the king, and half to him that shall sue in the sessions, or other court of record; or, if it is in a town corporate, then to be disposed of as other fines by the charter." *f.* 31.

It shall not be lawful. This is a negative clause, and no one shall exercise a trade against it, unless by virtue of a custom, as the widows of tradesmen, who by custom carry on the trade of their husbands, which the court held not to be within this statute. *2 Salk.* 610.

To any person. But by the 15 Car. II. c. 15. Hemp workers of all kinds, net-makers, and makers of tapestry hangings, are excepted; who may set up without having served seven years. And, by 3 Geo. III. c. 8. All officers, mariners, and soldiers, who have been employed in his majesty's service, and not deserted, may exercise such trades as they are apt for, in any town or place. And, by 6 and 7 Will. c. 17. An apprentice discovering two offenders guilty of coining, so as they be convicted, shall be deemed a freeman, and may exercise his trade as if he had served out his time. *f.* 12.

To set up, occupy, use, or exercise. T. 9 Geo. III. *Beach and Turner.* On an action brought for exercising a trade, without having served an apprentice, it appeared that the defendant was only a journeyman. And the question was, whether the statute extends to journeymen, or only to masters? By the court: The statute was meant to prevent masters only from setting up trades, and did not intend to give a penalty against both. There is great difference between setting up a trade and working in it: a man may work in it, by doing a very trifling part. A journeyman doth not exercise the trade upon his own account, but for his master. *Burr. Mansf.* 2449. And it is not material, as to the master, that the journeyman hath served seven years; for, if the master himself hath not served seven years, he is restrained by the statute to work as a trader, either by himself or others; for the intent of the act is, to annex the benefit of trade to such as underwent the hardship of learning it, thereby to encourage labour in youth: and few would undergo the trouble of being apprentices, if they might employ others to work for them. T. 3 Will. *Hobbs and Young.* *2 Salk.* 610.

If a man use the trade of a tallow-chandler, baker, brewer, or any other lawful trade, or manual occupation, for his

his own use, or for the use of his family, without selling any for lucre and gain, he may lawfully do it; but he cannot retain an apprentice therein; but he may hire one to be his servant, who is skilful in that trade or occupation. 8 Co. 129. In like manner, a person brought up to the trade may take a *partner*, who hath not served an apprenticeship to the trade, provided the partner share only in the profits or loss of the business, and do not actually exercise the trade. As in the case of *Reynard and Chafe*, M. 30 Geo. II. An action of debt was brought against Chafe, for a penalty on the act, for exercising the trade of a brewer, without having served an apprenticeship. On a special verdict, it was stated, that the defendant Chafe and one Cox were partners in the trade; that the trade was carried on, and had been for four years carried on, in their joint names; that Cox did serve an apprenticeship to the trade, but Chafe never did; and that Cox is a working brewer, and was paid a salary for his labour, which salary was always deducted, and allowed to him, previous to a division of the profits; and the entries at the excise-office were in their joint names; but that the defendant John Chafe never exercised the trade himself, (which was wholly managed and carried on by Cox;) but only shared the profits, and stood the risks of the partnership. The question was, whether the defendant John Chafe is within the act, upon this special finding? By L. Mansfield, Ch. J. The defendant is to share the profits with Cox in moieties; and is liable to the debts of the partnership: but it is expressly found, that, during all the time charged, he never acted in or exercised the trade. He was not, by the terms of his agreement, to act in the trade. The other partner was to do the whole, and had a particular salary on that account. It is not found, that either Cox, or any servant under him, was set to work by Chafe; nor that Chafe did any act whatever of exercising the trade; he was only concerned in the profits. Now though this may be, to some purposes, exercising a trade, in respect of third persons who deal with the partnership as creditors, and within the meaning of the statutes concerning bankrupts; yet the present question is, whether it be exercising a trade contrary to this act? In the argument of this cause it hath been well observed, that this is a penal law; that it is in restraint of natural right; that it is contrary to the general right given by the common law of this kingdom. To which I will add, that the policy on which the act was made, is, from experience, become doubtful. Bad and unskilful workmen are rarely prosecuted. This act was made early in the reign of queen Elizabeth. Afterwards, when the great number of manufacturers, who took refuge in England from the duke of Alva's persecution, had brought trade and commerce with them, and enlarged our notions; the restraint introduced by this law was thought unfavourable, and the judges by a liberal interpretation have extended the qualifications for exercising the trade much beyond the letter of it, and confined the penalty and prohibition to cases precisely within the express letter. Let us consider whether the present case be within the letter, or even the meaning, of this act. The general policy of the act was, to have trades carried on by persons who had skill in them. Now here, the personal skill of the defendant makes no real difference in the case. For the person who is skilful acts every thing, and receives no direction from this man: he neither did, nor was to interfere. In many considerable undertakings, it is absolutely necessary to take in persons as partners, to share the profits and risk the loss. And the general usage and practice of mankind ought to have weight, in determinations of this sort, affecting trade and commerce, and the manner of carrying them on. It is notorious that many partnerships are entered into upon the foundation of one partner contributing industry and skill, and the other money. Many great breweries and other trades have been carried on for the benefit of infants and residuary legatees, under the direction of the court of chancery: now, if the plaintiff's construction was to hold, the whole direction and

decree of the court of chancery was contrary to law, and to an express act of parliament. So it is likewise practised in other great trades. The late Mr. Child directed his business of a banker to be carried on for the benefit of his children and other persons. Many other instances might be mentioned. It would introduce the utmost confusion in affairs of trade and commerce, if this construction should prevail. On the other hand, I see no inconvenience. It is exactly the same thing as to trade, in every particular, whether this partner has or has not served an apprenticeship. Therefore I think the defendant not liable to the penalty of the statute. The other three justices concurred. And judgment was given for the defendant. *Bur. Mansf. 2.*
Any craft, mystery, or occupation. T. 3 Geo. III. *French and Adams.* An action of debt was brought upon the statute against the defendant for exercising the trade of a *carpenter*, he not having served an apprenticeship to that trade. It appeared, that the defendant had worked or served as a servant for seven years in the trade of a *glazier*, and for some time afterwards exercised that trade as a master; that afterwards he exercised the trade of a *carpenter* for the space of nine years, and it was proved that he well understood that trade. It was objected, that the defendant being originally bred up to the trade of a *glazier*, he could not follow two trades, both *glazier* and *carpenter*; and whether he could or not, was the question reserved for the consideration of the court. By the court: All the judges of England at a meeting lately resolved, that, if any man as a master had exercised and followed any trade as a master without interruption or impediment for the term of seven years, he was not liable to be sued or prosecuted on the statute of 5 Eliz. also, if a man hath followed two or more different trades for the term of seven years or more, he shall not be liable to be prosecuted on this statute. There is no law against one man's following several trades at this day. There was an ancient statute, (37 Edw. III. c. 6.) that artificers or handicraftsmen should use but one mystery, and that none should use any mystery but that which he had before that time chosen and used. But this restraint of trade and traffic was immediately found prejudicial to the public, and therefore at the next parliament it was enacted, that all people should be as free as they were at any time before the said ordinance. And L. Coke observes, that acts of parliament made against the freedom of trade never live long. Without the least doubt, a man may follow twenty trades, if he has worked at or followed each trade seven years. Mr. Harrison of Red-lion-square served an apprenticeship to the trade of a *carpenter*; but for twenty-six years past he has been a *watchmaker*; and, though he never served as an apprentice to the trade of a watchmaker, is the best maker of time-pieces in the world, and the parliament has given him a large sum of money towards finding out the longitude by the help of his watches or time-measurers: and shall this man be hindered from making watches and exercising the trade of a carpenter also if he pleases? And by the whole court in the present case, judgment was given for the defendant. 2 *Wilson*, 168.

Now used. That is, on the 12th of Jan. 1562, when that parliament began; and this restraint shall not extend any further than the words do expressly direct, and therefore not to new arts and mysteries since invented. 1 *Roll. Rep.* 10. 1 *Ventr.* 326, 346.

Within the realm of England and Wales. M. 1 Geo. II. *K. and Lister.* Indictment for using the trade of a dry-salter, being a craft, mystery, or occupation, used in this kingdom on the 12th day of Jan. in the 5th year of Eliz. Which the court held to be ill; for that the words in this kingdom tie down the indictment to the kingdom of Great Britain, as it is at this day; whereas it should have been in England or in England and Wales. 2 *Seff. C.* 160. *Str.* 788.

H. 3 Geo. II. *K. and Monro.* It was moved to quash an indictment for exercising the trade of a *baker*, the defendant not having served a legal apprenticeship. The exception was, the trade was not laid to be used within the realm of England and Wales at the time of the act. But the

the court said, the trade of a *baker* is within the words of the act; and no averment of the trade's being used at the time of the act is necessary, but where the trade only falls within the general conclusion of the clause at last. 1 *Barnardist*. 277.

Except he shall have been brought up therein seven years. E. 11 Will. K. and Fox. Indictment for using the trade of a taylor, not having served seven years, was quashed, because it is said only, not having served as an apprentice within England or Wales; for it may be he did so beyond sea, and if it were any where it sufficeth. 1 *Salk*. 67.

As an apprentice. E. 5 Anne, Q. and Maddox. By the court: Upon indictment on this statute, in evidence we allow following the trade for seven years to be sufficient, without any binding, this being a hard law. 2 *Salk*. 613. T. 3 Geo. II. K. and Morrice. On an indictment for exercising a trade, without having served a legal apprenticeship; the defendant offered to give evidence of his having exercised his trade for seven years, as being tantamount to his having served an apprenticeship for that time. Eyre, Ch. J. said, that the cases indeed had gone so far, as to allow a wife's living in the shop with her husband for seven years to be equivalent to an apprenticeship; but he thought the present case not strong enough to come up to the meaning of the statute. Accordingly the evidence was disallowed. 1 *Barnard*. 367. But in the case of *Wallen and Holton*, at the assizes for Berkshire, T. 33 Geo. II. On an information against the defendant for exercising the trade of a baker contrary to the statute, it appeared in evidence that he had followed it twelve years, but never had been an apprentice, nor served with any person *as such*. On a case reserved, baron Adams, before whom it was tried, consulted the eleven judges; who all joined with him in opinion, that exercising a trade seven years, without any prosecution with effect, was a sufficient qualification. *Blackst. Rep.* 233.

Nor to set any person on work therein, except he shall have been apprentice as aforesaid. But by 17 Geo. III. c. 33. with respect to the counties of Middlesex, Essex, Surrey, and Kent, for want of a sufficient number of persons who have served apprenticeships to the trade of a *dyer*, it shall be lawful for any person exercising that trade within any of the said counties, to employ such number of journeymen, servants, and labourers, as he shall have occasion for, without incurring any penalty.

Or else having served as an apprentice, will become a journeyman. M. 26 Car. II. K. and Moor. The defendant was indicted for using the trade of a weaver, not having served as an apprentice seven years; the evidence was, he served six as an apprentice, and had since as journeyman in the same trade worked above that time. And, by the court, the serving of seven years is sufficient either way; and the defendant was found not guilty. 3 *Keb.* 400.

To APPRENTICE, v. a. To put out to a master as an apprentice:

Him portion'd maids, *apprentic'd* orphans, blest,
The young who labour, and the old who rest. *Pope.*

APPRENTICEHOOD, f. The years of an apprentice's servitude:

Must I not serve a long *apprenticehood*
To foreign passages, and in the end,
Having my freedom, boast of nothing else,
But that I was a journeyman to grief? *Shakespeare.*

APPRENTICESHIP, f. The years which an apprentice is to serve under a master.—In every art, the simplest hat is, there is an *apprenticeship* necessary, before it can be expected one should work. *Digby.*

To APPRI'ZE, v. a. [*apprendre*, Fr. part. *appris*.] To inform; to give the knowledge of any thing.—He considers the tendency of such a virtue or vice; he is well *apprized*, that the representation of some of these things may convince the understanding, and some may terrify the conscience. *Watts.*

To APPROACH, v. n. [*approcher*, Fr.] To draw near locally.—'Tis time to look about: the powers of the kingdom *approach* apace. *Shakespeare.*—To draw near, as time. To make progress towards, in the figurative sense, as mentally.—To have knowledge in all the objects of contemplation, is what the mind can hardly attain unto; the instances are few of those who have, in any measure, *approached* towards it. *Locke.*—To come near, by natural affinity, or resemblance; as, The cat *approaches* to the tiger.

To APPROACH, v. a. To bring near to. This sense is rather French than English.—By plunging paper thoroughly in weak spirit of wine, and *approaching* it to a candle, the spirituous parts will burn, without harming the paper. *Boyle.*—To come near to.—He was an admirable poet, and thought even to have *approached* Homer. *Temple.*

APPROACH, f. The act of drawing near:

'Tis with our souls
As with our eyes, that after a long darkness
Are dazzled at th' *approach* of sudden light. *Denham.*

Access.—Honour hath in it the vantage-ground to do good; the *approach* to kings and principal persons; and the raising of a man's own fortunes. *Bacon.*—Hostile advance. Means of advancing:

Hills pil'd on hills, on mountains mountains lie,
To make their mad *approaches* to the sky. *Dryden.*

APPROACH'ER, f. The person that approaches or draws near.

APPROACH'ES, f. in fortification, the works thrown up by the besiegers, in order to get nearer a fortress, without being exposed to the enemy's cannon. See *FORTIFICATION*.

APPROACH'ING, f. in fowling, a term used to express such devices as are contrived for the getting within shot of shy birds. The best method is by means of three hoops tied together at proper distances according to the height of the man that is to use it, and having boughs of trees tied all round it, with cords to hang it over his shoulders; a man, getting into this, conceals himself, and approaches by degrees towards his game in the form of a moving bush. Geese, ducks, and teal, quit the waters in the evening, and pass the night in the fields; but at the approach of morning they return to the water again, and even when on the water they will retire to great distances, on the approach even of a horse or cow, so that the business of the stalking horse is of little use; but this device of approaching by the moving bush succeeds tolerably well.

APPROACH'MENT, f. The act of coming near.—As for ice, it will not concrete but in the *approachment* of the air, as we have made trial in glasses of water, which will not easily freeze. *Brown.*

APPROBATION, f. [*approbatio*, Lat.] The act of approving, or expressing ourselves pleased or satisfied.

Moralists are divided on the principle of approbation or the motive which determines us to approve and disapprove. The Epicureans will have it to be only self-interest: according to them, that which determines any agent to approve his own action, is its apparent tendency to his private happiness; and even the approbation of another's action flows from no other cause but an opinion of its tendency to the happiness of the approver, either immediately or remotely. Others resolve approbation into a moral sense, or a principle of benevolence by which we are determined to approve every kind affection either in ourselves or others, and all publicly useful actions, which we imagine to flow from such affection, without any view therein to our own private happiness.

APPROOF, f. [*from approve*, as *proof* from *prove*.] Approbation; commendation: a word rightly derived, but old:

O most perilous mouths,
That bear in them one and the self-same tongue
Either of condemnation or *approof*! *Shakespeare.*

To APPROPERATE, v. a. [*appropriero*, Lat.] To hasten; to set forward.

To APPROPINQUATE, *v. n.* [*appropinquo*, Lat.] To draw nigh unto; to approach.

To APPROPINQUE, *v. n.* [*appropinquo*, Lat.] To approach; to draw near to. A ludicrous word:

The clotted blood within my hose,
That from my wounded body flows,
With mortal crisis doth portend
My days to *appropinque* an end.

Hudibras.

APPROPRIABLE, *adj.* That which may be appropriated; that which may be restrained to something particular.

APPROPRIARE COMMUNIAM, is to approve or to appropriate and inclose part of a common to a man's own separate use; and this may be done either by the lord of the manor, or by a tenant with the lord's permission; provided they leave sufficient common for the rest of the tenants.

To APPROPRIATE, *v. a.* [*appropriar*, Fr. *approprio*, low Lat.] To consign to some particular use or person.—Marks of honour are *appropriated* to the magistrate, that he might be invited to reverence justice. *Atterbury*.—To claim or exercise; to take to himself by an exclusive right.—Why should people engross and *appropriate* the common benefits of fire, air, and water, to themselves? *L'Esfrange*.—To make peculiar to something; to annex by combination.—We, by degrees, get ideas and names, and learn their *appropriated* connection one with another. *Locke*.—In law, to alienate a benefice.

APPROPRIATE, *adj.* Peculiar; consigned to some particular use or person; belonging peculiarly.—The heathens themselves had an apprehension of the necessity of some *appropriate* acts of divine worship. *Stillingfleet*.

APPROPRIATION, *f.* The application of something to a particular purpose. The claim of any thing as peculiar. The fixing a particular signification to a word.

APPROPRIATION, in law, is the annexing of a benefice to the proper and perpetual use of some religious house, bishopric, college, or spiritual person, to enjoy for ever. To make an appropriation, the king's licence was to be obtained in chancery, and also the consent of the ordinary, patron, and incumbent. And in this manner the religious houses of old time became possessed of that vast number of advowsons, which they had in this kingdom; when these churches, after the dissolution of the monasteries, came into lay hands, the church so possessed by a *layman* was called an *impropriation*, and himself the *impropriator*. But the words *appropriation* and *impropriation* are often confounded and used for each other.

The contrivance of appropriations seems to have sprung from the policy of the monastic orders, who have never been deficient in subtle inventions for the increase of their own power and emoluments. At the first establishment of parochial clergy, the tithes of the parish were distributed in a four-fold division; one for the use of the bishop, another for maintaining the fabric of the church, a third for the poor, and the fourth to provide for the incumbent. When the sees of the bishops became otherwise amply endowed, they were prohibited from demanding their usual share of these tithes, and the division was into three parts only. And hence it was inferred by the monasteries, that a small part was sufficient for the officiating priest, and that the remainder might well be applied to the use of their own fraternities, (the endowment of which was construed to be a work of the most exalted piety,) subject to the burden of repairing the church and providing for its constant supply. And therefore they begged and bought, for masses and obits, and sometimes even for money, all the advowsons within their reach, and then appropriated the benefices to the use of their own corporation. The appropriators and their successors, being perpetual parsons of the church, must sue and be sued, in all matters concerning the rights of the church, by the name of *parsons*.

This appropriation may be severed, and the church become disappropriate, two ways; as, first, if the patron or

appropriator presents a clerk, who is instituted and inducted to the parsonage: or the incumbent so instituted and inducted is to all intents and purposes a complete parson; and the appropriation, being once severed, can never be re-united again, unless by a repetition of the same solemnities. And, when the clerk so presented is distinct from the vicar, the rectory thus vested in him becomes what is called a *fine-cure*; because he hath no cure of souls, having a vicar under him to whom that cure is committed. Also, if the corporation which has the appropriation is dissolved, the parsonage becomes disappropriate at common law: because the perpetuity of person is gone, which is necessary to support the appropriation.

In this manner, and subject to these conditions, may appropriations be made at this day: and thus were most if not all of the appropriations at present existing originally made; being annexed to bishoprics, prebends, religious houses, nay, even to nunneries, and certain military orders, all of which were spiritual corporations. At the dissolution of monasteries, by statutes 27 Hen. VIII. c. 28. and 31, c. 13. the appropriations of several parsonages, which belonged to those respective religious houses (amounting to more than one-third of all the parishes in England), would have been by the rules of the common law disappropriated; had not a clause in those statutes intervened, to give them to the king in as ample a manner as the abbots, &c. formerly held the same at the time of their dissolution. This, though perhaps scarcely defensible, was not without example: for the same was done in former reigns, when the alien priories (that is, such as were filled by foreigners only) were dissolved and given to the crown. And from these two roots have sprung all the lay-appropriations or secular parsonages which we now see in the kingdom; they having been afterwards granted out from time to time by the crown.

APPROPRIATION, in the animal economy, that action of the natural heat or vital flame, by which the fluids are so united with the solids of our bodies, as to enable them to perform their functions. Medicines are said to be *appropriated*, which are believed to be destined for a particular part of the body.

APPROPRIATOR, *f.* He that is possessed of an appropriated benefice.—These *appropriators*, by reason of their perpetuities, are accounted owners of the fee simple; and therefore are called proprietors. *Ayliffe*.

APPROVABLE, *adj.* That which merits approbation.—The solid reason, or confirmed experience, of any men, is very *approvable* in what profession soever. *Brown*.

APPROVAL, *f.* Approbation: a word rarely found.—There is a censor of justice and manners, without whose *approval* no capital sentences are to be executed. *Temple*.

APPROVANCE, *f.* Approbation: a word not much used.—A man of his learning should not so lightly have been carried away with old wives' tales from *approvance* of his own reason. *Spenser*.

To APPROVE, *v. a.* [*approver*, Fr. *approbo*, Lat.] To like; to be pleased with.—There can be nothing possibly evil which God *approveth*, and that he *approveth* much more than he doth command. *Hooker*.—To express liking. To prove; to shew; to justify:

In religion,
What damned error, but some sober brow
Will bless it, and *approve* it with a text? *Shakespeare*.

—Refer all the actions of this short life to that state which will never end; and this will *approve* itself to be wisdom to the last, whatever the world judge of it now. *Tillotson*.
—To experience. Not in use:

Oh! 'tis the curse in love, and still *approv'd*,
When women cannot love, where they're belov'd.
Shakespeare.

To make, or show, to be worthy of approbation. It has of before the object, when it signifies to be pleased, but may

be used without a preposition; as, I *approve* your letter, or, of your letter.

APPROVEMENT, *f.* Approbation; liking.—It is certain that at the first you were all of my opinion, and that I did nothing without your *approvement*. *Hayward*.

APPROVEMENT, in law, by the statute of Merton, 20 Hen. III. c. 4. is where a man hath common in the lord's waste, and the lord makes an inclosure of part of the waste for himself, leaving sufficient common with egress and regress for the commoners. If there be not sufficient common left for the tenant, he may have a writ of assize, and by 3 & 4 Edw. VI. c. 3. shall recover treble damages, and a commoner may break down an inclosure, if the lord doth inclose part of the common, and not leave sufficient room in the residue; but if any, upon just title of approvement, do make a hedge or ditch for that purpose, which afterwards is thrown down in the night by persons unknown, the towns adjoining may be distrained to make such hedge at their own charges, for which there is a writ (*noctantur*) in the register. 13 Edw. I. c. 46. But in the case of *Durberley v. Page*. E. 28 Geo. III. it was determined, that the lord has no right under the statute of Merton to inclose and approve the wastes of a manor, where the tenants of the manor have a right to dig gravel on the wastes, or to take effovers there. Cases by Durnford and East. 2 V. 391.

APPROVER, *f.* He that approves; he that makes trial.

APPROVER, in law, is a person indicted of treason or felony, and in prison for the same, who, upon his arraignment, before any plea pleaded, doth confess the indictment, and takes a corporal oath to reveal all treasons and felonies that he knoweth of, and therefore prays a coroner, before whom he is to enter his appeal or accusation against those that are partners in the crime contained in the indictment, and this accusation of himself, and oath, makes the accusation of another person of the same crime to amount to an indictment; and if his partners are convicted he shall have his pardon of course. But as it is in the discretion of the court, whether they will suffer one to be an approver, this method is now out of use; but in many cases we have what amounts to the same thing by statute, where pardon is assured to offenders on discovering and convicting their accomplices. 3 Inst. 129.

APPROVER, is particularly used in ancient law writers, for a bailiff or land-steward, appointed to have the care of a manor, franchise, or the like, and improve and make the most of it for the benefit of his master. In this sense, the word is also written *appruare*.

APPROXIMATE, *adj.* [from *ad*, to, and *proximus*, Lat. near.] Near to.—These receive a quick conversion, containing *approximate* dispositions unto animation. *Brown*.

APPROXIMATION, *f.* Approach to any thing.—The fiery region gains upon the inferior elements; a necessary consequent of the sun's gradual *approximation* towards the earth. *Hale*.—In science, a continual approach nearer still, and nearer, to the quantity sought, though perhaps without a possibility of ever arriving at it exactly.

APPUI, [q. d. rest or stay upon the hand.] In the manege, is the reciprocal effort between the horse's mouth and the bridle-hand, or the sense of the action of the bridle on the hand of the horseman. A just appui of the hand, is the nice bearing up or stay of the bridle, so that the horse, being awed by the sensibility and tenderness of his mouth, dares not rest too much upon the bit, nor check or beat upon the hand to withstand it. A horse is said to have no appui, when he is too apprehensive of the hand, and cannot bear the bit; and too much appui, when he rests or throws himself hard upon the bit. Horses designed for the army ought to have a full appui upon the hand. To give a horse a good appui, he should be kept reined up, galloped, and put often back.

APPULSE, *f.* [appulsus, Lat.] The act of striking against any thing.—An hectic fever is the innate heat kindled into a destructive fire, through the *appulse* of saline streams. *Harvey*.—In vowels, the passage of the mouth is open and free, without any *appulse* of an organ of speech

to another: but, in all consonants, there is an *appulse* of the organs. *Holder*.

APPULSE, in astronomy, means the actual contact of two luminaries, according to some authors; but others describe it as their near approach to each other, so as to be seen, for instance, within the same telescope. The appulses of the planets to the fixed stars have always been very useful to astronomers, as serving to fix and determine the places of the former. The ancients, wanting an easy method of comparing the planets with the ecliptic, which is not visible, had scarcely any other way of fixing their situations, but by observing their track among the fixed stars, and marking their appulses to some of those visible points. Dr. Halley has published a map or planisphere of the starry zodiac, in which are accurately laid down all the stars to which the moon's appulse has ever been observed in any part of the world. See *Philos. Transf.* No. 369; or *Abridg.* vol. vi. p. 170.

APPURTENANCES, *f.* [*pertinentia*, Lat.] In law, signify things both corporeal and incorporeal, appertaining to some other thing as principal: as an hamlet to a chief manor, common of pasture to lands, common of effovers to an house, outhouses, yards, orchards; gardens are appurtenant to a messuage; but lands cannot properly be said to be appurtenant to a messuage. 1 *Lil. Abr.* 91. Turbary may be appurtenant to an house, but not to lands; a leet may be appurtenant to a manor, but not to an house, for the things must agree in nature and quality. 1 *Inst.* 121.

TO A'PRICATE, *v. n.* [*apricor*, Lat.] To bask in the sun.

APRICITY, *f.* [*apricitas*, Lat.] Warmth of the sun; sun-shine.

A'PRICOT, *f.* in botany. See *PRUNUS*.

A'PRIES, son of Psammis, king of Egypt; the same with Pharaoh Hophrah in Jeremiah and Ezekiel. He ruined Sidon, and some say he put Jeremiah to death. He thought neither God nor man could dethrone him; which yet was easily done by Amasis, and he himself was strangled by the Egyptians.

A'PRIL, [*Aprilis*, Lat. of *aperio*, I open; because the earth, in this month, begins to open her bosom for the production of vegetables.] The fourth month of the year according to the common computation, and the second from the vernal equinox. In this month the sun travels through part of the signs of Aries and Taurus.—*April* is represented by a young man in green, with a garland of myrtle and hawthorn buds; in one hand primroses and violets, in the other the sign Taurus. *Peacham*.—Men are *April* when they woo, December when they wed: Maids are May when they are maids, but the sky changes when they are wives. *Shakespeare*.

A PRIORI, a kind of demonstration. See *DEMONSTRATION*.

A'PRON, *f.* [a word of uncertain etymology, but supposed by some to be contracted from *afore one*.] A cloth hung before, to keep the other dress clean.—In these figures the vest is gathered up before them, like an *apron*, which you must suppose filled with fruits. *Addison*.

APRON, in naval architecture, a piece of curved timber fixed behind the lower part of the stern, immediately above the foremost end of the keel.

APRON is also a name given to a platform or flooring of plank, raised at the entrance of a dock, against which the dock-gates are shut.

APRON, in gunnery, a piece of lead which caps or covers the vent or touch-hole of a great gun.

A'PRONED, *adj.* Wearing an apron:

The cobbler *apron'd*, and the parson gown'd. *Pope*.

APSINTHA'TUM, *f.* [from *αψινθος*, wormwood.] A sort of drink accommodated to the stomach.

APSINTHIUM, *f.* in botany. See *ARTEMISIA*.

AP'SIS, *f.* [*apses*, or *apsides*, plural: from *αψις*, Gr.] In astronomy, are the points in the orbits of planets, where they are at their greatest and least distance from the sun or the earth. The point at the greatest distance being called the

the *higher* apsis, and that at the nearest distance the *lower* apsis. And the two apses are also called *auges*. Also the higher apsis is more particularly called the *aphelion*, or the *apogee*; and the lower apsis the *perihelion*, or the *perigee*. The diameter, which joins these two points, is called the *line of the apses* or of the *apsides*; and it passes through the centre of the orbit of the planet, and the centre of the sun or the earth; and in the modern astronomy this line makes the longer or transverse axis of the elliptical orbit of the planet. In this line is counted the excentricity of the orbit; being the distance between the centre of the orbit and the focus, where is placed the sun or the earth.

Different means have been employed to determine the motion of the apses. Dr. Keil explains, in his *Astronomy*, the method used by the ancients, who supposed the orbits of the planets to be perfectly circular, and the sun out of the centre. But since it has been discovered that they describe elliptical orbits, various other methods have been devised for determining it. Newton has given, in the *Principia*, an excellent method of determining this motion, on the supposition that the orbits of the planets differ but little from circles, which is the case nearly. That great philosopher shews, that if the sun be immovable, and all the planets gravitate towards him in the inverse ratio of the squares of their distances, then the apses will be fixed, or their motion nothing; that is, the lines of greatest and least distance will form one right line, and the apses will be directly opposite, or at 180 degrees distance from each other. But, because of the mutual tendency of the planets towards each other, their gravitation towards the sun is not precisely in that ratio; and hence it happens, that the apses are not always exactly in a right line with the sun. And Newton has given a very elegant method of determining the motion of the apses, on the supposition that we know the force which is thereby added to the gravitation of the planet towards the sun, and that this additional force is always in that direction.

APsis, in architecture, signifies the bowed or arched roof of a house, room, or oven, &c. as also the ring or compass of a wheel.

APsis, in ecclesiastical writers, denotes an inner part in the ancient churches, wherein the clergy sat, and where the altar was placed. It is more particularly used for the bishop's seat, or throne. This was peculiarly called *apsis gradata*, because raised on steps above the ordinary stalls. It was also denominated *exedra*, and in latter times, *tribune*.

APsis is also used for a reliquary, or case, wherein the relics of saints were anciently kept. It took the name apsis, from its being round, or arched, at the top; or perhaps from the place where it was kept. The apsis was commonly placed on the altar: it was usually of wood, sometimes also of gold and silver, with sculptures, &c.

APSY'CHY, *f.* [of *α* priv. and *ψυχη*, the soul.] A swooning or fainting away.

APT', *adj.* [*aptus*, Lat.] Fit. Having a natural tendency to; liable to; inclined to; led to; disposed to.—You may make her you love believe it; which, I warrant she is *apt* to do, than confess she does. *Shakespeare*.—Men are *apt* to think well of themselves, and of their nation, of their courage and strength. *Temple*.—What we have always seen to be done in one manner, we are *apt* to imagine there was but that one way. *Bentley*.—Ready; quick; as, An *apt* wit. Qualified for.—All that were strong and *apt* for war, even them the king of Babylon brought captive to Babylon. *2 Kings*.

APT, or **AP'TA**, an ancient town in the department of the mouths of the Rhone. Its commerce consists in prunes, coarse ferges, and wax chandlery, for which last there is a great demand. Here are many fine Roman antiquities, and it is seated on the river Calaron, twenty miles north of Aix, and twenty-five south-east of Orange. Lat. 43. 51. N. lon. 5. 30. E.

To **APT**, *v. a.* [*apto*, Lat.] To suit; to adapt; to fit; to qualify; to dispose; to prepare:

We need a man that knows the several graces
Of history, and how to *apt* their places;
Where brevity, where splendour, and where height,
Where sweetness is required, and where weight. *Ben Jonson*.

To **AP'TATE**, *v. a.* [*aptatum*, Lat.] To make fit.—To *apate* a planet, is to strengthen the planet in position of house and dignities to the greatest advantage, in order to bring about the desired end. *Bailey*.

APTE'NODYTES, *f.* [of *α* priv. and *πτενναι*, to fly.] The **PENGUIN**, so called by the Dutch navigators, who first discovered these birds, on a voyage to the South Sea, in 1598. Dr. Grew calls them *pinguins*, from *pinguis*, "fat;" and Messrs. Pennant and Latham have gone so far, to favour that conjecture, as to alter the usual spelling into pinguin. But is it in the smallest degree probable, that the illiterate Dutch sailors should think of bestowing a Latin generic term upon a newly-discovered object? But, even admitting that any on-board were capable of this, they would have called the bird *pingued*, and not *pinguin*; surely far less *penguin*, which is the original orthography, and the name by which the Indians described these birds to the Dutch adventurers, and by which they distinguished them at this day.

They are a genus belonging to the order of the anseres, and there are eleven species; the characters are these: Bill straight, smooth, flatish, and somewhat knife-shaped; the upper mandible marked longitudinally with oblique furrows; the lower truncated at the tip. Feet fettered and palmated. Wings consist of pinions, without shafts. The penguins, in many respects, appear analogous to the *alca*, or auks. The former fill up the same space among the fowls of the southern, that the latter do among those of the northern, hemispheres. As nature seems to have begun the feathered tribes with birds incapable of flight, and resembling quadrupeds more than birds, so she concludes the order with others, that appear more nearly allied to fishes than to fowls. The plumage of the penguins, especially that upon the wings, more resembles scales than feathers; and, while it renders these instruments serviceable to their owners as fins in swimming, it renders them altogether useless for flight. The whole body of the penguins is covered with oblong plumes, of a hard, thick, and shining, substance, and closely applied to each other, like the scales of a fish. These, together with a thick coat of fat, protect the birds of this order from the cold of those frozen regions which they inhabit. They prefer, as a residence, those bleak and deserted tracts, that border upon the south pole; tracts, condemned by nature to perpetual sterility and solitude. In the highest latitudes visited by captain Cook, who penetrated to the very borders of those countries that are locked up by perpetual ice and snow, he constantly observed the penguins and petrels, far beyond the precincts allotted to other animals, as if sent to rouse nature from that eternal silence and inactivity in which she is sunk in these horrid abodes. As the water is the natural and proper element of the penguins, they can rest upon it by night as well as by day. When the ice, upon which they perch, breaks off and floats, they still keep by it, till they are often carried to an immense distance from land. Their motions, upon land are as slow and awkward as upon the sea they are alert and rapid. Their short legs are situated far back in the abdomen; and, in order to support themselves upon them, their bodies are raised quite perpendicular; so that, when walking, they appear like so many children with white aprons. The food of the penguins is fish only; and, although they are seen, while on shore, frequenting the tufts of coarse grass, the only vegetable that grows on those lands which they visit, it is, probably, for shelter, and not for the sake of food. They lay from one to three eggs, a very small progeny, like that of the congenerous birds of the North Seas. They dig holes, like rabbits, in the sand, where they deposit their eggs, and rear their young. In walking over the fields, which they have dug in this manner, one often sinks to the knee

knee in their burrows. If the penguins be within, they take their revenge by biting the leg, which they do with wonderful effect. The eggs and young afford an excellent refreshment to sailors, in those countries where there is no other species of food. As the penguins visit the land but seldom, their colours are influenced by that circumstance. The belly, and other parts covered by the water, are white; while the back is of different colours, according to the diversity of the species, which are as follow:

1. *Aptenodytes Patagonica*, or Patagonian penguin: so named, not only because it is found on that coast, but also because it exceeds in bulk all the other penguins. It was brought into England by captain Macbride, from Falkland Islands, off the straits of Magellan. The length of the stuffed skin of this bird, which may be seen in the Leverian Museum, measured four feet three inches, and the bulk of the body seemed to exceed that of a swan. The bill was four inches and a half long, slender, straight, bending on the end of the upper mandible, with no nostrils. The tongue half the length of the bill, and singularly armed with strong sharp spikes pointing backwards. Its bill and legs are black. The plumage is most remarkable, the feathers lying over one another with the compactness of the scales of a fish; the shafts are broad and very thin; the vanes unwebbed; the head, throat, and hind part of the neck, are of a deep brown colour; from each side of the head to the middle of the fore part of the neck are two spots of a gold colour, broad above, narrow beneath, and uniting half way down; from thence the same colour widens towards the breast, fading away till it is lost in pure white, of which colour is the whole under side of the body, a dusky line dividing it from the colour of the upper part. The back is of a deep ash-colour, almost dusky; but the end of each feather is marked with a blue spot, those about the junction of the wings larger and paler than the others. The wings are extremely short in respect to the size of the bird; hang down, and have the appearance of fins, whose office they perform; their length is only fourteen inches; on the outside they are dusky, and covered with feathers, whose shafts are so broad and flat as scarcely to be distinguished from scales; those on the ridge of the wings consisting entirely of shaft; the larger or quill feathers have some very short webs. The tail consists of thirty brown feathers, or rather thin shafts, resembling split whale-bone; flat on the upper side, concave on the under, and the webs short, unconnected, and bristly. From the knees to the end of the claws is about six inches, covered with strong pentangular black scales; the fore toe scarcely an inch long, and the others so remarkably short, as to evince the necessity of that strength of the tail, which seems intended as a support to the bird in its erect attitude; between the toes is a strong semilunar membrane, continued up even part of the claws; the middle claw is near an inch long, and the inner edge very sharp and thin; the interior toe is small, and placed very high. This species inhabits Falkland Islands, Kerguelen's Land, New Georgia, and New Guinea. M. Bougainville caught one, which soon became so tame as to follow and know the person who had the care of it: it fed on flesh, fish, and bread; but, after a time grew lean, pined away, and died. This is rather a scarce species. They lay in the end of September or the beginning of October. They are very full of blood, so that in killing them their head should be severed, to allow it to flow.

2. *Aptenodytes Magellanica*, or Magellanic penguin: is about two feet, and sometimes two feet and a half, long, and weighs eleven pounds. The bill is black, having a transverse band across near its tip; the head and neck are black, except a few markings here and there; the upper parts of the body and wings are of the same colour; the under parts of both are white from the breast, except a narrow band of black passing at a little distance within the white on the breast, and downwards on each side, beneath the wings, quite to the thighs; the legs are of a reddish colour, irregularly spotted on the thighs; and the

claws are black. This species, which is very numerous, inhabits the Straits of Magellan, Staten Land, Terra del Fuego, and Falkland Islands. As food they are not at all unpalatable. They often mix with sea-wolves among the rushes, burrowing in holes like a fox. They swim with prodigious swiftness. They lay their eggs in collective bodies, resorting in incredible numbers to certain spots, which their long residence has freed from grass, and to which were given the name of towns. Penrose observes, that they composed their nests of mud, a foot in height, and placed as near one another as may be. It is possible that they may have different ways of nestling, according to the places they inhabit; or perhaps the manners of this may be blended with those of another. "Here, (says he,) during the breeding-season, we were presented with a sight which conveyed a most dreary, and I may say awful, idea of the desertion of these islands by the human species. A general stillness prevailed in these towns; and, whenever we took our walks among them, in order to provide ourselves with eggs, we were regarded indeed with side-long glances, but we carried no terror with us. The eggs are rather larger than those of a goose, and laid in pairs. We took them once, and sometimes twice, in a season; but they were as often replaced by the birds. The eggs were palatable food, and were preserved good for three or four months."

3. *Aptenodytes demersa*, or Cape penguin: so called from being found in such vast numbers all around the Cape of Good Hope, where they nestle on the small islands in the vicinity of the continent; one of which is named *Penguin Isle*, from the multitudes there are of these birds always upon it. The male of this species is distinguished by a black collar, which crosses the back, and falls over the breast; the head, neck, and back, are of a brown colour, spotted with black. The bill is black, having a yellow band across near its tip. The legs and feet are black; and the back toe, which is not included in the membrane by which the others are connected, is very short, and turned about to one side. The fin, which supplies the place of the wing, is small and flat; and the small pointed feathers that rise out of it give it the appearance of rough leather, rather than of the wing of a bird. Their brood consists of two eggs only, of a white colour. When the young are excluded, the old birds defend them with great courage. Penguins of this species are about the size of a goose; and, though altogether incapable of flight, they sometimes build on these little islands, at the distance of a mile and a half from the shore. As these birds are capable of fasting for several days, it is probable, that they do not repair every day to feed upon the water, during the time they rear their young. This is the *diomedea demersa* of Linnæus, and the *black-footed* penguin of Edwards.

4. *Aptenodytes chrysolome*, the hopping or crested penguin: the birds of this species are twenty-three inches long; the bill is three inches long, and of a red colour, with a dark furrow running along on each side to the tip; the upper mandible is curved at the end, the under is obtuse; the irides are of a dull red; the head, neck, back, and sides, are black. Over each eye there is a stripe of pale yellow feathers, which lengthens into a crest behind, nearly four inches long; the feathers on each side of the head, above this stripe, are longer than the rest, and stand upward, while those of the crest are decumbent, but can be erected on each side at pleasure; the wings, or rather fins, are black on the outside, edged with white; on the inside they are white; the breast and all the under parts are also white; the legs are orange, and the claws are dusky. The female has a streak of pale yellow over the eye, but it is not prolonged into a crest behind as in the male. This species inhabits Falkland Islands, and was likewise met with in Kerguelen's Land, or Isle of Desolation, as well as at Van Diemen's Land, and New Holland, particularly in Adventure-bay. They are called *hopping penguins*, and *jumping jacks*, from their action of leaping quite out of the water, on meeting with the least obstacle,

for three or four feet at least; and indeed, without any seeming cause, they often do the same, appearing chiefly to advance by that means. This species seems to have a greater air of liveliness in its countenance than others, yet is in fact a very stupid bird, so much so as to suffer itself to be knocked on the head with a stick when on land. On one of the islands touched at by captain Cooke, vast numbers of these birds were found, in a sleep so profound, that they allowed themselves to be tumbled over several times before they awoke. The sailors were obliged to give a few of them smart cuffs, with their hands, before they could rouse them from this astonishing lethargy. By and by, however, the whole crowd awoke; and, seeing themselves surrounded by an enemy, they assumed courage, and fell upon the crew in close battle. The ship's company, finding their clothes and their legs torn, beat down vast numbers of them; and, leaving these dead, as they supposed, they went in pursuit of the main body of the flying army. While thus employed, they were surprised by finding that those which they had left upon the field had suddenly got up, and had already attacked their rear, tearing their legs and clothes with redoubled fury. Happy had it been for the human race, and much to the honour of adventurers, had the discovery of unknown countries never led to hostilities of a more mischievous nature!

5. *Aptenodytes catarractes*, or thick-billed penguin: the bill of this species is its distinguishing character; the lower mandible being thick, and apparently broken off, before it reaches the full length of the upper one. Brisson has given this bird the name of *catarracta*, an appellation applied by Aristotle to an aquatic bird of the predatory kind. It is certain, however, that neither he, nor any of the ancient naturalists, ever were acquainted with the penguins; because they are found to reside in regions far beyond the limits of ancient navigation. The bill and legs of this species are red; the face, dark brown; all the fore parts of the body, white; and the hind part of the head, neck, and back, purple, and covered with short stiff feathers, more resembling the scales of a serpent than the plumage of a bird. This is the *phæton demursus* of Linnæus.

6. *Aptenodytes Papua*, or Papuan penguin: it is about two feet and a half long, being a little larger than that which is called the *Cape penguin*. This species inhabits the Isle of Papos, or New Guinea; and has been met with at Falkland Isles and Kerguelen's Land. It is often found among the Patagonian penguins.

7. *Aptenodytes antarctica*, or antarctic penguin: is about twenty-five inches long, and weighs about eleven pounds and a half. The bill is upwards of two inches and three-quarters long; the upper parts of the body are black, the under are glossy white; beneath the chin there is a narrow streak of a blackish colour, passing backwards towards the hind head, a little bent about the region of the ears; the wings are much the same as in the other species; the tail is cuneiform; the feathers, or rather bristles, of which it is composed, are black, and in number thirty-two; the legs are of a flesh-colour, and the soles of the feet are black. This species inhabits the South Sea, from forty-eight degrees to the antarctic circle; and is frequently found on the ice mountains and islands; it is a very numerous species. Our last voyagers found them in plenty in the Isle of Desolation. And it was observed, that in an island they touched at, not greatly distant, the rocks were almost covered with penguins of this sort.

8. *Aptenodytes torquata*, or collared penguin: is a little less than the Papuan, being eighteen inches long. The bill, which is black, is similar to that of the Patagonian penguin; the irides are black; the eye is surrounded with a bare skin of a blood-colour, of an oval shape, and three times as large as the eye itself; the head, throat, hind part of the neck, the sides, back, wings, and tail, are all black; the fore part of the neck, breast, belly, and thighs, are white, extending round the neck, where the white begins, like a collar, except that it does not quite meet at the back part; the legs are black. This species inhabits New Gui-

nea. It was also seen by Forster, the companion of Capt. Cook, near Kerguelen's Land; and again on two isles adjoining to the island of South Georgia.

9. *Aptenodytes minor*, or little penguin: is about the size of a teal, being fifteen inches long. The bill, which is of a dusky colour, is about an inch and a half long, and shaped like that of the *phæton demursus*; the upper parts of the bird from the head to the tail appear to be of a cinereous blue colour, of which colour are the ends of the feathers; the base of them is brown black, and the shafts of each of the same colour; the under parts from chin to vent are white; the wings are dusky above and white beneath; the tail, which is exceedingly short, consists of sixteen stiff feathers, which are scarcely perceptible; the legs are of a dull red colour; the webs are dusky, and the claws are black. This species is commonly found among the rocks on the southern parts of New Zealand, but they are most frequent at Dusky-bay. They make deep burrows on the sides of the hills, in which they lay their eggs. The inhabitants of Queen Charlotte's Sound kill them with sticks, and, after skinning them, esteem the flesh as good food. They are known at New Zealand by the name of *korora*. The legs in these two last are marked with black at the end of the toes; and the claws are black.

10. *Aptenodytes chilensis*, or woolly-cinereous penguin: found very common in the archipelago of Chiloe, and is about the size of a goose.

11. *Aptenodytes Chilensis*, or three-toed penguin: is found in Chili, and is about the size of the former species, but hath a longer neck. It lays in the sand, about six or seven eggs, white, dotted with black.

APT'ERA, or AP'TERON, an inland town of Crete, whose port was Cifamus, on the west side of the island, twelve miles to the south of Sydonia, towards the Montes Leuci, and as many from the Sinus Amphimales. So called from the Sirens, who, being there vanquished in song by the Muses, stripped themselves of their wings, and out of grief leaped into the sea. *Stephanus*. There was a town of Lycia of the same name. Lat. 35.50. lon. 25.0. E.

APT'ERA, a term used by Linnæus for his seventh order of insects, comprehending such as have no wings.

APT'HA, *f.* [αῖμα, Gr.] Certain ulcers which breed in the uppermost part of the mouth.

APT'HANE, a title anciently given to the higher degrees of nobility in Scotland. See THANE.

APTITUDE, *f.* [from *aptus*, Lat. fit.] The natural disposition any thing hath to serve for any particular purpose. Thus, oil hath an *aptitude* to burn, and water to extinguish fire. It is often used, in speaking of the faculties of the mind, for a promptitude or disposition to learn things with ease and expedition. In which sense *aptitude* amounts to the same with what the Greeks call *εὐαδία*, *bona indoles*, and *docility*. Charlton divides *aptitude* into three parts, viz. *acuteness*, *sagacity*, and *memory*.—He that is about children, should study their natures and *aptitudes*, what turns they easily take, and what becomes them; what their native stock is, and what it is fit for. *Locke*.

APT'LY, *adv.* Properly; with just connection, or correspondence: fitly:

But what the mass nutritious does divide?
What makes them *aptly* to the limbs adhere,
In youth increase them, and in age repair? *Blackmore*.

Justly; pertinently. Readily; acutely: as, He learned his business very *aptly*.

APT'NESS, *f.* Fitness; suitability.—The nature of every law must be judged of by the *aptness* of things therein prescribed. *Hooker*.—Disposition to any thing; of persons. Quickness of apprehension; readiness to learn. Tendency; of things.—Some seeds of goodness give a relish of such reflections, as have an *aptness* to improve the mind. *Addison*.

APTOTE, *f.* [απρωτος, of a and πρωτος, a case.] A noun which is not declined with cases.

APTYS'TOS, *f.* [from α priv. and πτω, to spit.] A denomination for disorders in which spitting, though an

usual symptom, is yet wanting, as in what is called a dry asthma, a dry pleurisy, &c.

APULEIUS (Lucius), a Platonic philosopher, universally known as the author of the *Golden Ass*. He lived in the second century, under the Antonines; and was born at Madaura, a Roman colony in Africa. He was a man of a curious and inquisitive disposition, especially in religious matters, which prompted him to take several journeys, and to enter into several societies of religion. He spent his fortune in travelling; so that, at his return to Rome, when he was about to dedicate himself to the service of Osiris, he had not money sufficient to defray the expence attending the ceremonies of his admission, and was obliged to pawn his clothes to raise the necessary sum. He supported himself afterwards by pleading causes; but he raised himself more by a good marriage, than by his pleadings: a widow named *Pudentilla*, who was very rich, fell in love with him. This marriage drew upon him a troublesome law-suit. The lady's relations, pretending he made use of sorcery to gain her heart and money, accused him of being a magician. Apuleius was under no great difficulty of making his defence. He said *Pudentilla* was neither handsome nor young, nor such as could tempt him to have recourse to enchantments. He also took notice of many inconveniences which attend the marrying of widows, and spoke highly of the advantages of a maid above a widow. "A handsome virgin (said he), let her be ever so poor, is abundantly portioned; she brings to her husband a heart quite new, together with the flower and first-fruits of her beauty. It is with great reason that all husbands set so great a value upon the flower of virginity: all the other goods which a woman brings her husband are of such a nature, that he may return them again, if he has a mind to be under no obligation to her: but, virginity cannot be restored, it remains in the possession of the first husband. If you marry a widow, and she leaves you, she carries away all that she brought you." This apology is still extant, and is reckoned a very fine piece. Apuleius was extremely indefatigable in his studies; and composed several books. He took great pleasure in declaiming, and was generally heard with applause.

APULIA, the east side of the kingdom of Naples, on the gulf of Venice. It is divided into three territories, Capitanata, Terra di Bari, and Otranto.

APURIMA, or **APORAMAC'**, a rapid river of Peru, in South America.

A'PUS, *Avis Indica*, in astronomy, a constellation of the southern hemisphere, placed near the pole, between the *triangulum australe* and the *chamelion*, supposed to represent the bird of paradise.

APYCNISUONI, *f.* in music, sounds distant one or more octaves, and yet concord.

APYCNOS, *f.* in music, is said of the diatonic genus, on account of its having spacious intervals, in comparison of the chromatic and enharmonic.

APYE'TOS, *f.* [from α priv. and $\pi\upsilon\omicron\varsigma$, *pus*.] An epithet for a tumour that will not suppurate.

APY'REXY, *f.* [$\alpha\pi\upsilon\sigma\epsilon\lambda\gamma\alpha$, Gr.] The abating or slackening of a fever.

APY'ROUS, *f.* a word applied to denote that property of some bodies, by which they resist the most violent fire without any sensible alteration. Apyrous bodies ought to be distinguished from those which are refractory. Refractory substances are those which cannot by violent heat be fused, whatever other alteration they may sustain. But a body, properly apyrous, can neither be fused by heat, nor can undergo any other change. Diamonds were long thought to be possessed of this property. But some late experiments have shewn, that diamonds may be entirely dissipated or evaporated by heat, and are therefore not intitled to be ranked among apyrous substances. Perhaps there is no body in nature essentially and rigorously apyrous; but it is sufficient that there be bodies apyrous relatively to the degree of fire which art can produce, to intitle them to that name.

A'QUA, *f.* [Lat.] A word signifying *water*, very much used in chemical writings.

AQUA FORTIS, a name given to an impure nitrous acid, commonly used by dyers, brass-founders, &c. and serves as a menstruum for dissolving of silver, and all other metals, except gold. It is usually contaminated with a small quantity of marine acid. The artists who use nitrous acid distinguish the common and less pure acid by the name of *aqua fortis*, and call the more concentrated acid *spirit of nitre*. This distinction appears to be of some utility, and is therefore not improperly retained by chemical writers. The manufacturers of soap in France and elsewhere call their *lixivium* or soap-les by the name of *strong water*; and this name, *eau forte*, being consequently used to denote the caustic alkali in recipes for dyeing and other processes, has given rise to several mistakes.

AQUA MARINA, or **AUGITES**, a precious stone of a transparent green-blue colour, fusible by the blow-pipe; it is nearly the same both in form and specific gravity with the *Peru emerald*, and the *chrysolite*. Its specific gravity is about 2.72, and its hardness nearly the same as that of quartz.

AQUA MIRABILIS. The wonderful water is prepared of cloves, galangals, cubebs, mace, cardomums, nutmegs, ginger, and spirit of wine, digested twenty-four hours, then distilled.

AQUA REGIA, or **REGIS**, an acid compounded of a mixture of the nitrous and marine acids, the bases of which, together with a certain portion of vital air different from what originally existed in the two acids, become combined in a manner which has not been clearly explained. When one or two parts of pale concentrated nitrous acid are mixed with four of marine acid, an effervescence soon takes place, and dephlogisticated marine acid flies off in the elastic form, at the same time that the mixture becomes of a deep red colour: it has obtained its name from its property of dissolving gold, the royal metal of the alchemists, which is not perceptibly acted upon by either of the acids which compose it. *Aqua regia* may be made by adding to nitrous acid any alkaline or earthy salt which contains the marine acid; for the affinity of the nitrous acid to the base being in most cases stronger than the marine, this last is set at liberty, and consequently the mixture, if the salt be not excessive in quantity, so as to engage the whole of the nitrous acid, will contain a certain portion of both acids at liberty. An *aqua regia* will therefore be produced, which is not essentially impaired with respect to common uses by the portion of neutral salt suspended in it. It is usual to make *aqua regia* by dissolving sal ammoniac in about four times its weight of strong nitrous acid; but the results of experiments must vary considerably according to the nature and proportions of the ingredients made use of.

The opinions and inferences of chemical writers respecting the nature of this mixed acid, are various. After the discovery of the dephlogisticated marine acid, it was concluded, that the nitrous acid performs the same office with respect to the marine as the manganese does; that is, in fact, that it either deprives the marine acid of phlogiston, or affords vital air to combine with it, or answers both these purposes. This general supposition is not however without several difficulties. If the marine acid be enabled to calcine and dissolve gold, because it has been dephlogisticated or aerated by the nitrous, it should follow much more strongly that the nitrous acid itself should dissolve that metal; whereas, in fact, it does not. And again, it has not been shewn how this dephlogisticated acid, which is so volatile, and so sparingly soluble in water, is retained in the solution; not to mention that no component part of the nitrous acid is found to escape during the effervescence, except the vital air which enters into the composition of the gas which flies off. When the two acids are in due proportion, *aqua regia* must therefore consist of marine acid and nitrous acid, which has an under-proportion of vital air, or is in the most fuming state; or, in other words, it contains the two bases of the acids, together with a less proportion

proportion of vital air than they possessed before mixture. But whether these principles combine, and form a compound acid, or in what other order they may be arranged, has not been experimentally determined, though the writings of chemists abound with conjectures upon this subject. The combinations of earths and alkalies, and even of metals, with aqua regia, have not been well examined. It is not known whether two different kinds of salts are formed apart from each other, or whether a triple combination takes place, consisting of two acids united to one base. It appears, however, that in some cases the result is one entire compound, and in others two separate ones.

AQUA SECUNDA, is a name sometimes given to an exceedingly-diluted aqua fortis, used in the arts for cleaning the surface of metals, and some other bodies.

AQUA-TETRACHYMAGO'CON, *f.* [of aqua, Lat. *τρίψα*, in compounds, four, *χυμῶς*, humour, and *αγωγός*, Gr. a leader.] A medicine purging the four humours of the body.

AQUA VITÆ, is commonly understood of what is otherwise called brandy, or spirit of wine, either simple, or prepared with aromatics. Some, however, distinguish between them; appropriating the term *brandy* to what is drawn from wine, or the grape; and *aqua vitæ* to that drawn after the same manner from malt, &c. For medicated and aromatic waters, see PHARMACY.

AQUÆ AUGUSTÆ, AQUÆ TARBEL'LICÆ, or AQUEN'SIS CIVITAS, in the Notitia, now *Aqs*, or *Dax*, a town in Gascony, on the river Adour, famous for its baths. Lat. 43. 56. N. lon. 1. 40. W.

AQUÆ BILBILITANÆ, baths twenty-four miles to the west of Bilbilis. Now *Banos de Alhama* in Arragon. *Antonine*.

AQUÆ CALIDÆ, or AQUÆ SOLIS, a place of the Belgæ in Britain, famous for its hot waters. Now *Bath*, in Somersetshire.

AQUÆ CALIDÆ, or AQUICALDEN'SIS, formerly a place in great repute, and a public bath; whose ruins still remain testimonies of the Roman grandeur. Now *Orense*, in Gallicia, still famous for its baths; on the river Minho, fifty-four miles south-east of Compostella. Lat. 42. 30. lon. 8. 30. W. Also a place in the bay of Carthage, *Strabo*. There are other Aquacaldenses, to the north of Gerunda, in Catalonia. *Ptolemy*.

AQUÆ CALIDÆ, a colony between the rivers Serbetes and Savus, in Mauretania Cæsariensis. *Ptolemy*.

AQUÆ CELEN'IE, or CI'LINÆ, now *Caldas*, a hamlet on the Minho, in Gallicia.

AQUÆ CONVENARUM, a hamlet of Gaul, in Aquitaine, and on the borders of the Convenæ, or le Cominge, at the foot of the Pyrenees, near the source of the Garonne; now *Bagnères*. Lat. 42. 20. lon. 3. 39. W.

AQUÆ CUTILÆ, a lake of the Sabines, in the territory of Reate, with a moveable island in it, supposed to be the centre of Italy. The waters were medicinal, and extremely cold, good for a weak stomach and weak nerves; they seemed to act by a kind of suction, which approached to a bite. *Pliny*. Vespasian used them every summer, and there he died. *Suetonius*.

AQUÆ FLAVIÆ, a town on the confines of Gallicia and Portugal, so called from Vespasian and Titus. The inhabitants called *Aquiflavienfes*. Now *Chaves*, a mean hamlet: but the ruins of its bridge testify its former grandeur. Lat. 41. 40. lon. 6. 6. W.

AQUÆ HELVETIÆ, described by Tacitus as a municipal town, and much frequented for its excellent waters; and, though he does not mention its name, Cluverius supposes it to be Baden, in Switzerland, or the river Limat, which falls into the Aar. It is called the Upper, to distinguish it from another called the Lower Baden, in Alsace. Lat. 47. 55. lon. 8. 49. E.

AQUÆ ME'ROM, famous for the defeat of Jabin: supposed to be the lake called *Samachonitis*, or *Semechonitis*, by Josephus; into which the river Jordan falls, before it comes to the sea of Genesareth, or Galilee.

AQUÆ PANNO'NIÆ, celebrated baths of Austria, now

called *Baden*, twenty-eight miles to the south of the city of Vienna.

AQUÆ PATAVINÆ, baths in the territory of Venice, near Padua, called *Fontes Aponi*; now *Bagni d'Abano*. Lat. 45. 15. lon. 13. 48. E.

AQUÆ QUINTIANÆ, now supposed to be *Sarria*, a town of Gallicia, on a rivulet of the same name, three leagues to the south of Lugo.

AQUÆ SEX'TIÆ, a colony to the north of Marseilles, so called both from the founder Sextus Calvinus, and from its quantity of water, and number of cold and hot springs; built after the defeat of the Salyes, or Salvii, whose territory in the south of Provence reached from the Rhone to the borders of Italy. By an inscription the colony appears to have been either increased or renewed by Augustus. In the Notitia it is called *Civitas Aquensis*; now *Aix*. Here the Teutones and Cimbri were defeated with great slaughter by Marius. Lat. 48. 4. lon. 6. 4. E.

AQUÆ SATIEL'LE, or SATIELLO'RUM, a town in Liguria, on the river Bormia; now *Aqui*, a town of Montserrat. Lat. 44. 45. lon. 8. 40. E.

AQUÆ TAURI, hot waters or baths in Tuscany, three miles from the sea, said to be discovered by a bull, whence the appellation; now *Aquapendente*, in Orvieto. Lat. 42. 40. lon. 12. 40. E.

AQUAM'BOË, one of the principal monarchies on the coast of Guinea in Africa, stretching twenty miles in breadth, and ten times that space in length from east to west. According to Bosman, the coast is divided into a great number of petty royalties, but all of them subject to the king of Aquamboe, who indiscriminately uses an unlimited authority over them. His despotism gave rise to a proverbial saying, that "there are only two ranks of men at Aquamboe; the royal family, and slaves." The natives of this country are haughty, turbulent, and warlike; and their power is formidable to all the neighbouring nations.

AQUA-NE'GRA, a town of Italy, on the river Chiesia, twelve miles west of Mantua. Lat. 45. 12. N. lon. 10. 25. E.

AQUAPENDENTE. See FABRICIUS.

AQUA'PIM, a Danish settlement on the western coast of Africa, founded by D. Ifert, conformable to an edict of his Danish majesty, dated the 7th of November, 1792, which provides for the abolition of the slave-trade in his dominions, opens the Danish African ports to all nations, and ordains the establishment of a colony, in which the introduction of hired labour should be attempted, and every labourer be free. This edict is said to have been suggested by the humane count Bernstorff, as an experiment to try whether the African negroes might not be induced to civilization, and voluntary labour, and to embrace the Christian religion, by putting them on the same footing with husbandmen and hired servants in free countries. Social improvement, indeed, is but progressive; and, though its advancement may not be perceptible to vulgar eyes, yet the philosopher will trace it by comparing the present with the past; and the Christian will rest satisfied, that every real improvement which, in the course of Providence, has once been begun, will in due time, arrive at perfection.

AQUA'RIANS, Christians in the primitive church who consecrated water in the eucharist instead of wine. This they did under pretence of abstinence and temperance; or, because they thought it universally unlawful to eat flesh or drink wine. Epiphanius calls them *Encratites*, from their abstinence; St. Austin, *Aquarians*, from their use of water; and Theodoret, who says they sprung from Tatian, *Hydropostata*, because they offered water instead of wine.

AQUA'RIOUS, in astronomy, one of the celestial constellations, being the eleventh sign in the zodiac, reckoning from Aries, and is marked by the character ♒, representing part of a stream of water, issuing from the vessel of Aquarius, or the water-pourer. This sign also gives name to the eleventh part of the ecliptic, through which the sun moves in part of the months of January and February. The poets feign that Aquarius was Ganymede, whom

whom Jupiter ravished under the shape of an eagle, and carried away into heaven to serve as a cup-bearer, instead of Hebe and Vulcan; whence the name. Others hold, that the sign was thus called, because that, when it appears in the horizon, the weather commonly proves rainy. The stars in the constellation Aquarius, are, in Ptolemy's catalogue, forty-five; in Tycho's, forty-one; in Hevelius's, forty-seven; and, in Flamsteed's, 108.

AQUAR'TIA, f. [so named by Jacquin, in honour of his friend *Aquart*, merchant of Martinico, who assisted him in his botanical researches.] In botany, a genus of the tetrandria monogynia class, ranking in the natural order of solanæ. The generic characters are—Calyx: perianthium monophyllous, permanent; tube bell-shaped; limb subquadrid, expanding; two opposite divisions obsolete. Corolla: monopetalous, rotate; tube very short; limb quadrid; divisions linear, widely spreading. Stamina: filaments short; antheræ erect, very large, linear. Pistillum: germ ovate; style filiform, declined, the length of corolla; stigma simple. Pericarpium: berry globular, one-celled. Seeds: very many, compressed—*Essential Character.* Calyx, bell-shaped; corolla, wheel-shaped with linear divisions; berry, many-seeded.

There is but one species, known by the name of *aquartia aculeata*. It is a perennial aculeate plant, unarmed at top. Leaves alternate, ovate, obtuse, petioled. The stature of *solanum*. A native of South America. Swartz is of opinion, that it is rather a species of *solanum*, with four stamens to the flower; differing from it in number, in the segments of the corolla being linear, and the calyx bell-shaped; the habit however is quite the same.

AQUATIC, adj. [*aquaticus*, Lat. from *aqua*, water.] That which inhabits the water.—The vast variety of worms found in animals, as well terrestrial as aquatic, are taken into their bodies by meats and drinks. Ray.—Applied to plants, that which grows in the water.—Flags, and such-like *aquatics*, are best destroyed by draining. *Mortimer*.

A'QUATILE, adj. [*aquatilis*, Lat.] That which inhabits the water.—We behold many millions of the *aquatile* or water frog in ditches and standing plashe. *Brown*.

AQUATINTA, f. a method of etching on copper, lately invented, and by which a soft and beautiful effect is produced, resembling a fine drawing in water-colours or Indian ink. Previous to the operation upon the plate, the following powder must be prepared. Take equal parts of asphaltum and fine transparent rosin, and powder them separately in a mortar. Through a muslin sieve sift upon a sheet of paper a thin stratum of the asphaltum, above which sift a similar layer of the rosin, and upon this another layer of asphaltum, continuing these alternate layers till both of the powders are exhausted. Then pass the mixture both together through the same sieve so as to mix them sufficiently for use. Some, instead of the above mixture, used powdered gum sandarach only.

The process is as follows: A copper plate being polished in the usual way, lay the etching-ground upon it, and etch the outlines of your design in the manner directed under the article **ETCHING**. The ground is then to be softened with a little greafe, and wiped off with a piece of rag; leaving, however, as much greafe upon the plate as just to dim the copper. Next sift the powder upon the surface of the plate; after which, strike the other side of it pretty smartly against the edge of a table to discharge it of the loose powder. This done, with a hand-vice hold the back of the plate over a chaffing-dish of burning charcoal, till it becomes so hot as to give pain upon being touched with the back of the hand; and the powder which adhered to the greafe will now be fixed to the plate. The plate being then suffered to cool, take turpentine-varnish mixed with ivory black; and with a hair-pencil dipped in it cover all the lights or places where there is no work or shade. A rim or border of bees-wax is now to be raised round the plate; and, having reduced a quantity of aquafortis to a proper strength with water, pour it on, and let it stand five minutes for the first or lightest shade; after which,

pour it off; and, having washed the plate with water, let it edgewise to dry. Then with varnish stop out all the light shades, pour on the aqua fortis for the second tint, and let it stand five minutes more; proceeding in the same manner for every tint till you produce the darkest shades. If a bold open ground is wanted in any part, this requires an after-operation. The ground must be laid as in the other case, by sifting on the powder; only this powder must be much coarser, and the plate more heated in order that the particles of the powder may spread, and form small circles: even good clean rosin will do by itself. In etching landscapes, the sky and distant objects are also performed by a second operation, and the powder is sifted upon the plate with a finer sieve. If the trees or any part of the fore-ground require to be finished higher, the plate must be entirely cleaned from greafe with bread, and a ground laid in the common way of etching; when you may finish as highly and neatly as you please with the needle or point, by stippling with dots, and biting in those parts, or by a rolling-wheel, which is more expeditious.

If different colours are to be expressed in aquatinta, there will be required so many different plates, each having only that part etched upon it which is designed to be charged with its proper colour. It may happen however in particular subjects that some of the colours are so distant from each other as to allow the printer room to rub them in without blending; in which case, two or three different colours may be printed from the same plate at once. Where different plates are necessary, a separate one, having a pin in each corner, must be provided as a sole or bottom to the aquatinta plates; and these again must be exactly fitted, having each a small hole in their corners for passing over the pins of the sole: the said pins serving the double purpose of retaining the plates successively in their due position, and of directing the printer in placing the paper exactly on each plate so as not to shift; by which means each tint or colour will be exactly received on its proper place. This is the method practised with so much beauty and effect in France. A landscape or any similar subject may be printed off at once in its different proper colours, by laying these upon the plate. In this case, the colours must be pretty thick in their consistence; and the plate must be carefully wiped in the usual way, after the laying on of each tint, as well as receive a general wipe when charged with all the tints.

The art of engraving in aquatinta is kept a secret by those artists who practise it. In order to succeed in it, great care and judgment are requisite; and much depends upon a certain nicety of management, which is only attainable by practice.

AQUAVIVA, a town of the kingdom of Naples, and province of Barri.

A'QUEDUCT, f. [*aquæductus*, Lat.] A conduit, or construction of stone or timber, built on an uneven ground, to preserve the level of water, and convey it, by a canal, from one place to another. Aqueducts are either visible, or subterraneous: visible, when constructed above-ground, and supported by arches or arcades; subterraneous, when formed by piercing through rocks or mountains, or any elevated ground; which, in the construction of navigable canals, is called **TUNNELLING**.

Aqueducts were long ago the wonders of Rome; the quantity of them which they had; the prodigious expence employed in conducting waters over arcades from one place to another, at the distance of even 100 miles, by cutting through mountains, and piercing rocks; were performances which justly excite our admiration. Appias the censor advised and constructed the first aqueduct. His example gave the public luxury a hint to cultivate these objects; and the force of prodigious and indefatigable labour diverted the courses of rivers and floods to Rome. Agrippa, in that year when he was ædile, put the last hand to the magnificence of these works. It is chiefly in this respect that the modern so much resembles the ancient city of Rome. For this advantage, she is peculiarly indebted to

to Sextus V. and Paul V. who for grandeur and magnificence, in repairing and beautifying the aqueducts, emulated the masters of the universe.

It has been a matter of surprise, that these aqueducts, which might have been directed in a straight line to the city, approach towards it by frequent and winding mazes. Some have said that this oblique track was pursued to avoid the expence which must attend the building of arcades to an extraordinary height: others, that it was their intention to diminish the impetuosity of the current, which, rolling in a straight line through an immense space, must always have increased its velocity, must have worn the canals by perpetual and forcible attrition, and of consequence afforded an impure and unwholesome draught to the inhabitants. But since there was so great a descent between the cascade of Tivoli and Rome, it is demanded why they drew water from the same river at the distance of more than twenty miles higher; nay, of more than thirty miles, if we reckon the curvatures of its direction through that mountainous country? It is replied, the motive of obtaining the water more salubrious, and more limpid, was sufficient to make the Romans think their labour necessary, and their expence properly bestowed; and to those who reflect that the waters of this river were impregnated with mineral particles, and by no means wholesome, the answer will appear satisfactory.

If any one will cast his eyes upon plate 128th of the Antiquities of Father Montfaucon, he will see with how much care these immense works were constructed. From distance to distance spiramenta were left, that, if the water should happen to be stopped by any accident, it might gradually disembogue, till they could clear its ordinary passage. There were likewise, even in the very canals which conveyed the water, cavities considerably deeper than its internal surface, into which the stream was precipitated, and where it remained stagnant till it was refined from mud and feculence; and ponds, where it might expand itself till it was purified.

The aqueduct of the *aqua Marcia* had an arch of sixteen feet in diameter. Above, there appeared two canals; of which the highest was fed by the waters of the Tivertine, and the lower by the *Clodian* river. The entire edifice is seventy Roman feet high. The arch of the aqueduct of the *aqua Claudia* is of hewn stone, very beautiful; that of the aqueduct of the *aqua Neronia* is of brick: they are each of them seventy-two Roman feet in height. The canal of the aqueduct which was called the *aqua Appia*, deserves to be mentioned for the singularity of its being much narrower at the lower than at the higher end. Nor must we forget to mention the aqueduct of Drusus, and that of Rimini, so celebrated in ancient Rome. We are told by Frontinus, a man of consular dignity, who had the superintendence of the aqueducts under the emperor Nerva, that nine of them emptied their waters into the city through 13,594 pipes, of an inch diameter each; and Vignere relates, that every twenty-four hours, Rome received no less than 300,000 hogsheads of water by means of her aqueducts!

The munificence of the Roman emperors, in providing their subjects with this necessary article of domestic comfort and cleanliness, was not merely confined to the capital, nor limited to their natural dominions. The luxury of excellent water was provided in a liberal manner to many cities that submitted to the Roman arms. Athens, the seat of Grecian glory and magnificence, was indebted to Rome for its most valuable supply of water. That city, even in the most flourishing state of its republic, had recourse only to wells, which were held so sacred, that, by a law of Solon, those only who lived contiguous to a well could claim the benefit of its waters. This defect was at length removed by the munificence of the emperor Adrian, who erected an aqueduct to supply all Athens with water, and which still bears his name; and is adorned with a frontispiece of the Ionic order, said to be a more correct specimen

of that style of ancient architecture than any Rome can furnish.

Another very surprising instance of human art and industry, is the aqueduct of Metz, of which a great number of arcades still remain. These arcades crossed the Moselle, a river which is very broad at that place. The copious sources of this aqueduct furnished water for the representation of a sea-fight. This water was collected in a reservoir: from thence it was conducted by subterraneous canals formed of hewn stone, and so spacious that a man could walk erect in them: it traversed the Moselle upon its superb and lofty arcades, which may be still seen at the distance of two leagues from Metz: so nicely wrought and so firmly cemented, that, except those parts in the middle which have been carried away by the ice, they have resisted, and will still resist, the severest shocks of the most violent seasons. From these arcades, other aqueducts conveyed the waters to the baths, and to the place where the naval engagement was represented. It is also said, that the aqueduct of Segovia, in Spain, may be recorded among the most admired labours of the Romans. It was built by the emperor Trajan, and is said to be the best preserved of all the Roman works. There still remain 159 arcades, wholly consisting of stones enormously large, and joined without mortar. These arcades, with the edifice, are 102 feet high; there are two ranges of arcades, one above another. The aqueduct flows through the city, and runs beneath the greatest number of houses which are at the lower end. The aqueduct which Louis XIV. caused to be built near Maintenon, in France, for carrying the river Eure to Versailles, is perhaps the greatest which now exists in the universe: it is 7000 fathoms in length, above 2560 in height, and contains 242 arcades.

A'QUEOUS, *adv.* [from *aqua*, Lat. water.] Watery. —The vehement fire requisite to its fusion, forced away all the *aqueous* and fugitive moisture. *Ray*.

AQUEOUS HUMOUR. See **ANATOMY**, p. 597.

A'QUEOUSNESS, *f.* [*aqueositas*, Lat.] Wateriness.

AQUIFOLIUM, *f.* in botany. See **LEX**.

A'QUILA, *f.* in ornithology, a synonyme of the eagle. See **FALCO**.

AQUILA, *f.* in astronomy, the *Eagle*, or the *Vulture*, as it is sometimes called, is a constellation of the northern hemisphere, usually joined with Antinous. It is one of the forty-eight old constellations, according to the division of which Hipparchus made his Catalogue of the Fixed Stars, and which are described by Ptolemy. The number of stars in Aquila, and those near it, now in the later-formed constellation Antinous, amount to fifteen in Ptolemy's Catalogue, to nineteen in Tycho's, to forty-two in that of Hevelius, and to seventy-one in Flamsteed's. But in Aquila alone, Tycho counts only twelve stars, and Hevelius twenty-three; the principal star being *Lucida Aquila*, and is between the first and second magnitude. The Greeks, as usual, relate various fables of this constellation, to make the science appear as of their own invention.

AQUILA, a city of Italy, and the capital of Abruzzo, seated on the banks of the river Pescara, near its source. It has an ancient castle, and is a bishop's see immediately under the pope. The land about it produces great plenty of saffron. It was very near being destroyed by an earthquake, in February, 1703. The first shock was so terrible, that the inhabitants abandoned the city; but returning to vespers, it being Candlemas-day, the shocks followed one another with such violence, that 24,000 people perished; 800 were killed in one single church; many other churches, monasteries, and noble buildings, were either swallowed up or overturned, together with the greater part of the city and its walls. Aquila stands thirty miles from the sea, and fifty-two N. E. of Rome. Lat. 42. 20. N. lon. 13. 39. E.

AQUILA-DEL-CAMPO, a small town of Old Castile.

AQUILARIA, *f.* [*aquila*, Lat. an eagle; in French, *bois d'aigle*, eagle-wood, from its lofty situation.] In botany,

tany, a genus of the dicandria monogynia class. The generic characters are—Calyx: perianthium one-leaved, permanent; tube bell-shaped; border five-cleft; clefts ovate, acute, flat, spreading; nectary one-leaved, pitcher-shaped, length of the tube of the calyx, half five-cleft; clefts bifid, obtuse. Stamina: filaments ten, alternate to the clefts of the nectary, and shorter than them; antheræ oblong, versatile. Pistillum: germ ovate, on a very short pedicel, superior; style none; stigma simple. Pericarpium: capsule on a very short pedicel, obovate, woody, two-celled, two-valved; with the partition contrary and bipartite. Seeds: solitary, oblong.—*Essential Character.* Calyx, five-cleft; nectary pitcher-shaped, half five-cleft, with bifid clefts; capsule superior, woody, two-celled, two-valved; seeds solitary.

There is only one species, called *agularia ovata*: it is a large tree, with the trunk and branches erect, and covered with a brown or grey bark, smooth except towards the ends of the twigs, which are villose; leaves alternate, about eight inches in length, quite entire, very smooth, somewhat coriaceous, having one branched nerve, and very fine veins; the petioles are short and hairy; there are no stipules: flowers terminating, on many-flowered peduncles. The wood of the tree is white and inodorous. Native of the mountains of Malacca and Cochinchina. The *aroma* of aloes-wood is a disease, caused by oleaginous particles stagnating and concreting in the inner parts of the trunk and branches into a resin, by which means the natural appearance of the wood is altered as to colour, smell, &c. till at length the tree dies, and when split the valuable resin is taken out of it. No part of the tree is lactescent or poisonous. All the true *lignum aloes*, so called, proceed from this tree, even the most valuable, which is commonly called *calumbac*, and is found in the mountains of Champava, belonging to Cochinchina. The inferior species, or rather varieties, are less rare, and are found in various places. Perfumes from this wood are highly esteemed by the oriental nations, and from the bark of the tree is made the common paper which the Cochinchinese use for writing, in the same manner as in Japan from the bark of the mulberry (*morus papyrifera*). This perfume is said to be good in vertigo and palsy: the powder restrains vomiting and fluxes, and particularly henteries; this it brings about, not by astringing, properly speaking, but by its corroborating power. It has the name of *lignum aloes*, or *wood aloe*, from its bitter taste.

AQUILEGIA, *f.* [from *aquila*, Lat. an eagle; because the nectaries are fancied to resemble an eagle's claws. Our English name, *columbine*, is derived from the resemblance which the same parts bear, both in form and colour, in the wild state, to the head and neck of a pigeon, *columba*.] In botany, a genus of the polyandria pentagynia class, in the natural order of multifloræ or corniculatæ. The generic characters are—Corolla: petals five, lanceolate-ovate, flat, spreading, equal; nectaries five, equal, alternate with the petals; each horned, gradually broader upwards, with an oblique mouth, ascending outwardly, annexed inwardly to the receptacle; produced below into a long attenuated tube, with an obtuse top. Stamina: filaments thirty to forty, subulate, the outer one shorter; antheræ oblong, erect, the height of the nectaries. Pistillum: germs five, ovate-oblong, ending in subulate styles, longer than the stamens; stigmas erect, simple; chaffs ten, wrinkled, short, separate, and involving the germs. Pericarpium: capsules five, distinct, cylindric, parallel, straight, acuminate, one-valved, gaping from the tops inward. Seeds: very many, ovate, keeled, annexed to the gaping future.—*Essential Character.* Petals five; nectaries five, horned, between the petals; capsules five, distinct.

Species. 1. *Aquilegia viscosa*, or clammy columbine: stem almost naked, with viscid hairs, and one or two flowers; leaves subtrilobate. Root perennial; stem a foot high at most, hispid with glutinous hairs, quite simple, or with only a single branch or two. Petioles from an inch to three inches in length, with viscid hairs like the stem,

proceeding from wide, coloured, stem-clasping, sheaths. The first root-leaf palmate-three-lobed, the divisions two-lobed or three-lobed; the other root-leaves, which are four or five in number, ternate, the leaflets equally petioled, blunt, digitate-three-parted; the lateral segments three-lobed or four-lobed; the middle ones always three-lobed. Stem-leaf one only, or seldom two, ternate; the leaflets quite entire, lanceolate, the middle one longest. Peduncles usually two, one axillary, the other terminating, one-flowered. Nectary curved inwards. Capsules five, viscid, with netted veins. It varies with a short, one-flowered, leafless, stem. Native of the south of France, and the mountains of Piedmont.

2. *Aquilegia vulgaris*, or common columbine: nectaries incurved. Stem three feet high, erect, branching, leafy, somewhat angular; leaves smooth, glaucous underneath; the lower ones petiolate, biternate; the leaflets roundish, trilobate, gashed, and notched; the upper ones digitate, the lobes oval and quite entire; the radical petioles very long. The flowers are produced from the tops of the naked branches, and hang down; they have generally six pistils and eight nectaries. There are many varieties of this species. The usual colour of the flowers in their wild state is blue, but Haller says the red is common about Berne; white ones are also seen about Berne. Mr. Woodward has found both red and white flowers in Norfolk. Haller mentions double flowers occurring in the Pays de Vaud. The columbine is found native in most parts of Europe, in woods, hedges, and among bushes. It is perennial; and flowers with us in June. The flowers vary much by culture; and become double either by multiplying the petals, or the nectaries. Of all these varieties, there are subordinate variations, both in the degree of doubleness, as with two or more rows of petals, two or three rows of nectaries, curiously inserted one into the other; and in the colours, as blue, white, red, purple, flesh-coloured, ash-coloured, chestnut-coloured, and striped or variegated blue and purple, blue and white, red and white. From the different shape of these flowers, persons not well skilled in the culture of plants might suppose they were distinct species. The root, the herb, the flowers, the seeds, have been recommended to be used medicinally, on good authority; but this plant is of a suspicious tribe, and Linneus affirms, as of his own knowledge, that children have lost their lives by an over-dose of it. The sensible qualities of the seeds, says Lewis, afford little foundation for their supposed virtues in the jaundice, measles, and small-pox; as they do not seem to differ materially from those of the cold seeds, being only somewhat more mucilaginous, with a disagreeable relish. The virtues ascribed to a tincture of the flowers, as an antiphlogistic, and for strengthening the gums, and detaching scorbutic ulcers in the mouth, appear to be better founded; the tincture being made with an addition of the vitriolic acid, and differing little from our official tincture of roses. The flowers themselves, as well as the conserve and distilled water of them, directed in some foreign pharmacopœias, are insignificant.

3. *Aquilegia alpina*, or Alpine columbine: nectaries straight, shorter than the lanceolate petal. Root biennial; leaves biternate, tender, and smaller than in the common sort; the leaflets multifid; the lobes sublinear and blunt, with the appearance and tenderness of Canadian columbine. The leaflets in the common sort are trifid, but in this they are ternate; or they have one pair of sessile lobes, with the odd lobe petioled and trifid; the middle segment again trifid, and the side ones bifid; the middle segment, and the uppermost of the side ones, three-toothed; the side-lobes are of the same form, but only bifid; all the teeth are roundish. In common columbine the petioles are twice trifid, and all the lobes petioled; in this the side-leaves are sessile, and the lobes more deeply cut. The corollas are blue, with the tips of the petals yellowish green; the anterior part of the nectaries paler blue; the claws of the petals whitish within. According to Haller and Al-lioni, the nectaries are bent in at the end. The former of these

these adds, that the stem is only a foot or at most eighteen inches high, that the divisions of the leaves are linear, not rounded, and that there are only one or two flowers on a stem. They both are of opinion, that the Alpine columbine is distinct from the common sort. Native of the Alps of Switzerland and Savoy: said also to be found in Westmoreland. It flowers in May and June.

4. *Aquilegia canadensis*, or Canadian columbine: nectaries straight, stamens longer than the corolla. Root perennial; stems very slender, reddish; leaves of the same form and size with those of thalictrum, or meadow rue; the lower ones biternate, irregularly divided, the extreme lobes blunt; the upper ones simply ternate, toothed, or quite entire; the uppermost simple, lanceolate, acuminate. Corollas yellow within, and red on the outside. Native of Virginia, Canada, and most of the northern parts of America. It flowers in April, and the seeds ripen in August. Introduced before the year 1640, by Mr. John Tradescant, sen.

5. *Aquilegia viridiflora*, or green-flowered columbine: nectaries straight, thickened, and a little bent in at the tip; stamens nearly equal to the corolla. Root perennial; stems a foot high or more, upright, slightly angular and villose; leaves biternate, petioled; leaflets frequently two-lobed, gashed, blunt, pale green underneath: flowering peduncles nodding, short, fruiting ones erect. Petals pale green, wrinkled, shorter than the borders of the nectaries, which are greenish yellow within, and brownish on the outside, the border cordate-wedge-shaped, the horn subulate and straight, blunt, and a little bent in at the end. Stamens shorter by half than the corolla. Styles longer than the corolla. Germs five, with brownish styles, surrounded with ten subulate, acuminate, white, wrinkled, pellucid, chaffs. The whole plant is smooth; it flowers in May, and the seeds ripen in July. Native of Siberia; where it was found by Pallas.

Propagation and Culture. These plants are all raised by sowing the seeds, or parting the old roots, but the former method is chiefly practised; for the old roots are very apt to degenerate after they have blown two or three years, so as to become quite plain. The seeds should be sown in a nursery-bed in August or September, for the seeds which are kept till spring seldom grow well, or at least remain in the ground a whole year. The spring following the plants will appear above ground, therefore should be kept clear from weeds, and, if the season should be dry, they must be refreshed with water, that they may gather strength. In the middle or latter end of May, these plants will be strong enough to transplant; therefore some beds of good fresh undunged earth should be prepared, planting them therein at eight or nine inches distance every way, keeping them clear from weeds, and refreshing them with a little water, as they may require it. In the following autumn, by which time the plants will have acquired strength enough to flower the summer following, the roots should be carefully taken up, and planted in the borders of the flower-garden; but, where their roots are designed to be preserved in perfection, all their flower-stems should be cut off, as soon as the flowers are past, to prevent their degenerating by the mixture of the farina from other flowers. But, in order to be sure of having no single or bad flowers in the borders, you may suffer the plants to remain in the nursery-beds until they have blown; at which time you may put a stick by each root you fancy to preserve, or pull out all the single or bad-coloured ones, and throw them away, cutting off all the flowers from your best roots as soon as they have shewn themselves, which will greatly add to the preserving them fair in their colours. In order to keep up a succession of good flowers, fresh seeds should be sown every year; and, if you can meet with a friend at some distance, who is furnished with good flowers of this kind, it will be very advantageous to both parties, to exchange seeds once in two years, by which means they will not be so apt to degenerate into plain colours. In sowing the seeds of the variegated columbines, great care should be taken

not to suffer any plain flowers to remain for seed, there being generally some plain flowers intermixed with the striped ones on the same plant, and often in the same branches: these should be cut off, for, if they are permitted to seed, or if their farina impregnate the striped flowers, they will degenerate into plain colours; so that there cannot be too much care taken in sowing the seeds, where the beauty of their flowers are regarded. The Canada columbine flowers almost a month before the other sorts; for which reason it is preserved in the gardens of the curious, though there is no great beauty in the flowers. There is another variety of this with taller flower-stems, which flowers a little after the other, but does not differ either in the shape of its flowers or leaves from this; therefore I conclude that they are but one species. The Canada columbines flower in April, and their seeds ripen the beginning of August. The other sorts flower towards the end of May, and in cool seasons will continue to produce flowers till the middle of July, and the seeds ripen towards the middle or end of September, according as the season proves more or less favourable.

AQUILEIA, a large city of the Carni, or Veneti, and a noble Roman colony, which was led thither between the first and second Macedonian wars. It was washed by two rivers, the Natiso and Turrus. The reason of leading this colony was, in order to be a bulwark against the neighbouring barbarians. The colony was afterwards increased with 1500 families by a decree of the senate; from which it became a very famous port-town. The emperor Julian ascribes the appellation to the augury of an eagle at the time of building it; but Isaac Vossius on Mela, to the great plenty of water, as if the town were called *Aquilegia*. The harbour, at the mouth of the Natiso, is distant sixty stadia from the city, so that ships of burden are towed up the river. In 452, it was besieged by Attila, with an innumerable host of barbarians. The walls were assaulted by a formidable train of battering-rams, moveable turrets, and engines, that threw stones, darts, and fire; and the monarch of the Huns employed the forcible impulse of hope, fear, emulation, and interest, to subvert the only barrier which delayed the conquest of Italy. Aquileia was at that period one of the richest, the most populous, and the strongest, of the maritime cities of the Adriatic coast. Three months were consumed without effect in the siege; till the want of provisions, and the clamours of his army, compelled Attila to relinquish the enterprize, and reluctantly to issue his orders that the troops should strike their tents the next morning and begin their retreat. But, as he rode round the walls, pensive, angry, and disappointed, he observed a stork preparing to leave her nest in one of the towers, and to fly with her infant family towards the country. He seized, with the ready penetration of a statesman, this trifling incident which chance had offered to superstition; and exclaimed, in a loud and cheerful tone, that such a domestic bird, so constantly attached to human society, would never have abandoned her ancient seats, unless those towers had been devoted to impending ruin and solitude. The favourable omen inspired an assurance of victory; the siege was renewed, and prosecuted with fresh vigour; a large breach was made in that part of the wall from whence the stork had taken her flight; the Huns mounted to the assault with irresistible fury; and the succeeding generation could scarcely discover the ruins of Aquileia. The place, however, is still called *Aquileia*, and there are several inscriptions and antiquities to be seen in it, which are worthy of a traveller's notice; and, though dwindled into a poor village, it gives a title to the patriarch of Aquileia. The patriarch is named by the Venetians, and resides at Udino, because the town of Aquileia belongs to the house of Austria. It is situated fifty-seven miles N. E. of Venice. Lat. 46. 0. N. lon. 13. 8. E.

AQUILICIA, *f.* in botany. See *LEE*.

AQUILICIUM, or *AQUILICIANA*, *f.* in Roman antiquity, sacrifices performed in times of excessive drought, to invoke rain from the gods.

AQUILIFER,

AQUILIFER, *f.* A standard-bearer of the Roman army, the picture of an eagle being in his colours; a cornet or ensign.

A'QUILINE, *adj.* [*aquilinus*, Lat. from *aquila*, an eagle.] Resembling an eagle; when applied to the nose, hooked: His nose was *aquiline*, his eyes were blue, Ruddy his lips, and fresh and fair his hue. *Dryden.*

Gryps signifies some kind of eagle or vulture; from whence the epithet *grypus* for an hooked or *aquiline* nose.

A'QUILLO, *f.* is used by Vitruvius for the north-east wind; or that which blows at 45° from the north towards the east point of the horizon. The poets gave the name *aquilo* to all stormy winds dreaded by the mariner.

A'QUILUS, *f.* among the ancients, a dark or dusky colour approaching to black. Hence some of the heathen gods were called *dei aquili*, q. d. *nigri*.

AQUIMINARIUM, *f.* in antiquity, a kind of lustral vessel, wherein the Romans carried their holy water for expiation and other religious offices.

AQUINAS (St. Thomas), styled the *Angelical Doctor*, was of the ancient and noble family of the counts of Aquino, descended from the kings of Sicily and Arragon, and was born in the castle of Aquino, in the Terra di Lavorna, in Italy, in the year 1224 or 1225. He entered into the order of Dominicans; and, after having taught school-divinity in most of the universities of Italy, at last settled at Naples, where he spent the rest of his life in study and acts of piety; and was so averse to ambition or profit, that he refused the archbishopric of that city, offered him by pope Clement IV. He died in 1274, leaving an amazing number of manuscripts, which were printed at Venice, in seventeen volumes folio, in the year 1490. He was canonized by pope John XXII. in the year 1323; and Pius V. who was of the same order with him, gave him, in 1567, the title of the *fifth doctor of the church*, and appointed his festival to be kept with the same solemnity as those of the other four doctors. His authority has always been of great importance in the schools of the Roman catholics. Lord Herbert, in his *Life of Henry VIII.* tells us, that one of the principal reasons which induced that king to write against Luther was, that the latter had spoken contemptuously of Aquinas. This extraordinary person, like many men of great talents, shewed in his early youth none of that liveliness and vivacity of disposition which is but too often mistaken for quick parts. He was called by his companions *le bœuf muet*, "the silent ox;" but his master, Albert the Great, more capable of distinguishing, used to say of him to those who gave him that appellation: *Les doctes mugissemens de ce bœuf retentiroient un jour dans l'univers*: "The learned bellowings of this ox will one day be heard through the world." St. Thomas, possessing an ardent mind, devoted it to the studies then in vogue, scholastic philosophy and theology: in the latter, indeed, he was so eminently successful, that Bucer said of him: *Tolle Thomam, ecclesiam Romanam subvertetrem*: "Take away Thomas, and I will effect the downfall of the Romish church." It is to be observed that this speech has a double meaning, as the word *Thomam* may be taken to mean the holy volume, or the Bible, as well as *Thomas*.

St. Thomas was one day with pope Innocent IV. in his

closet, when an officer of his chancery came in with a bag of gold, procured by absolutions and indulgences. The pope profanely said, "See, young man, the church is not what it was in the times when it used to say, Silver and gold have I none."—"Holy father, that is very true, indeed," replied St. Thomas, "but then it cannot say to the poor afflicted with the palsy, Rise, take up thy bed and walk."

A'QUINO (Philip d'), in Latin *Aquinas*, or *Aquinus*, having turned from Judaism, had a pension from the clergy of France, and acquired much reputation by his knowledge of the Hebrew language, which he taught at Paris, in the reign of Louis XIII. and by the books he published, among which is his *Dictionarium Hebraeo-Chaldaeo-Thaludico-Rabbinicum*. His grandson, Anthony d'Anquin, was first physician to Louis XIV.

AQUINO, a town in Italy, in the kingdom of Naples, and Terra di Lavorna; a bishop's see, but ruined by the emperor Conrade. It was the birth-place of the poet Juvenal, and of Thomas Aquinas. It was anciently called *Aquinum*, and was a Roman colony. Lat. 41. 32. N. lon. 14. 30. E.

AQUITA'NIA, was anciently one of the three principal divisions of Gallia Comata, bounded by the Garonne, the Pyrenees, and the Ocean; this is the *Aquitania Casariiana*, or *Vetus*. Augustus set the different boundaries, viz. the Loire, the Cevennes, the Pyrenees, and the Ocean. It was called *Gallia Aquitanica*; and in the old Notitiae, *Provincia Aquitanica*. Now comprising Guienne (which seems to be a corruption of Aquitania) and Gascony.

AQUO'SE, *adj.* [from *aqua*, Lat.] Watery; having the quality of water.

AQUO'SITY, *f.* [from *aquose*.] Wateriness.

A. R. anno regni; that is, the year of the reign; as, A. R. G. R. 20. *Anno regni Georgii regis vigesimo*, in the twentieth year of the reign of king George.

AR, the metropolis of Moab, in Arabia Petrea; and the royal residence situate on the east side of the river Arnon. It was called also *Rabba*; and, to distinguish it from Rabba of the Ammonites, *Rabbat Moab*, and on coins *Rabbath Moma*. Eusebius says it was called *Arcopolis* in his time, from *Ar* and *Polis*. The inhabitants are called *Arcopolitae*. St. Jerome says, that this city was entirely destroyed by an earthquake when he was a young man.

A'RA, *f.* in astronomy, the *Altar*, one of the forty-eight old constellations, mentioned by the ancient astronomers, and is situated in the southern hemisphere; containing only seven stars in Ptolemy's Catalogue, and nine in that of Flamsteed; none of which exceed the fourth magnitude.

ARABELLA, [of *ara* and *bella*, Lat. i. e. a fair altar.] A proper name of women.

ARABES'QUE, or **ARABES'K**, *f.* something done after the manner of the Arabians. *Arabesque*, *Grotesque*, and *Moreque*, are terms applied to such paintings, ornaments of friezes, &c. wherein there are no human or animal figures, but which consist wholly of imaginary foliages, plants, stalks, &c. The words take their rise from hence, that the Moors, Arabs, and other Mahometans, use these kinds of ornaments; their religion forbidding them to make any images or figures of men or other animals.

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